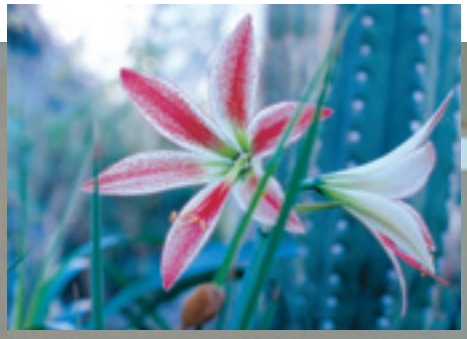
Nokia Global Training

Training Catalogue 2004



NOKIA

CONNECTING PEOPLE

Meeting the challenge of continuous development

Telecommunications companies are facing a challenging period during which they must maintain continuous development in a difficult business environment to ensure their competitiveness today and into the future.

Many companies recognize the importance of continuously developing the competence of their organization. It is vital that the capability to operate is not compromised even though the number of personnel available may be limited. Personnel working in this environment turn out to be a company's most important asset, making it ever more important that companies are able to retain their best people.

Yet the telecommunications industry is undergoing continuous change, driven by digital convergence and increasing mobility. This sets new challenges for competence development. It is more important than ever to ensure that people are ready to take on these new challenges.

In such a situation, the investment in people must be as cost-effective as possible. Planning competence development therefore plays a critical role. Furthermore, follow-up to ensure that the required capabilities have been achieved is important. It is no longer enough just to apply the training and assume that people are then capable of doing what is needed; it must be possible to verify that this is really the case.

Today's businesses often comprise complex value networks, alliances and partnerships that also require new abilities to be able to work together effectively. In this environment, trust is an important aspect and new ways to build trust between companies are needed. We believe that certification of competence development is an essential tool for building trust in people's abilities to work in these new and demanding environments.

Nokia is committed to supporting its customers' business through a full and high-quality range of competence development services. We hope our commitment is illustrated in this document. In addition to our existing portfolio, we are working hard to develop solutions that will open up new, efficient and effective opportunities to enable you to meet the challenges of the future. Nokia Customer Training is working for you.

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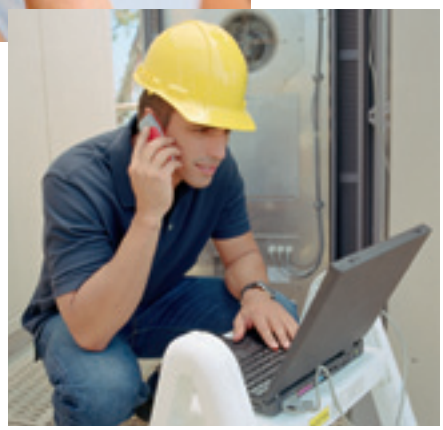


Nokia Training Services

The right training solution for your needs

In Nokia Training Services, we follow a simple philosophy: right training, for the right people, at the right time at the right price. To meet your needs we provide the full range of competence development services for all Nokia Networks' customers and partners. With over 20 years of experience in providing education in one of the fastest growing industries in the past decade, we have a vast amount of know-how, but also understand the importance of change.

Our services form a unique integrated approach that includes the analysis and identification of your competence needs, planning of competence development solutions, delivery of the solutions and further analysis of the delivery and competence for future needs.

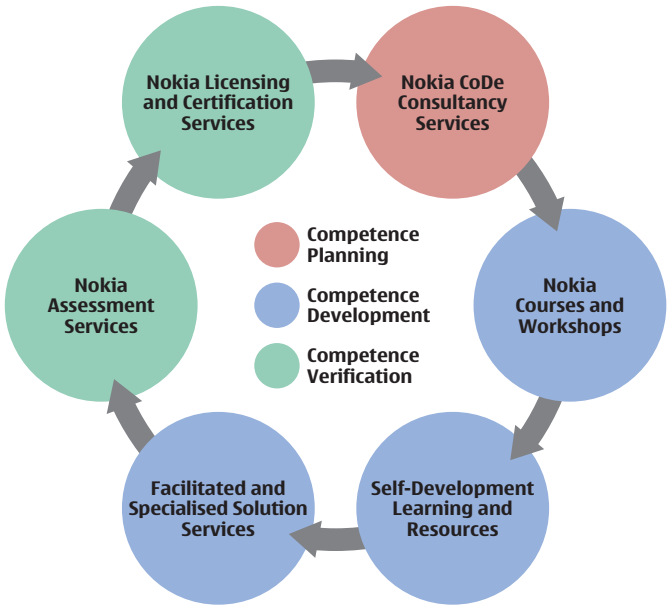
Programs are created in a modular fashion to ensure flexibility in delivery. They are continuously being developed to include the latest changes in technology/ products and to incorporate the best learning trends. In addition, our solutions are adapted to a variety of learning styles, using a combination of alternative learning channels.

Our team of specialized trainers are also continually developing themselves to ensure that they possess the industry leading technical and training skills needed to deliver a professional service of high quality. We maintain an established network of training suppliers to ensure we can provide a complete portfolio by using experts from specialized areas.

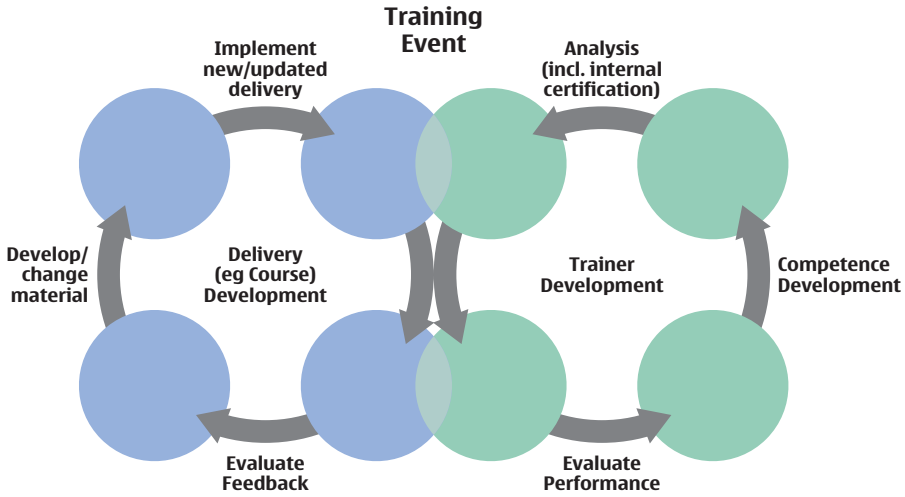
Full range of solutions to develop industry leading class professionals

We provided training for over 30 000 participants last year, from our catalogue of over 180 products and even more customized programs. Our training deliveries include a range of different types of courses, workshops, self-learning services and a series of seminars.

As our industry faces challenges, with more emphasis on cost and efficiency, training courses are only one part of our comprehensive service. We provide training consultancy and assessment services, enabling you to better manage your personnel development.



Manage and maximize your competence.



Continuous quality improvement.

Nokia's approach to continuous quality improvement

To meet your continuing needs, we in Nokia training implement a process of continuous development in all of our services. In 2003 we introduced a range of new e-functionality on NOLS to better help you manage your training. We have also improved the way we evaluate our services, by looking at the value and end-to-end performance of what we deliver.

Nokia training is BSI compliant and we implement a continuous feedback process where all the course and module evaluations are fed into the development cycle. We update the majority of training yearly with the release of new hardware and software, following which we ensure that our trainers go through a professional capability development program before introducing the updated or new course.

Flexibility in delivery

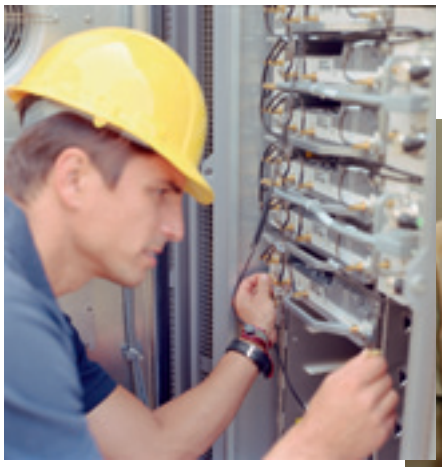
Nokia provides four options for purchasing training:

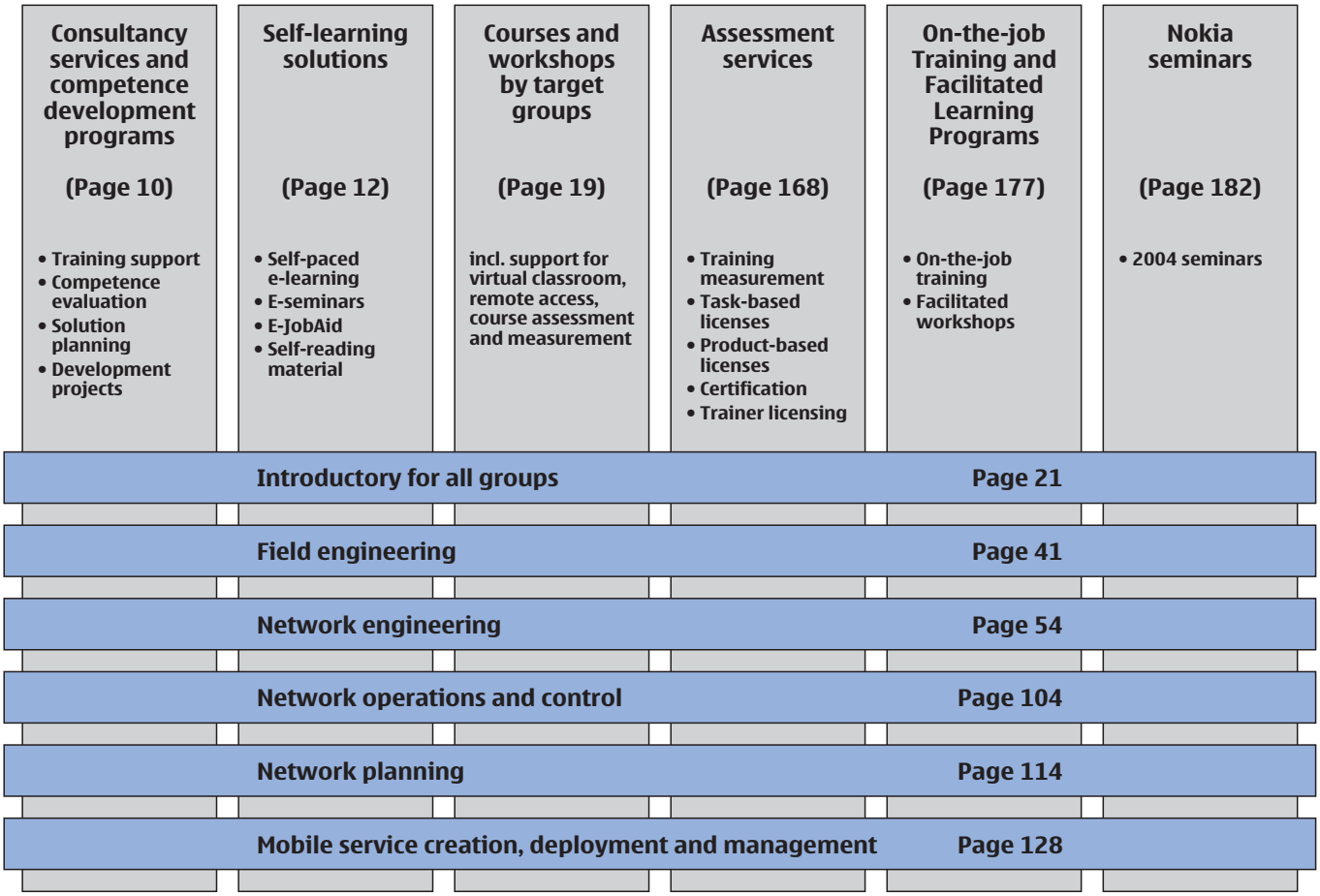
Dedicated Standard – Courses and workshops that you can purchase for participants only from your company.

Dedicated Customized – Tailored courses, designed for your needs and only delivered to you. This is ideal if you have a high training demand and understand the skills and knowledge you require.

Open Seats – The majority of our standard courses and workshops are available globally as open deliveries where you can buy seats. This is ideal for situations where you only have a small group of individuals who need training quickly – or a few experts who require specialized training.

Competence Development Project – When a large amount of competence development is required, then together we can launch a Competence Development Project that includes consultancy, planning, delivery and assessment for all your needs.





Nokia training solutions.

Finding your solution

Our comprehensive service portfolio is grouped into six categories that support all the target groups working with our products and solutions. Recommended learning solutions for each target group can be found in the courses and workshops section (page 19).

Our services are designed to inter-lock with one another – for example, the assessment services are for use with our courses and workshops.

What's new for 2004

With over 140 new products being introduced in 2004, we are further strengthening and deepening our diverse range of services designed to meet your needs in these challenging times. We have updated our recommended solutions, to include a further 82 advanced/expert trainings. In addition, our range of self-paced e-learning training has increased, with more support for multiple languages.

New innovative services for 2004

- Competence evaluation and profiling to improve your planning process
- Introduction of globally recognized license and certification programs
- Use of more web casting (recorded presentations) in our solutions
- Integration of e-JobAid to allow learning to continue after training
- More courses available through virtual classroom and remote access
- Facilitated workshops to better develop your experts

New solutions for you to maximize your learning

- Refresher training in the Base Station Subsystem (BSS), Radio Access Network (RAN) and Swithcing Core Network (SCN) areas to ensure your people are all up-to-date
- Self-reading material integrated into our solutions in many areas
- Course assessment and measurements available for you to better track learning efficiency
- Ability to manage all your training online, including new options for reporting through NOLS

Training solutions for new technologies

In 2004, we will see the continued deployment of 3G and EDGE in many parts of the world and as the technology becomes more established, so has our training solution. Also, in 2004 we will add training solutions for:

- IP Multimedia Subsystem (IMS), also known as Release 5
- New service opportunities, such as streaming and PoC (Push to talk over Cellular)
- Innovative evolutional solutions, such as Intelligent Content Delivery (ICD)
- Nokia FlexiServer will host a range of new upcoming products

Manage your training and learn online

We draw on our vast experience in all training areas, and bring this know how closer to you with a service, which is open 24 hours a day, 7 days a week. Our e-training services are made available through Nokia Online Services (NOLS), our e-business channel that complements our conventional services offering. You can access NOLS from anywhere you have Internet access. We provide the following e-training services:

Online course information

The information available contains course descriptions, maps, dates and number of available seats, both for our open standard courses and for your company's dedicated courses. Compared to this brochure, you always have the latest course information in NOLS. This information makes course scheduling easier and faster for both you and your line managers.

E-administration

E-administration is an optional service that allows you to manage your Nokia training through NOLS. You can make course requests for yourself or your personnel, for our open and your company's specific courses. You will receive our training proposals and order confirmation on the same channel. E-administration supports course approval processes inside your company with a sophisticated authority system. You do not need to spend a lot of time sending e-mails or talking on the phone to get the course you desire. You also now have one common place for your personnel's' training information and can see all their courses at once.

Benefits of e-administration

- Easy and quick to use
- Track and manage your training more effectively
- Always available

E-administration must be separately activated for your company – please contact our local training representative for training and configuration.

Unique training portal

Our training portal in NOLS gives you access to all the functions of online course information and e-administration. Furthermore, our training portal gives you access to

- Nokia Training Centers – get online information on how to find the way to your classroom courses
- Training news – read about the latest developments in our training offering
- Mailing lists – receive personalized training news by e-mail
- E-learning demos – test our e-learning offering
- Customized training plan and recommended flows by target group
- Access to e-assessment service
- Access to Nokia e-learning service

Improve your visibility to your training

There are several ways to get the latest information on which training is available for you. Our new mailing lists offer you personalized training news direct to your mailbox, a function that can be configured through our NOLS training portal. There are mailing lists covering the following training areas:

- Advanced 3G Radio Access Network (RAN) training
- Advanced Mobile Packet Core (MPC) training
- Advanced Circuit Switched Core Network (SCN) training
- What's new in Nokia e-learning?

Finally, 'What's new in Nokia training' sends you a summary of our training portal news, and a list of our available open course seats.

You can enrol on our mailing lists on NOLS (www.online.nokia.com). To get to the NOLS training portal, select 'Training' from the main navigation. Select 'My Settings' > 'Mailing List' from the navigation on the left and select the mailing list(s) of your choice. To make sure that your e-mail address is correct please go to 'My Profile' in the NOLS top navigation.

Nokia e-learning services

E-learning complements traditional training channels with an efficient and effective delivery method that is largely free from constraints of time and place. It enables personnel to learn at their own pace in the workplace or at home. In combination with classroom training it becomes 'blended learning'.

E-learning methods

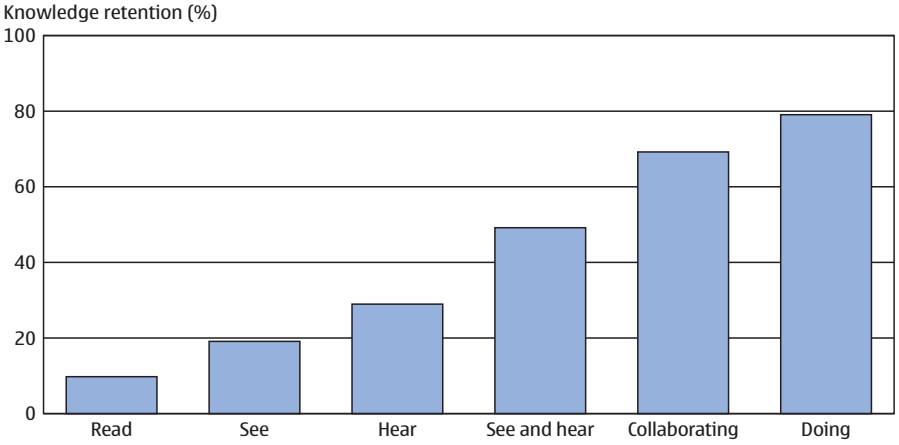
- **Self-paced e-learning programs** are ideal for providing underpinning knowledge. They can be used for preparing students for practical courses – classroom or virtual classroom.
  We use self-paced e-learning for introductory and system level training, for theory product training, as well as for training of new product releases.
  Self-paced e-learning offers interactive learning modules with audio narration and multimedia applications, while reference material allows deeper investigation of the training subject.
  Assessments verify the learning outcomes, and successful learners receive a diploma from us. Nokia may report the individual e-learning results.
- We now also offer our self-paced e-learning courses in selected local languages, such as Italian, Spanish, Chinese, and Japanese.
- **Recorded presentations – as if you were there?** For highly specialized training, the geographical location of the training is sometimes limited, or the training is of short duration and therefore not cost-effective. To meet these challenges, we are now recording these sessions and will make them available through our learning portal.
- **Question and Answer Forums** allow discussion of actual questions that appear during the learning process. They can be applied in combination with self-paced e-learning or with instructor-led training. With the Q&A Forum, the learning does not end when students leave the classroom.
- **Virtual classroom** (VC) allows online instructor-led training, allowing real-time interaction of participants and trainer without the need to travel.
  VC is ideal for sharing knowledge in a small interactive group. The use of Voice over IP makes it cost-effective, and extra features such as 'breakout rooms' make VC a highly interactive learning experience.
  VC may be applied for both theory and practice training – in the latter case, the learner is working with a connection to some training equipment in one of our Nokia Training Centers.
- **Online learning resources – the visual notes from the classroom.** In our practical training we focus on ensuring that the participant has the competence to perform the tasks as set in the objectives. However, as the training can be intensive, the participant may not have time to practice or reflect on what he/she has learnt before being expected to perform the same tasks on a live network. The online resources will include E-JobAid of procedures that are covered in the classroom training, yet the individual can easily follow them step-by-step in the real working environment. The E-JobAid is also supported by a Question and Answer Forum and will be available in English, Chinese, Spanish, Japanese, German, French and Italian.

What is e-JobAid?
E-JobAid is a small learning unit, usually not more than five minutes long. It introduces a single working procedure in a very task-orientated presentation. We have recorded these learning units. A video, audio and either slides or a demonstration are presented on an equipment 's user interface, in the same window.
The presentation goes through the task step-by-step, so you can view, pause, view and review. Delivered over the Internet, the e-JobAid is not tied to being on a certain computer platform.

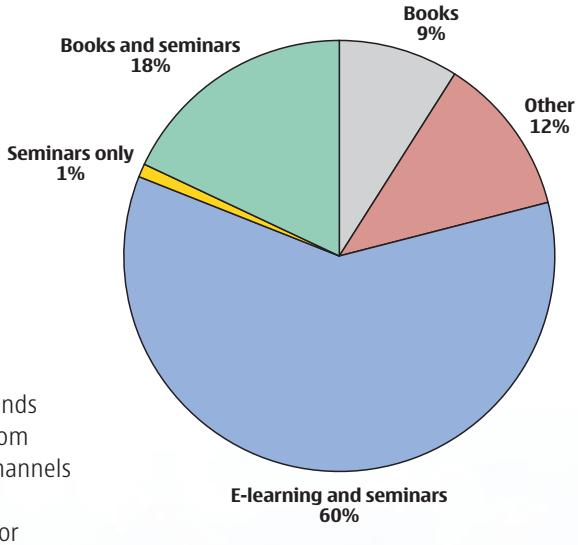
Our e-JobAid is updated to reflect any changes a software release may bring.

Benefits of e-learning

- **Easy access:** E-learning sessions can be held anywhere at any time.
- **Flexible scheduling:** Sessions can be arranged during the normal working day.
- **Cost-effective:** E-learning is more cost-effective than traditional classroom training, and provides additional savings through a reduction of travel and opportunity costs.
- **Effective learning:** Modular learning content can easily be tailored to match the users' personal competence profile.



Knowledge retention.



How employees want to develop their knowledge.

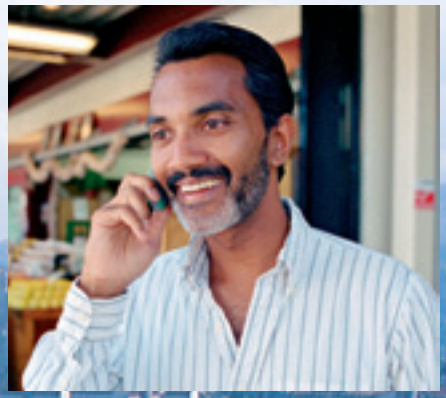
Unique e-learning portal

We are using a unique extranet portal to access all forms of e-learning: self-paced learning programs, e-seminars, forums, and virtual classroom.

From e-learning to blended learning

Public research shows that a majority of learners in business education today expect e-learning to be one of their desired learning methods. Together with the economic benefits of e-learning, we have founded our training strategy on this expectation. Thus, we will successively increase the e-learning offering in our training portfolio.

Forums and virtual classroom open up e-learning for new innovative channels for 'collaboration' and 'doing'. The essence is a learning experience that extends beyond the limitations of classroom training. The different learning channels merge to provide an integrated experience: e-learning prepares for classroom training, e-assessment verifies the learning outcomes of classroom training and e-learning, and an online-tutor guides the learner to optimize his learning achievement. These scenarios describe our understanding of 'blended learning'.



Consultancy services and competence development programs

Making the most of your investment

To get the maximum from your training investment we have built our portfolio with a modular approach to allow increased flexibility and efficiency in delivery. With this approach the identification of your needs is a crucial part. Therefore, under the umbrella of our consultancy and competence development projects, we provide an integrated way to combine the best planning, with assessment and reporting. Therefore, to support you we provide a four-level solution, where you decide how much support you need:

Support of our Training Services Manager (TSM) in selecting development paths – Our competent and experienced Training Services Managers can help guide you through our recommended actions. In some cases, they are able to bring the portfolio experts into the discussion.

Nokia Competence Evaluation and Profiler Service – From Spring 2004, we offer the opportunity for your people to create recommended development actions based upon an evaluation. The results can be tracked.

Nokia Solution Planning Consultancy Service – In addition to the evaluation service, we can also provide comprehensive planning that provides the best-tailored solutions to meet your needs, in a structured format that includes reporting.

Nokia Competence Development Project – In addition to the planning, we also can provide a full project service where we manage the full capability development, planning, assessment, reporting and licensing.

Each level of our consultancy service is built on the previous one.

We always nominate a dedicated person to support your needs and we take care that our deliveries are at the agreed level of quality.

Always finding the best solution for you
Our Training Services Managers will provide you with a recommended training solution that meets five objectives:

- Delivered when you need it
- Optimized to meet your needs and avoid unnecessary investment
- Meeting the challenge of complex technology implemented in your network
- Modular to ensure flexibility through a number of delivery methods
- Holistic, to explore development actions not solely based upon courses and workshops

Nokia Competence Evaluation and Profiling Service

To help you plan the training needs of your organization accurately, we provide a tool that allows personnel to evaluate their own competences and skills.

We define standard profiles (job titles), which include a description of the knowledge and skills required to perform the job. This standard is the basis of the evaluation – the person is then asked to make a self-assessment. The assessment is a series of questions to help determine if the person meets the requirements of the standard profile. On completing the evaluation a list of recommended development actions is provided.

The profiles can be customized to meet your needs and track the change in your peoples' competence. The benefit is that you can clearly see the progression and effect of learning.

Functionality and deliverable:

- Individual environment for each person to complete the evaluation
- Individual recommended competence development actions based upon the person's job profile (including self-development actions and proposed courses/workshops)
- Historical evaluations can be kept and the changes can be tracked by the individual and their manager
- As a manager, you can configure the job-roles to best suit your organization.

Local privacy and data-protection laws are observed with this service. Nokia does not use this information, unless otherwise agreed with you. Please ask your local training contact person for more information on activation and use.

Nokia Solution Planning Consultancy Service

If you are facing the prospect of mass training, for example, after an organizational change or when deploying new technology in your network, we can provide a solution planning service, where we carefully analyze your requirements, your organization and even the current competences you have.

Our experienced Competence Development consultants will visit you and listen to your needs and expectations. They will analyze your organization, processes and roles to develop a complete picture of your requirements. From this they will build tailored solutions that meet the needs of each target group, giving the right training at the right time.

The solution is then validated by you – and once agreed we would create a plan and start to schedule all the training. Also, we provide volume discounts if the training is ordered as part of a plan. The next stage would be for your people to use our Competence Evaluation and Profiler service (as described previously) to generate individual plans. This would also identify who should attend which training.

Deliverables of the planning process:

- Documented training plan and recommended flows per target group
- Individual competence development plan
- Customized target groups and descriptions via NOLS
- Pre-delivery evaluation of competence
- Monthly measurement report on progress
- Needs analysis
- Fully scheduled plan

Although the project requires a higher initial investment, savings are made throughout the duration of the cycle as fewer days are needed and training is specific for each target group. Furthermore, you will receive monthly reports on the progress and the individual improvement can be tracked.

From our experience, by planning and working together we can provide you with a more competitive price and solution than on an ad-hoc basis.

Nokia Competence Development Project

If you require more than just planning, and need a full combination where we take the risk to assure the competence of your engineers, then we provide a project oriented solution combining the planning consultancy, delivery and assessment. As described in the previous section, the plan is made for each target group and each individual has their own development path.

Together we create and agree on the goals, objectives and timeframe of the project. We nominate a project manager who will steer the whole project. In addition to the monthly reporting, at the end of the project you will receive records of the competence assessments and a report on the impact the training investment has had on your business.

Deliverables of the planning process:
- All the deliverables of the Nokia Competence Development Planning Service
- Individual competence assessment histories
- License and Certification programs embedded into the tailored solution
- End-of-Cycle Assessment and Impact Report

Feedback from Vodafone Omnitel on their Competence Transfer Program

"The Competence Transfer Program (CTP) has been the result of more than two years of co-operation with Nokia. This is a good example of a partnership between Vodafone Omnitel and Nokia, rather than the delivery of a simple training service. Through the established Competence Transfer Program, it is now possible to collect and store detailed information about our technical staff's skill set and competences, establish an efficient and tailored training solution to transfer the necessary competences, and support the training plan and budget activities."

L. Paonessa (Network Testing, OM staff Support Manager) and R. Clerico (Network Training Manager)

Self-learning solutions

Technical requirements for e-learning
- Computer with web access
- Audio capabilities (sound card, speakers, microphone) are recommended for self-paced e-learning programs, mandatory for the other e-learning services
- Actual web browser (Microsoft IE or Netscape)
- Macromedia Flash for self-paced e-learning
- Windows Media Player for recorded presentations and learning resources

With the cost constraints we all face, and the continuous challenges to renew our knowledge and skills, a more efficient and holistic approach to learning is needed. This means that more responsibility is placed on the individual to seek out the specific knowledge they need. In addition to maximizing the blended learning approach, Nokia provides four services which support the continuous development of the individual:
- E-learning self-study packages
- Recorded presentations
- E-learning resources (e-JobAids)
- Published material

We provide a wide range of self-paced e-learning, developed with the learner's needs in mind. Our solutions can be bought for the individual, or alternatively they can be purchased for your whole organization, depending on your needs.

On the next page you can find an overview of the e-learning solutions we currently offer. You can find a general description of the e-learning methods on page 8. Detailed descriptions of the actual courses are in the chapter 'Courses and workshops by target groups.' Please refer to the page numbers given in the table.

Package	Abbreviation	Available	Page
Self-paced e-learning packages			
Nokia UltraSite for GSM/EDGE System	2G ULTSYSe	Now	45
3G Introduction	3G INTe	Now	24
3GPP Release 4 Switching Core Network Architecture and Functionality	3G REL 4 CORe	Now	75
3GPP Release 4 System	3G REL 4 SYSe	Now	26
New Features in Nokia Base Station Subsystem Release S10/10.5	BSS REL S10/10.5 THe	Now	58
New Features in Nokia Base Station Subsystem Release S11	BSS REL S11 THe	Now	59
EDGE System Overview	EDGESYSe	Now	25
GPRS Overview	GPRSOVe	Now	23
System Level Features with Nokia PCN/GPRS Release 2	GPRS REL 2e	Now	92
Nokia IP Multimedia Subsystem Architecture and Functionality	IMSARCe	Now	95
Nokia IP Multimedia System	IMSSYSe	Now	26
Multimedia Messaging System	MMSSYSe	Now	151
Nokia Microwave Radio Overview	MWOVERe	Now	42
New Features in Packet Core Network Release 3	MPC REL 3e	Now	93
Introduction to Nokia mPosition	MPOSINTe	Now	153
New Features in MSC/HLR Release M11	NSSREL M11 THe	Now	80
Introduction to Nokia WAP Gateway	NWGINTe	Now	146
Nokia WAP Gateway Operation and Maintenance	NWGOM	Now	146
Nokia NetAct Operations Support System Platform	OSSPLAT(e)	Now	39
Nokia NetAct Operations Support System User Release 3 (T12->OSS3.1)	OSSUSER REL 3(e)	Now	39
New Features in Radio Access Network Release 4	RAN REL 4e	Now	65
Radio Network Controller Architecture and Functionality	RNCARCe	Now	62
iGMLC System	iGMLCSYSe	Now	158
Nokia Switching Platform	SWPLATe	Now	36
Nokia UltraSite Triple-mode BTS Installation and Commissioning	TriULTCOMe	Now	47
Understanding GSM	UndGSMe	Now	22
Recorded Presentations			
3G Switching Core Network Planning in Release 4	3G SCNPL REL 4	Q1/04	126
Intelligent Content Delivery System	ICDSYS	Q1/04	138
Base Station Controller 3i Delta	BSC3i DELTA	Q1/04	58
Push to talk over Cellular System	PoC SYS	Q2/04	147
Learning Resources			
3G Radio Access Network Online Learning Resources	RANRESOURCEe	Q3/04	63
Nokia Switching Core Network Online Learning Resources	SCNRESOURCEe	Q3/04	71
Operations Support System Enhancements in Nokia NetAct 3.1	OSSRESOURCEe	Q3/04	40
Virtual Classroom			
Switching Platform Essentials	SWPLAT ESS	Now	37

Nokia reserves the right to change the above list. During 2004 Nokia will provide more system and technology training content to better support our competence flows. For more information and regular updates on our e-learning offering, please go to our NOLS training portal at www.online.nokia.com, join our mailing lists or refer to your Nokia contact person.

Self-reading published material

To complement our training material, Nokia can also provide reference and self-reading material in the form of books from Wiley, the international technical publisher.

Nokia authored titles

The following titles are supported by Nokia and are authored by our experts. These are available from Nokia Training, as well as other distributors.

Name	**WCDMA for UMTS: Radio Access for Third Generation Mobile Communications**, 2nd Edition
Author	Harri Holma (Editor), Antti Toskala (Editor)
Publisher and year	Wiley, July 2002
Short description	Written by leading experts in the field, the first edition of WCDMA for UMTS quickly became established as the best-selling and most highly respected book on the air interface of 3G cellular systems. Fully revised and updated the second edition now covers the key features of 3GPP Release 5 ensuring its position as the leading resource in this constantly developing area.
Pages	412
ISBN	0470844671

Name	**Implementing Service Quality in IP Networks**
Author	Vilho Räisänen
Publisher and year	Wiley, February 2004
Short description	In Implementing Service Quality in IP Networks, Vilho Räisänen addresses the issues and how to solve them. He discusses the business drivers for multi-service IP networks from various different angles. He defines service quality, explains how to estimate and measure the end-user experience and discusses different ways of conveying service quality requirements to the network.
Pages	312
ISBN	047084793X

Name	**UMTS Networks: Architecture, Mobility and Services**
Author	Heikki Kaaranen, Ari Ahtiainen, Lauri Laitinen, Siamäk Naghian, Valtteri Niemi
Publisher and year	Wiley, June 2001
Short description	UMTS Networks provides an outstanding description of 3G UMTS mobile networking technology. It discusses both the core network evolving from the globally successful GSM/GPRS system and the radio access network based on newly emerged Wideband CDMA (Code Division Multiple Access) technology.
Pages	326
ISBN	047148654X

Name	**Services for UMTS: Creating Killer Applications in 3G**
Author	Tomi T. Ahonen (Editor), Joe Barrett (Editor)
Publisher and year	Wiley, March 2002
Short description	Services for UMTS is about the near future, where the technology issues are solved and revenues come from take up of services. The book details the opportunities and issues.
Pages	392
ISBN	0471485500

Name	**UMTS Security**
Author	Valtteri Niemi, Kaisa Nyberg
Publisher and year	Wiley, November 2003
Short description	UMTS (Universal Mobile Telecommunication System) systems are 3G systems designed for multimedia communication. UMTS Security covers the security aspects of 3G mobile networks based on WCDMA technology. WCDMA (Wideband Code Division Multiple Access) is the main air interface used for 3G mobile communication systems.
Pages	256
ISBN	0470847948

Name	Radio Network Planning and Optimisation for UMTS
Author	Jaana Laiho (Editor), Achim Wacker (Editor), Tomáš Novosad (Editor)
Publisher and year	Wiley, October 2001
Short description	Radio Network Planning and Optimization for UMTS comprehensively explains how to dimension, plan and optimize UMTS (Universal Mobile Telecommunication Systems) networks. It introduces the properties of the spread spectrum system and provides a general overview of the physical layer of FDD-WCDMA. The radio network planning process for WCDMA is clearly presented and detailed information on how to dimension, plan and rollout a 3G network, both theoretically and practically is provided. This valuable text examines current and future radio network management issues and their impact on network performance as well as the relevant capacity and coverage enhancement methods.
Pages	510
ISBN	0471486531

Name	**GSM, GPRS and EDGE Performance: Evolution Towards 3G/UMTS**, Second edition
Author	Timo Halonen (Editor), Javier Romero (Editor), Juan Melero (Editor)
Publisher and year	Wiley, October 2003
Short description	GSM, GPRS and EDGE Performance 2nd edition provides a complete overview of the entire GSM system. It features comprehensive descriptions of GSM's main evolutionary milestones – GPRS, AMR and EDGE and how such developments have now positioned GERAN (GSM/EDGE Radio Access Network) as a full 3G radio standard. For the first time in one volume, the radio network performance and capabilities of GSM, GPRS, AMR and EDGE solutions are studied in-depth by using revealing simulations and field trials. New material includes filed trials for AMR and narrowband, and EGPRS deployment guidelines.
Pages	654
ISBN	0470866942

Name	Multi-antenna Transceiver Techniques for 3G and Beyond
Author	Ari Hottinen, Olav Tirkkonen, Risto Wichman
Publisher and year	Wiley, January 2003
Short description	Multi-antenna techniques are currently an extremely active area of research in wireless communications. They are widely considered to be the most promising avenue for significantly increasing the bandwidth efficiency of wireless data transmission systems and this exceptional volume presents their key aspects. MIMO and MISO (transmit diversity) techniques are explained in a common setting, in a clear and concise manner, and special emphasis is placed on combining theoretical understanding with engineering applicability.
Pages	342
ISBN	0470845422

Name	The IMS – IP Multimedia Concepts and Services in the Mobile Domain
Author	Miika Poikselka, Georg Mayer, Hisham Khartabil, Aki Niemi
Publisher and year	Wiley, June 2004
Short description	This book is intended to answer the question: "What is the IMS?" It is intended to give an expert's digested view of the IMS, its concepts, architecture, protocols, and functionalities. Specifically, it will cover: • General description of system concepts, architecture and functionality • Introduction to and description of base protocols • Detailed description of key functionalities • Services on top of IMS
Pages	448
ISBN	047087113X

Other titles

In addition to the Nokia authored titles, we also provide reading material not authored by Nokia. They form part of recommended reading for our development flows.

Name	**Migrating to IPv6: A Practical Guide for Mobile and Fixed Networks**
Author	Marc Blanchet
Short description	Migrating to IPv6 does not try to cover absolutely everything, it is not an 'everything you ever wanted to know and quite a lot you didn't' style reference book, but it is a 'how to' tutorial on implementing, applying and deploying the protocol.
Pages	368
ISBN	0471498920

Name	**Multiple Access Protocols for Mobile Communications: GPRS, UMTS and Beyond**
Author	Alex Brand, Hamid Aghvami
Short description	If you're looking for a comprehensive discussion of multiple access protocols, taking into account the constraints and capabilities of cellular communication systems, then this is the book for you. Engineers, researchers, academics and advanced students will all find it an important and valuable reference.
Pages	478
ISBN	0471498777

Name	**ATM Signaling: Protocols and Practice**
Author	Hartmut Brandt, Christian Hapke
Short description	Highly practical in its approach, ATM Signaling will explain all you need to know about how things really work, how to interpret the behaviour of systems, what problems may arise and how to find the solutions to such problems.
Pages	270
ISBN	0471623822

Name	**GSM Switching, Services and Protocols**, Second Edition
Author	Jörg Eberspächer, Hans-Jörg Vögel, Christian Bettstetter
Short description	By focusing on the fundamentals of the mobile radio systems, it provides an excellent introductory insight to the whole area of GSM cellular radio. By providing an easy-to-follow instructive text, this second edition will have insight appeal to telecommunication engineers, researchers, and developers. The graphical approach and numerous illustrations will also make it an indispensable reference for senior undergraduates and postgraduates in electrical and computer engineering.
Pages	346
ISBN	047149903X

Name	**Data Networks, IP and the Internet: Networks, Protocols, Design and Operation**
Author	Martin P. Clark
Short description	Data Networks, IP and the Internet is intended not only for network designers and practitioners, who may have long sought a 'bible' on protocols and data networking, but also for the newcomer eager to understand the principles and put the plethora of 'protocols' into context.
Pages	866
ISBN	0470848561

Name	Mobile Telecommunications Protocols for Data Networks
Author	Anna Hac
Short description	Mobile Telecommunications Protocols for Data Networks proposes a comprehensive methodology for mobile communications. The author covers the entire spectrum of lower and upper layer protocols for the design and evaluation of modern mobile telecommunications systems, including related aspects of applications, networking, and transmission.
Pages	260
ISBN	0470850566

Name	Broadband Wireless Mobile: 3G and Beyond
Author	Willie W. Lu
Short description	This innovative resource presents the enabling technologies required. Ultimately, 4G mobile will provide seamless high data rate wireless service over an increasing number of integrated yet distinct and heterogeneous wireless mobile and access platforms and networks operating across multiple frequency bands.
Pages	388
ISBN	0471486612

Name	QoS Measurement and Evaluation of Telecommunications Quality of Service
Author	William C. Hardy
Short description	Whether you have a limited technical background or are a telecommunications professional this simple and straightforward approach will be an essential tool to understanding QoS.
Pages	246
ISBN	0471499579

Name	An Introduction to ATM Networks
Author	Harry G Perros
Short description	This introductory well-structured text on ATM networks describes their development, architecture, congestion control, deployment, and signaling in an intuitive, accessible way. It covers extensive background information and includes exercises that support the explanations throughout the book.
Pages	258
ISBN	0471498270

Name	GSM and UMTS: The Creation of Global Mobile Communication
Author	Friedhelm Hillebrand (Editor)
Short description	GSM and UMTS provides an interesting and informative read and will appeal to everyone involved in the mobile communications market needing to know how GSM and UMTS technologies evolved. The accompanying CD-ROM provides nearly 500 reference documents including reports of all standardisation plenary meetings, strategy documents, key decisions, the GSM Memorandum of Understanding and the report of the UMTS Task Force.
Pages	590
ISBN	0470843225

Name	GPRS Networks
Author	Geoffrey Sanders, Lionel Thorens, Manfred Reisky, Oliver Rulik, Stefan Deylitz
Short description	GPRS Networks provides a thorough grounding in GPRS by constantly explaining how and why. This practical handbook will be an essential purchase for all those involved in telecommunications, from network planners and engineers through to project managers, consultants and students.
Pages	304
ISBN	0470853174

Name	**IP Switching & Routing Essentials – Understanding RIP, OSPF, BGP, MPLS, CR-LDP & RSVP-TE**
Author	Stephen A. Thomas
Short description	An invaluable resource for network managers and service provider professionals, this book delivers complete coverage of routing technologies – distance vector, link state, and path vector – as well as the full roster of Internet standard routing protocols: Routing Information Protocol (RIP), Border Gateway Protocol (BGP), and Open Shortest Path First (OSPF).
Pages	368
ISBN	471034665

Name	**The GSM Network: GPRS Evolution: One Step Towards UMTS**, Second Edition
Author	Joachim Tisal
Short description	By presenting the GSM standard, it describes the varied aspects of this technology, including international scale compatibility, spectral frequency usage, availability, adaptability, quality and costs, access potentials and proposed services. The GSM Network provides an instructive insight into recent progress in this area and will have great appeal to telecommunication engineers and consultants as well as network and telecommunications managers.
Pages	240
ISBN	0471498165

Name	**IP for 3G: Networking Technologies for Mobile Communications**
Author	Dave Wisely, Philip Eardley, Louise Burness
Short description	IP for 3G gives a comprehensive overview of 3G networking functionality and examines how IP protocols can be developed to provide some of the basic building blocks of a mobile system (mobility, QoS and call control)
Pages	304
ISBN	0471486973

Nokia task-based solution

Nokia is a leader in implementing task-based and blended learning, with our first solutions implemented in 1998 for the Nokia BSS/OSS. By working closely with several customers we were able to build a task definition which we used throughout the courses.

Our GPRS and 3G portfolios were built on the success of this project and hence we have been able to easily provide modular training in these areas, allowing your people to start operations as soon as they complete their training.

Courses and workshops by target groups

Symbols used in competence flows and course descriptions

Our recommended solutions are based upon generic target groups, and are designed to ensure the best number of days and flexibility. All the courses and workshops listed here are available globally as open courses. If you require customization, please contact your Nokia training contact person.

For more detailed and up to date description of all our courses and workshops, please visit our pages on NOLS (www.online.nokia.com).

I Introductory course

II Intermediate course

III Advanced course

IIII Expert course

Course provided by Nokia supplier

C Nokia Certification

L Nokia License

O On-the-job Training

F Facilitated Learning Program

T Trainer License

Courses relevant for GSM

Courses relevant for GSM and 3G

Courses relevant for 3G

Classroom course – A structured training session that has clear learning objectives, uses standardized material and can be delivered either in a classroom or through a virtual learning environment. Nokia provides two types of courses:

- **Product-based training** – provides the participants with knowledge and skills necessary to handle Nokia equipment and fully understand how it is implemented.
- **Task-based training** – are programs built round specific tasks that are performed in network operations. These may include using more than one element and are designed so the task is performed in the best way.

Virtual classroom – More and more of our training can be given to remote locations, again, reducing the cost of travel. It is the same as the classroom course, except the training is restructured to meet the environment – for example, more days, but less training per day.

Self-paced e-learning – An activity where the responsibility for learning is on the individual student. A number of options can be applied, the most common being e-learning where the participant is guided through learning in a structured way. Books and discussion forums are also alternative methods for developing skills.

Blended training – In some competence areas a simplified course or course-flow may not be the best solution. In these cases, Nokia has developed a range of "Learning Solutions" that use a mixture of deliveries and delivery methods.

Workshop – Typically an unstructured training event based on completing set objectives or tasks. It adopts a more relaxed approach involving group work and discussion with reference material used in place of formal training material.

Seminar – In these sessions, experts in the field discuss their research in highly technical or new areas of expertise. Attendees are encouraged to actively participate.

E-seminar – Increasingly we are looking at cost-effective delivery solutions and sometimes record short courses, modules or even seminars, so you can join a session when it best suits you.

Material in CD-ROM – Based on customer requests, we will start providing student material in a slimmer package that includes all the training and reference material on a CD-ROM. Also included in the package are the slides, so you can make notes. For an extra charge, you can receive both electronic and paper material.

Pre- and post-assessment – As part of our initiative to enhance our evaluation many of our courses offer students free pre- and post-assessments, the results of which are used to measure the efficiency of learning. For an extra charge, you can receive individual assessment results and evaluation of participation.

Remote access – Given the need to reduce traveling costs, we are now offering the facility to access a dedicated remote test bed through the Internet. This means that the venue of the training can be much more local. The price of the training is not affected, but you benefit through reduced travel costs.

E-learning resources – Learning should continue after the classroom and to support better personnel development, Nokia provides you with the option of having access to an online resource which includes e-JobAids, additional training information and Q&A discussions on training, helping the student apply the newly learnt skills in the workplace.

Measurement report – Some of our practical training now includes an optional price service for our trainers to make a follow-up on how competent the participants are in performing the skills they learned. The results of these are linked to the licensing programs.

Simulation – To aid the learning process in some of our theory courses we make use of simulation techniques. In some practical courses, as we don't always have a live network available, simulated results are used.

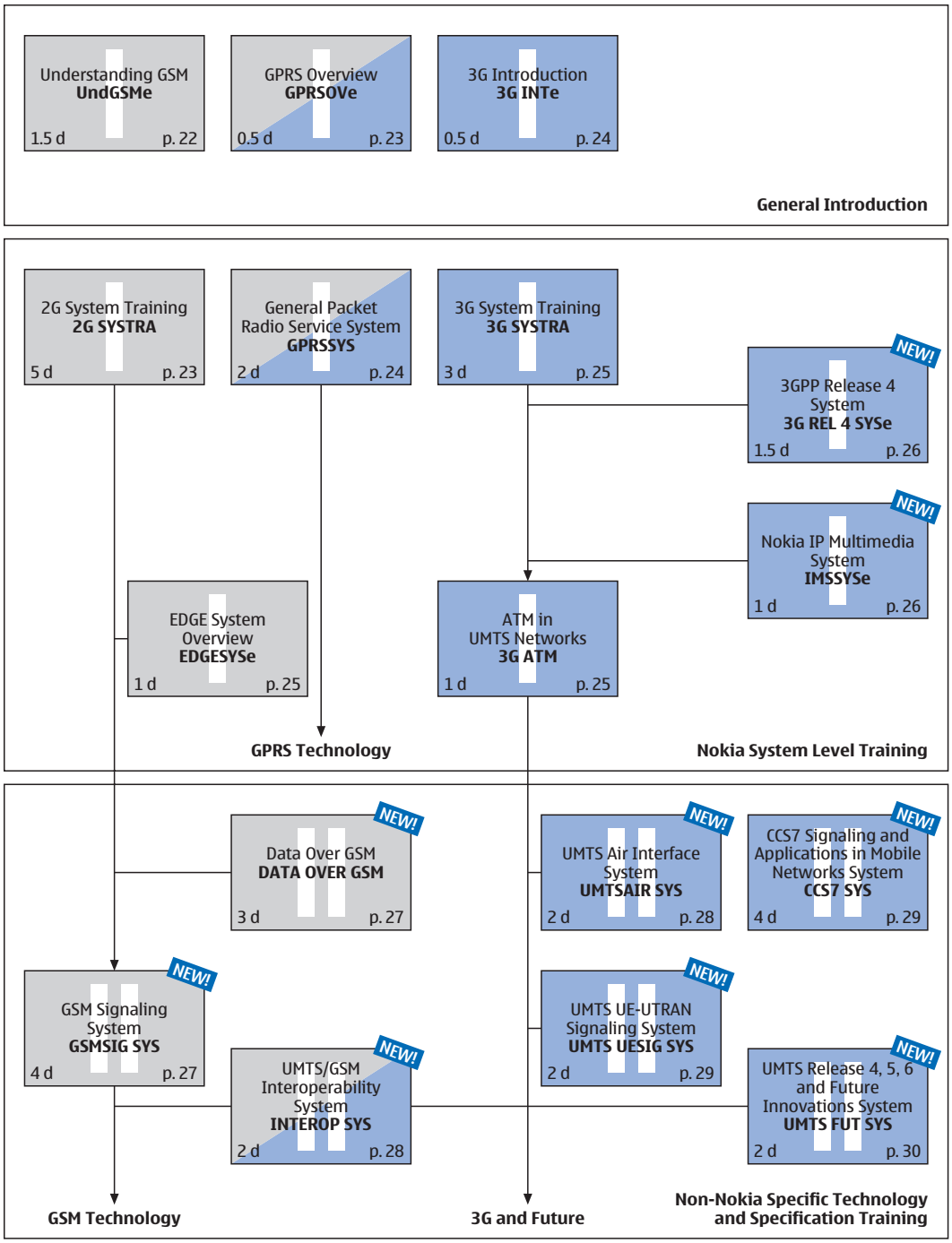
The following descriptions are based upon the most accurate information we have regarding the portfolio for 2004. However, Nokia reserves the right to add, remove or change the content and/or courses should there be a need. At all times, we try to inform customers of changes being made to programs that you are actively using. When ordering new training courses and workshops, Nokia strongly recommends that you check the detailed learning program descriptions to ensure that you and the participants are aware of the objectives and requirements.

What is pre- and post-assessment?
The majority of our intermediate courses now come with the option for you to take an assessment before and after the course. The assessment is made through NOLS and the questions are based upon a random pool.
By comparing the results from before and after the course, we have a tangible measure of how effective the training has been. This service is free on applicable courses.

When ordering the course, simply ask for this option and ensure that each participant has a NOLS account.
They will receive an e-mail before the course to complete the assessment and they have some days after the course to do the re-assessment.
An overall evaluation is made based upon all participants. Nokia can supply individual performance assessment but this is based upon local agreements or laws on data-protection and carries an additional charge.

Network technology and solution training

Overview and system training



Nokia technology and system level training is divided into three categories. First, trainings that will give you a basic understanding of the technology delivered through e-learning. Second, system level training that provides a thorough grounding in GSM/EDGE, GPRS and WCDMA technology and the Nokia implementation. Third, topics that are not specific to Nokia solutions, but focused on mobile specifications. These are ideal complements to our advanced solutions.

We provide comprehensive e-learning programs to support a wide range of personnel who need to understand the basics. These are followed by a program of classroom training, which is the foundation for our technical courses. System level aspects of GPRS networks are now included in the 2G SYSTRA course. However, participants on the old SYSTRA course who need to gain GPRS knowledge should take the interim GPRSSYS course.

Together with selected companies, we also provide a range of more technical system training courses that look into the theory behind signaling, inter-operability and specifications (such as the air-interface and the future). These do not cover the Nokia solutions or approach.

Understanding GSM

UndGSMe

Target Group
Technical and non-technical personnel working in the cellular radio industries that require fundamental knowledge of GSM.

Objectives
After the training, the participant will be able to:
- Explain at the overview level the history and evolution of the GSM system.
- List the benefits of a digital mobile system.
- List the two multiple access methods that make possible the simultaneous use of a base station by several mobile stations.
- Draw the GSM network architecture diagram including the network elements and interfaces.
- Explain the function of each network element in the GSM network architecture diagram.
- List the identifiers and addresses for locating, routing, authenticating and security purposes in a GSM network.
- Explain step by step how the mobile station and network communicate with each other to allow a certain traffic management function to occur i.e. call set up.
- Explain the basic of the GSM cellular network and what should be considered during the planning phase.
- List the service types and categories in the GSM system.
- List the different types of charging in the GSM system.
- Explain using a GSM network diagram how billing information is handled by the network.
- Explain how the Nokia implementation of GSM differs from the generic implementation.
- Draw the functional diagram of the Nokia network elements MSC/VLR, HLR and BSC.

Prerequisites
General understanding of telecommunications

Duration
1.5 days

No. of Participants
N/A

Modules
- Introduction to GSM
- Technological concepts in GSM
- GSM architecture and interfaces
- Identifiers and addresses in GSM
- GSM traffic management
- GSM cellular network
- Security and privacy in GSM
- GSM services
- Charging in GSM
- Nokia implementation of GSM
- Towards the next generation from GSM

2G System Training

2G SYSTRA

Target Group
Personnel needing overview knowledge about GSM and GPRS.

Objectives
After the training, the participant will be able to:
- Explain the architecture functionality of GSM and GPRS network elements.
- Explain the main concepts of GSM and GPRS traffic management.
- Explain the main concepts of TDMA air interface transmission.
- Explain the connections/interfaces within the GSM and GPRS network.
- Explain the addressing in GPRS.
- Give an overview of the Nokia implementation of GSM and GPRS.

Prerequisites
General understanding of telecommunications

Duration
5 days

No. of Participants
Max. 24

Modules
- Introduction to GSM
- GSM architecture
- GSM traffic management
- Introduction to SS7 signaling
- GSM air interface and network planning
- Introduction to GPRS
- Introduction to TCP/IP
- GPRS architecture
- GPRS traffic management
- GPRS air interface

Notes
Additional material: “GPRS Networks” (authors: Sanders, Thorens, Reisky, Rulik, Deylitz), page 17. “The GSM Network: GPRS Evolution: One Step Towards UMTS” (Tisal), page 18.

GPRS Overview

GPRSOVe

Target Group
New and inexperienced personnel, who require the basic knowledge of GPRS networks.

Objectives
After the training, the participant will be able to:
- Identify the drivers of the GPRS network and the subsequent effects on mobile data communication.
- List the business benefits for operator’s implementing a GPRS network with respect to emerging data communication needs and eventual migration to 3G mobile networks.
- Using a GPRS network architecture diagram, illustrate typical traffic management procedures.
- List the key network elements required to implement a GPRS network on top of an existing GSM network.
- List the functions of each of the key GPRS network elements.

Prerequisites
General understanding of telecommunications

Duration
0.5 day

No. of Participants
N/A

Modules
- Introduction to GPRS
- GPRS from a business point of view
- GPRS architecture and interfaces
- GPRS traffic management

General Packet Radio Service System GPRSSYS

Target Group
Personnel who are experienced in GSM system, but need a good theoretical knowledge of the GPRS system and the Nokia GPRS solution.

Objectives
After the training, the participant will be able to:
- Describe the role of GPRS in telecommunications and data networks.
- Name the different network elements of the GPRS network and explain their functionality.
- Explain the connections/interfaces to the existing networks and between different GPRS network elements.
- Explain the structure of Nokia GPRS network.
- Explain the mobility management functions in GPRS.
- Describe the addressing in GPRS.
- Describe the charging function in GPRS.
- List the most important planning/ dimensioning factors in the GPRS network without reference to notes.

Prerequisites
2G SYSTRA or similar. This course contains the same GPRS related modules as the 2G SYSTRA course.

Duration
2 days

No. of Participants
Max. 24

Modules
- Introduction to GPRS
- Introduction to TCP/IP
- GPRS architecture
- GPRS traffic management
- GPRS air interface

3G Introduction 3G INTe

Target Group
New and inexperienced personnel, who require basic knowledge of 3GPP Release 99 Mobile Networks.

Objectives
After the training, the participant will be able to:
- Identify the drivers behind the evolution towards 3G networks.
- Identify and list the characteristics of the radio path technology used in 3G networks compared to GSM networks.
- Complete a 3G network architecture diagram.
- List the functions of each of the 3G network elements.
- Using a 3G network architecture diagram, illustrate how 3G services, voice and Internet traffic are supported.
- Identify the available services types within 3G networks and the uses of available service applications.

Prerequisites
General understanding of telecommunications

Duration
0.5 day

No. of Participants
N/A

Modules
- Introduction to 3G
- 3G network architecture
- Introduction to 3G radio interface
- Introduction to 3G services
- Using 3G networks

3G System Training

3G SYSTRA

Target Group
Personnel requiring underpinning knowledge on 3G networks.

Objectives
After the training, the participant will be able to:
- Briefly explain and list the motivation and development of mobile networks towards 3G.
- Without reference to the material, draw and label the key components and interfaces of the Nokia 3G solution.
- Using a simplified model, explain the key elements of the 3G/UMTS radio path and transmission.
- At an overview level, explain what UMTS radio resource management is, and describe its effect on network planning.
- Outline the functions of the different management layers within traffic management.
- List and give examples of 3G services and how they are implemented into a UMTS network.

Prerequisites
Preferably 2G SYSTRA or similar

Duration
3 days

No. of Participants
Max. 24

Modules
- Introduction to UMTS networks
- UMTS network architecture
- UMTS radio path and transmission
- UMTS traffic management
- Introduction to UMTS signaling and interfaces
- UMTS services and applications
- Vocabulary for system training

Notes
Additional material: “UMTS Networks” (Kaaranen), page 14. For supporting the understanding of the Air Interface we recommend “WCDMA for UMTS” (Holma), page 14.

EDGE System Overview

EDGESYSe

Target Group
Personnel who require overview knowledge of the EDGE system.

Objectives
After the training, the participant will be able to:
- Identify what is meant by a Nokia EDGE technology.
- Understand the principle of GMSK and 8PSK modulation.
- Explain and understand new EDGE features.
- Explain the implementation of EDGE in each network subsystem.

Prerequisites
2G SYSTRA

Duration
1 day

No. of Participants
N/A

Modules
- GSM evolution to EDGE
- EDGE modulation
- Nokia EDGE features
- Nokia EDGE implementation
- Nokia NetAct and EDGE
- Nokia EDGE Network Planning Services

ATM in UMTS Networks

3G ATM

Target Group
Technical personnel requiring understanding of ATM.

Objectives
After the training, the participant will be able to:
- Explain the basics of the ATM and how it is implemented in UMTS.

Prerequisites
3G SYSTRA

Duration
1 day

No. of Participants
Max. 24

Modules
- ATM basics
- ATM protocols and signaling

Notes
- E-seminar (2H/04)
- Additional material: “ATM Signaling: Protocols and Practice” (Brandt), page 16.

3GPP Release 4 System

NEW!

3G REL 4 SYSe

Target Group
Personnel in Customer Care, Marketing, Network Operations and Control, Network Engineering, Network Planning.

Objectives
After the training, the participant will be able to:
- Understand the main principles of 3GPP Release 4 architecture, the system features and basic technologies used in 3GPP Release 4.

Prerequisites
None

Duration
1.5 days

No of Participants
N/A

Modules
- Generic 3GPP Release 4 – Architecture
- Generic 3GPP Release 4 – Basic technologies
- Nokia solution for 3GPP Release 4 Core – MSC server system and system features
- Nokia solution for 3GPP Release 4 Core – New user services

Nokia IP Multimedia System

NEW!

IMSSYSe

Target Group
Core Network Engineering, Network Operations and Control, Core Network Planning, System Administration, Service Creation and Integration Engineers, Marketing and Technical Management, Customer Care.

Objectives
After the training, the participant will be able to:
- List the subsystems of Nokia IP multimedia system.
- List the Nokia IP multimedia system network elements.
- Describe the protocols and interfaces between subsystems.
- List the main functionalities of the subsystems.
- Describe connectivity between sites.
- Explain the operation and maintenance principles of Nokia IP multimedia system.
- Describe the evolution of Nokia IP multimedia system.

Prerequisites
3G Release 5 system level understanding (vendor independant), basic understanding of IP and SIP protocols

Duration
1 day

No. of Participants
N/A

Modules
- Introduction to Nokia IP multimedia system
- Architecture of Nokia IP multimedia system
- Technologies in Nokia IP multimedia system
- Functionality of Nokia IP multimedia system
- Operation and Maintenance of Nokia IP multimedia system
- Evolution Summary of Nokia IP multimedia system

Notes
- This course was formerly named IPMMSYSe.
- Additional material: “The IMS – IP Multimedia Concepts and Services in the Mobile Domain” (Poikselka, Mayer, Khartabil, Niemi), page 15.

Technology and specification training

Data Over GSM

NEW!

DATA OVER GSM

Target Group
Personnel requiring in-depth knowledge of circuit switched data transfer over a GSM network.

Objectives
After the training, the participant will be able to:
- Have a thorough understanding of the functions needed to establish a circuit switched data call over GSM.
- Search, find and understand relevant information in the GSM specifications and similar documents, regarding circuit switched data transfer over GSM.
- Through the combination of detailed descriptions and system wide overview given in the course be able, for example, to 'locate' problems relating to data calls to a specific network node, interface or function.

Prerequisites
2G SYSTRA, GSM Signaling course or equivalent knowledge is useful but not compulsory.

Duration
3 days

No. of Participants
Max. 24

Modules
- Data communication fundamentals
- GSM data services
- Terminal adaptation functions
- Radio link protocol
- Forward error correction
- Rate adaptation
- Inter working function
- Basic data rate 14.4 kbit/s
- HSCSD
- EDGE

Notes
This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.

GSM Signaling System

NEW!

GSMSIG SYS

Target Group
Personnel requiring in-depth knowledge of GSM, with particular reference to the access part of the network (MS-BSS-MSC/VLR).

Objectives
After the training, the participant will be able to:
- Have a thorough understanding of the architecture and functions of the protocols used on the different interfaces in a GSM network.
- Search, find and understand relevant information in the GSM specifications, and similar documents, regarding GSM protocol functions and signaling procedures.
- Through the combination of detailed descriptions and system wide overview given in the course, be able for example to 'locate' a signaling problem to a specific network node, interface or protocol.
- Possess a general understanding on how to interpret log files and traces taken from live networks.

Prerequisites
2G SYSTRA

Duration
4 days

No. of Participants
Max. 24

Modules
- GSM overview
- GSM signaling model
- Um air interface
- Abis-interface
- A-interface
- Other interfaces
- Location updating
- Call setup
- SMS transfer p.t.p
- SMS transfer cell broadcast
- Handover
- Supplementary services

Notes
- This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.
- In the description of the traffic cases, a TEMS test mobile is used to illustrate the signaling flow and message contents. Live or recorded files from a number of operators are studied.
- Additional material: "GSM Switching, Services and Protocols" (Eberspächer), page 16.

UMTS/GSM Interoperability System

NEW! INTEROP SYS

Target Group
Professionals who require understanding of how interoperability issues are handled in a mixed 2G/3G network environment.

Objectives
After the training, the participant will be able to:
- Be aware of the interoperability problems that may arise in a 'mixed' GSM/UMTS (2G/3G) network environment.
- Understand the requirements and restrictions imposed on a dual mode (2G/3G) terminal in terms of signaling, measurements, mobility management and call handling.
- Understand how Quality of Service (QoS) issues are handled when handovers take place between 2G and 3G network environments, for both circuit switched and packet switched services.
- Have a general understanding of the signaling flows needed to execute handovers between 2G and 3G networks.

Prerequisites
2G SYSTRA, 3G SYSTRA

Duration
2 days

No. of Participants
Max. 24

Modules
- Introduction to interoperability
- UE capabilities
- QoS handling
- Security handling
- Handover scenarios
- Network sharing
- Future releases

Notes
- This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.
- Nokia provides a new workshop dealing with interoperability in our solution, see page 54.

UMTS Air Interface System

NEW! UMTSAIR SYS

Target Group
Personnel requiring knowledge of the WCDMA radio interface, selected for UMTS.

Objectives
After the training, the participant will be able to:
- Understand functions and procedures taking place in the physical layer of the UMTS radio interface.
- Through the combination of detailed descriptions and system wide overview understand how the different physical channels are used, implemented and coded, and how information is transported on the physical channels.
- Search, find and understand relevant information in the 3GPP specifications and similar documents, regarding UMTS radio interface physical layer procedures and functions.

Prerequisites
3G SYSTRA

Duration
2 days

No. of Participants
Max. 24

Modules
- Introduction
- Air interface
- Physical layer procedures
- Multiplexing and channel coding
- Power control

Notes
- This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.
- Nokia provides practical courses on the Nokia Solution on page 54.
- Additional material: "WCDMA for UMTS" (Holma), page 14.

UMTS UE-UTRAN Signaling System

NEW!

UMTS UESIG SYS

Target Group
Anyone needing in-depth knowledge of UMTS signaling, with particular reference to the Uu interface.

Objectives
After the training, the participant will be able to:
- Seek, find and understand relevant information in the UMTS specifications, and similar documents, regarding UMTS protocol functions and signaling procedures.
- The combination of detailed descriptions and system-wide overview given in the course should allow the participant to understand the requirements imposed on the UE from a signaling perspective.

Prerequisites
3G SYSTRA

Duration
2 days

No. of Participants
Max. 24

Modules
- UTRAN channels and protocols
- UMTS protocol architecture
- UMTS attach
- MT packet transfer
- Soft handover
- Uu interface – Part 1: RRC
- Uu interface – Part 2: RLC
- Uu interface – Part 3: MAC
- Uu interface – Part 4: PDCP

Notes
- This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.
- Additional material: “WCDMA for UMTS” (Holma), page 14.

CCS7 Signaling and Applications in Mobile Networks System

NEW!

CCS7 SYS

Target Group
Personnel who need knowledge in functionality and structure and usage of various SS7 protocols used within fixed, mobile and intelligent networks (IN).

Objectives
After the training, the participant will be able to:
- Understand the structure of signaling system No 7, as well as an overview of various SS7 protocols along with their usage in PSTN, IN and mobile networks.
- Understand the fundamental SS7 protocols, MTP and ISUP, their functions, messages and signaling flow used in different situations.
- Understand various protocols, their functions and messages flows used in different networks that utilize signaling system No 7.
- Associate a signaling problem with a specific network node, protocol or application software through an understanding of how to interpret log files and traces taken from live networks.

Prerequisites
2G SYSTRA or equivalent knowledge is useful but not compulsory. General telecommunication knowledge is required.

Duration
4 days

No. of Participants
Max. 24

Modules
- Signaling introduction
- SS7 introduction
- MTP – message transfer part
- MTP over ATM
- ISUP – ISDN user part
- ISUP call set-up
- SCCP – signaling connection control part
- TCAP – transaction capabilities application part
- MAP – mobile application part
- MAP traffic case
- SS7 over IP
- INAP protocol family

Notes
- This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.
- For more material on protocols, interfaces and procedures – look at our recommended reading on page 14.

UMTS Release 4, 5, 6 and Future Innovations System

NEW!

UMTS FUT SYS

Target Group
Personnel from the technology and management sector, who are interested in the most important modifications and add-ons with the UMTS Releases 4, 5, and 6.

Objectives
After the training, the participant will be able to:
- Identify and list the key elements driving the development of the UMTS specifications.
- Identify and list what are the main goals and modifications of each release.

Prerequisites
3G SYSTRA

Duration
2 days

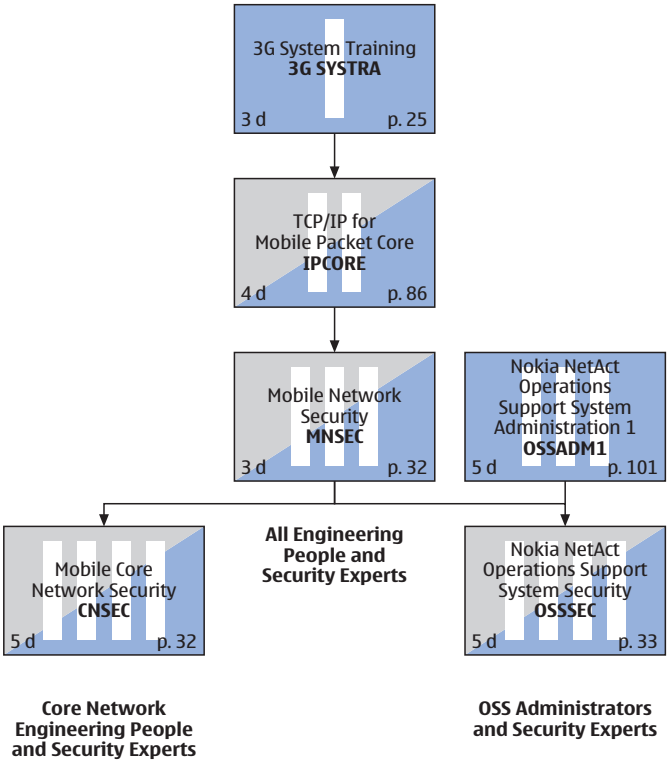
No. of Participants
Max. 24

Modules
- Introduction
- Bearer independent circuit switched core network (UMTS Release 4)
- Home subscriber server (UMTS Release 5)
- IP multimedia subsystem (IMS) (UMTS Release 5)
- Open service access (OSA) (UMTS Release 99 and 4)
- Radio interface and radio access network modifications
- UMTS Release 6 prospects

Notes
This course is arranged in cooperation with Techcom (www.techcom.de) and is not Nokia specific.

Mobile network security

Mobile network security can be achieved if security awareness and vigilance are present throughout the entire operating process, from planning to operation. For that reason, we recommend that at least the network element engineering personnel are trained to a good level of knowledge in network security and are able to recognize and counter vulnerabilities in the organization's network. A well-founded understanding of security issues and principles is needed to deal with today's latest threats, which quickly become tomorrow's outdated threats. We emphasize an understanding of the security aspects of the protocols, platforms and environments involved, in order to prepare your staff for likely threats.



Security tailored workshop

Tailored workshops can be adapted from standard courses and our case-study-pool. These workshops then emphasize specialized areas of the network e.g. the charging gateway, DNS security, OSS host security etc.

Top management errors in network security

Many security problems and network outages are related to popular erroneous management decisions. The famous SANS Institute has identified the seven top management errors related to network security:

- Pretend the problem will go away
- Authorize reactive, short-term fixes so problems re-emerge quickly
- Fail to realize how much money their information and organizational reputation are worth
- Rely primarily on a firewall for security perimeter protection
- Fail to deal with the operational aspects of security
- Fail to understand the relationship of information security to the business problem – they understand physical security, but do not see the consequence of poor information security
- Assign untrained people to maintain security and provide neither the training nor the time to make it possible to do the job

(Source: SANS Institute Network Security Roadmap 2003)

Available Security Workshops

Fundamental topics like DNS-, VPN- or firewall configuration constantly give reason to ask fundamental questions: What is a suitable firewall policy at the Gi interface, how to configure DNS towards the roaming partners and how to efficiently protect routing and network functionality? Standard OM courses often can not provide the answer, because technical planning and strategic considerations are based on profund knowledge of network procedures, used protocols and particular features. To provide a training solution for those fundamental topics, a set of tightly focused workshops deals with those key issues. Other tailored workshops can be delivered upon short request.

Mobile Network Security MNSEC

Target Group
System level experts and second line maintenance staff in a mobile network.

Objectives
After the training, the participant will be able to:
- Understand and use the correct terms when addressing security issues.
- List potential risks for a given network.
- Explain the role of cryptography in a mobile network and describe the main principles.
- Contribute to planning, implementing and reviewing the security architecture of a mobile network.
- List the most relevant network services and describe the security implications.
- Describe selected procedures in the mobile network and their implication for network security.
- Name the 3GPP security standards and describe their implication for the mobile network.
- Be aware of security issues in daily work and spread this attitude.

Prerequisites
3G SYSTRA, IPCORE

Duration
3 days

No. of Participants
Max. 12

Modules
- Security principles and elements
- Cryptography
- Security in 3G mobile networks
- Network services
- Security networks and hosts

Notes
Additional material: “UMTS Security” (Niemi), page 14.

Mobile Core Network Security CNSEC

Target Group
System level experts in 3G core network, security teams, second line maintenance staff.

Objectives
To enable the participants to contribute in a team of security experts or to be the partner for Nokia security experts on the customer side.

After the training, the participant will be able to:
- Understand security in IP based networks as a whole and in the context of mobile networks.
- List the potential risks for a given network.
- Contribute to planning and implementing a secure core network.
- Use standard auditing tools to checkout hosts in a mobile network.
- Contribute efficiently to securing a mobile network.
- Be aware of security issues in daily work and spread this attitude.
- Understands threads for the mobile core network for SCN and PCN as well as the interdependencies.

Prerequisites
3G SYSTRA, IPCORE, MNSEC, GGSNOM

Duration
5 days

No. of Participants
Max. 8

Modules
- CNSEC introduction
- Key topics LAN security
- Key topics WAN security
- Key topics routing security
- Key topics VPN security
- Methods and principles for securing a mobile network
- Key topics network services
- Intrusion detection
- Core network security toolbox
- Core network case studies

Notes
Additional material: “UMTS Security” (Niemi), page 14.

Nokia NetAct Operations Support System Security OSSSEC

Target Group
OSS administrators and specialists, security experts and second line maintenance staff in a mobile network.

Objectives
To enable the participants to contribute in or towards a team of security experts when planning and implementing secure management of a mobile network using the Nokia OSS solution.

After the training, the participant will be able to:
- Understand, use and explain the correct terms when addressing OSS security issues.
- List potential risks for a given network management solution.
- Contribute to planning, implementing and reviewing the security policy of a network management solution.
- Improve security of an existing OSS by taking corrective actions and applying customizations without impacting OS functionality.
- Contribute to planning, implementing and reviewing the security architecture of telecommunication management network (DCN), particularly with regard to VPN and WAN security aspects.
- Harden and configure the DCN routers, LAN-switches and firewalls according to either Nokia manuals or customer specific configuration policies.
- List the most relevant network management procedures, related network services and describe the security implications.
- Use and explain OSS user management applications in order to implement secure and policy-conformant user environments on the OSS servers and towards DCN network elements.
- Plan, execute and evaluate penetration tests and security audits in an existing network management environment.
- Verify and benchmark security settings of an existing OSS environment and rate security interests against usability and performance issues.
- Show awareness of security issues in daily work and spread this attitude.

Prerequisites
3G SYSTRA, IPCORE, OSSADM1, MNSEC

Duration
5 days

No. of Participants
Max. 8

Modules
- OSSSEC introduction
- OSS security architecture
- Key topics LAN security
- Key topics routing security
- Key topics VPN security
- Key topics network services
- OSS security toolbox
- OSS case studies

Domain Name Service Security Workshop NEW! DNSSEC WS

Target Group
System level experts, network engineering and second line maintenance staff in a mobile network.

Objectives
After the training, the participant will be able to:
- Explain basic functionality of the DNS without references to notes.
- Plan new or improve existing DNS structures and hierarchies.
- Set-up a DNS server inside an existing hierarchy.
- Create DNS protocol traces; Understand, monitor and debug DNS configurations based on traces.
- Explain and use most common configuration options and the DNS security features.

Prerequisites
IPCORE, MNSEC

Duration
2 days

No. of Participants
Max. 8

Modules
- DNS protocol concepts
- Elementary and advanced DNS features
- Practical DNS configuration (Linux + HP Unix)

Firewall Security Workshop

NEW!

FWSEC WS

Target Group
Network engineering staff, security experts and second line maintenance staff in a mobile network.

Objectives
After the training, the participant will be able to:
- Outline how to set up filters on different types of firewalls (Checkpoint, CISCO, IPTables) and discuss and plan different filtering rulebases on all IP interfaces of the 3GPP mobile network.
- Discuss and explain advantages and weaknesses of firewalls.
- Configure tunnels through a firewall given suitable configurations.
- Discuss and plan different filtering rulebases on all IP interfaces of the 3GPP mobile network.

Prerequisites
IPCORE, MNSEC

Duration
2 days

No. of Participants
Max. 8

Modules
- Filters and gateways
- Applying filters and rulebases

Unix Host Security Workshop

NEW!

HPUXSEC WS

Target Group
OSS/CG/DNS administrators and specialists, security experts and second line maintenance staff in a mobile network.

Objectives
After the training, the participant will be able to:
- Recognize and qualify security relevant Unix configuration settings.
- Recognize security relevant Achilles' heels in Unix host configurations.
- Monitor user behaviour and system integrity on Unix servers.
- Configure HP-Unix in order to provide controlled and restricted access to applications and resources.
- Isolate or protect Unix hosts against non-trusted environments.
- List and name sources of recent information about security incidents, statistics and other relevant topics in the context of Unix security.
- Find, download and install vendor security patches and additional software in order to enhance Unix host-security.
- Find and use recent, appropriate tools to support secure system administration, base lining and penetration testing.

Prerequisites
IPCORE, MNSEC

Duration
2 days

No. of Participants
Max. 8

Modules
- HPUXSEC introduction
- Securing Unix host access
- HP-UX security toolbox

IP Routing Security Workshop

NEW!

IPRSEC WS

Target Group
Network engineering staff, security experts and second line maintenance staff in a mobile network.

Objectives
After the training, the participant will be able to:
- List various routing protocols, their functions and implement different routing types (static/dynamic).
- Protect routers and switches against break-ins and misuse.
- Explain and know how to execute attacks on standard routing protocol weaknesses like forged LSAs, authentication or replay attacks and outline and implement corrective actions.

Prerequisites
IPCORE, MNSEC

Duration
2 days

No. of Participants
Max. 8

Modules
- Static and dynamic routing
- Routing protocol weaknesses and security features

LAN and VPN Security Workshop

NEW!

VPNSEC WS

Target Group
Network engineering staff, security experts and second line maintenance staff in a mobile network.

Objectives
After the training, the participant will be able to:
- Explain LAN and WAN architectures, configure VLAN infrastructure and outline possible points of attacks and corresponding countermeasures.
- Explain authentication methods PP, L2F, L2TP, configure IP tunneling, list its advantages regarding security and configure a IPSec VPN.
- Configure VPNs in various interfaces in a mobile network.

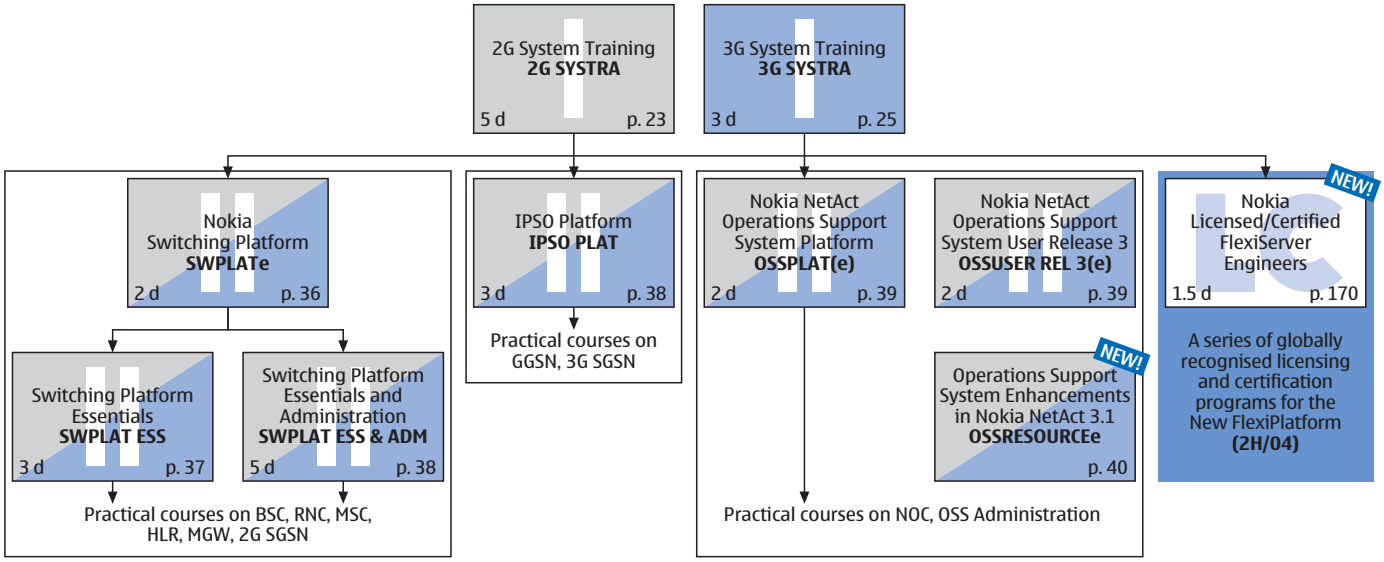
Prerequisites
MNSEC, IPCORE

Duration
3 days

No. of Participants
Max. 8

Modules
- LAN and WAN architectures
- Tunneling protocols
- Selected LAN/WAN/VPN configuration case studies

Nokia platforms



Our platform training is not specific to Nokia 2G or 3G solutions, but caters for the equipment that the student is already using. Platform training lays the foundation for any practical work on the platforms, such as handling the user interface, basic understanding of the equipment's hardware and software architecture, or important common maintenance tasks. The training should be attended prior to taking OM courses on the respective equipment.

Introduced during 2004 will be products based upon Nokia's new FlexiServer, a flexible platform used in a multitude of solutions. Nokia will provide training through product-based licenses and certification – for more information turn to page 169. Prior to the availability of the new licenses and certifications, Nokia will provide OM training with the possibility of being assessed at a later stage.

Nokia Switching Platform — SWPLATe

Target Group
Personnel operating and maintaining the Nokia Platform in GSM, GPRS and 3G environments.

Objectives
After the training, the participant will be able to:
- Identify which Nokia platforms are used in different network technologies.
- List what kind of documentation and supporting resources can be used for operation and maintenance tasks.
- Identify what kind of user interfaces can be used to perform the operation and maintenance tasks.
- Describe the different technologies used in GSM, GPRS and 3G platforms.
- List the characteristics of Nokia platforms.

Prerequisites
2G SYSTRA, GPRSSYS and/or 3G SYSTRA, depending on which modules are included

Duration
2 days

No. of Participants
N/A

Modules
- System review GSM/3G
- Documentation and online resources
- Introduction to 3G platform
- Introduction to DX 200
- Changes from 2G to 3G
- Introduction to IPA2800 platform
- Nokia MML overview
- Nokia NEMU overview
- I/O devices and logical files
- Files and software
- Data communications and signaling
- Switching
- Synchronization
- ATM basics

Notes
- The applicable modules will be selected according to the learner's prerequisite knowledge and target group.
- This course was formerly named Nokia PLAT CBT.

Switching Platform Essentials

SWPLAT ESS

Target Group
Technical personnel using IPA 2800 and/or DX 200 platforms in daily operations.

Objectives
After the training, the participant will be able to:

- List and identify the elements of the Nokia platform in terms of the hardware, user interfaces and how it can be supported. In addition the participant is expected to identify which network element utilizes which platform.
- List five main platforms of IPA 2800 and DX 200 and shortly explain their meaning. Also explain the functional unit grouping and PIU, power distribution, redundancy principle, switching and synchronization.
- List and explain clearly the two different approaches to how the Nokia customer documentation is structured. Furthermore, the participant is expected to give examples of the documents included in each approach and identify the different media of how the documentation is delivered.
- Explain the functioning of the MMI system and man-machine language (MML). Also, demonstrate the use of MML.
- Identify and describe the philosophy of the Nokia NEMU in terms of its role in the telecommunication management networks (TMN). List the key functions of NEMU in the network elements whilst making a difference to the role of the OMU unit. Also, demonstrate the ability to start a NEMU EM session from the client and navigate applications with the application manager.
- List and explain the four fields of DX 200 / IPA 2800 system maintenance. Also, demonstrate the ability to interrogate maintenance information.
- Give six examples of I/O devices in DX 200 and IPA 2800 and their 2 main working states. Also, demonstrate the ability to interrogate the state of I/O devices.
- Explain the concept of DX 200 and IPA 2800 microcomputer, file types, directory structure and file administration procedures. Also, interrogate file information.
- Explain the items belonging to a software package, software package status and the procedures used for software package administration.
- List three examples where OM data communications is used in 3G networks. Also, interrogate DCN configuration.

Prerequisites
2G SYSTRA, 3G SYSTRA, SWPLATe

Duration
3 days

No. of Participants
Max. 8

Modules

- Basics of DX 200 IPA2800 platform
- Documentation and NOLS
- Nokia NEMU
- MMI system
- I/O system
- Maintenance
- File administration
- Software package administration

Notes

- Virtual Classroom available in Q3/04
- Remote Access available in Q3/04
- Additional material: “UMTS Networks” (Kaaranen), page 14. For supporting the understanding of the air interface we recommend “WCDMA for UMTS” (Holma), page 14.

Switching Platform Essentials and Administration

SWPLAT ESS & ADM

Target Group
Technical personnel performing platform administrative tasks e.g. system back-ups and platform troubleshooting.

Objectives
After the training, the participant will be able to:
- Demonstrate 3 basic operations: create, copy and delete files on a WDU disk.
- Demonstrate 4 main operations on the software package: fallback, rollback, safe copying and changing software package in the DX/IPA exchanges. Also, explain the 4 main steps to install a change note/change delivery to a DX/IPA exchange.
- Demonstrate centralized backup configuration using NMS/Nokia NetAct.
- Demonstrate centralized change note management using NMS/Nokia NetAct.
- Modify, create and test logical files connections, file types and redundant logical files.
- Explain the authority system and user access control.
- Configure TCP/IP stack for DX/IPA.

Prerequisites
2G SYSTRA, 3G SYSTRA, SWPLATe

Duration
5 days

No. of Participants
Max. 8

Modules
- Basics of DX 200 /IPA 2800 platform
- Documentation and NOLS
- Nokia NEMU
- MMI system
- I/O system
- Maintenance
- File administration
- Software package administration

IPSO Platform

IPSO PLAT

Target Group
Packet core network (PCN) personnel dealing with IPSO network elements, such as GGSN, LIG, 3G SGSN.

Objectives
After the training, the participant will be able to:
- Install and configure Nokia IP routers. This includes installation of the operating system (IPSO) and configuration of full IP routing functions, including IPv6, OSPF, RIP and VRRP. The training concentrates on topics that are most relevant to those working with Nokia GPRS/3G products.

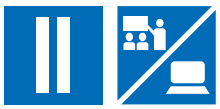
Prerequisites
3G SYSTRA, IPCORE

Duration
3 days

No. of Participants
Max. 8

Modules
- IPSO platform product overview
- IPSO installation
- Basic IPSO configuration with voyager
- Basic IPSO debugging
- IPSO maintenance procedures
- IPSO routing configuration
- IPSO high availability features, VRRP
- IPSO configuration of IPv6 interfaces

Nokia NetAct Operations Support System Platform OSSPLAT(e)



Target Group
Personnel working with the Nokia NetAct Release OSS3.

Objectives
After the training, the participant will be able to:
- Explain the Nokia NetAct functionality and product structure.
- Explain and demonstrate how to use the Nokia NetAct Common Desktop Environment (CDE).
- Explain the basic architecture of Nokia NetAct and how it is connected to the network elements.
- Explain and demonstrate how to use the Nokia NetAct customer documentation.
- Explain the concepts and terms used for alarm monitoring.
- Explain and use the Nokia NetAct Monitor tools for fault monitoring the network.
- List the Nokia NetAct Configurator applications and knows their purpose and usage for network management.
- List the Nokia NetAct Reporter applications and knows their purpose and usage for network management.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
1 day self-study and 1 day practical

No. of Participants
N/A or 8

Modules
- Introduction to Nokia NetAct
- Nokia NetAct basic architecture
- Using Nokia NetAct
- Element management
- Nokia NetAct documentation
- Nokia NetAct Monitor: Introduction concepts and data flow
- Nokia NetAct Monitor: Use of fault management tools
- Nokia NetAct configuring: Overview of applications and functionality
- Nokia NetAct reporting: Overview of applications and functionality

Nokia NetAct Operations Support System User Release 3 (T12 –> OSS3.1) OSSUSER REL 3(e)

Target Group
Personnel working with the Nokia NetAct system.

Objectives
At the end of the learning program the participant will be able to outline the changes between T12 and OSS3.1 in
- Classroom training: the product structure and the applications, the basic architecture of the Nokia NetAct system including hardware, connectivity, DCN solution, system platform, UMA; the customer documentation structure of the Nokia NetAct system; and can handle the e-learning self study and facilitation service.
- E-learning self-study: At the end of the self study the participant will be able to outline the changes between T12 and OSS3.1 in the respective functionality area for certain network technologies.
- Q&A Forum: At the end of the Question and Answer Forum experts worldwide will answer the open questions from the e-learning self study with the focus on the functionality of the tools.

Prerequisites
3G SYSTRA, experience in network management operation with Nokia NetAct

Duration
1 days classroom training + self-study and Q&A Forum

No. of Participants
N/A or 8

Modules
- Introduction to Nokia NetAct (rel)
- Nokia NetAct basic architecture (rel)
- Use of Nokia NetAct (rel)
- Element management (rel)
- Nokia NetAct documentation (rel)
- Nokia NetAct snapshots of functionality areas
- Introduction to e-learning self-study and Q&A Forum
- Monitor e-learning
- 2G Radio Access Optimizer e-learning
- 3G Radio Access Development e-learning
- 2G Radio Access Development e-learning
- XML interface for planning data e-learning
- Reporter e-learning
- Administrator applications e-learning
- Packet Core Configurator e-learning
- Service Quality Manager e-learning
- Nokia NetAct Planner e-learning
- OSSUSER REL 3(e) changes with OSS3.1 ED2 and ATM Manager e-learning

Operations Support System Enhancements in Nokia NetAct 3.1

NEW!

OSSRESOURCEe

E-JobAid
- Change in OSS applications and procedures after software upgrade, feature activation etc.

E-Forum
- Supporting Commonly asked Questions and Answers
- Mailing list specific for members

E-Reference
- Additional Slides from training

Notes
- The content of this material is comparable with our intermediate training.
- Available in Q3/04.

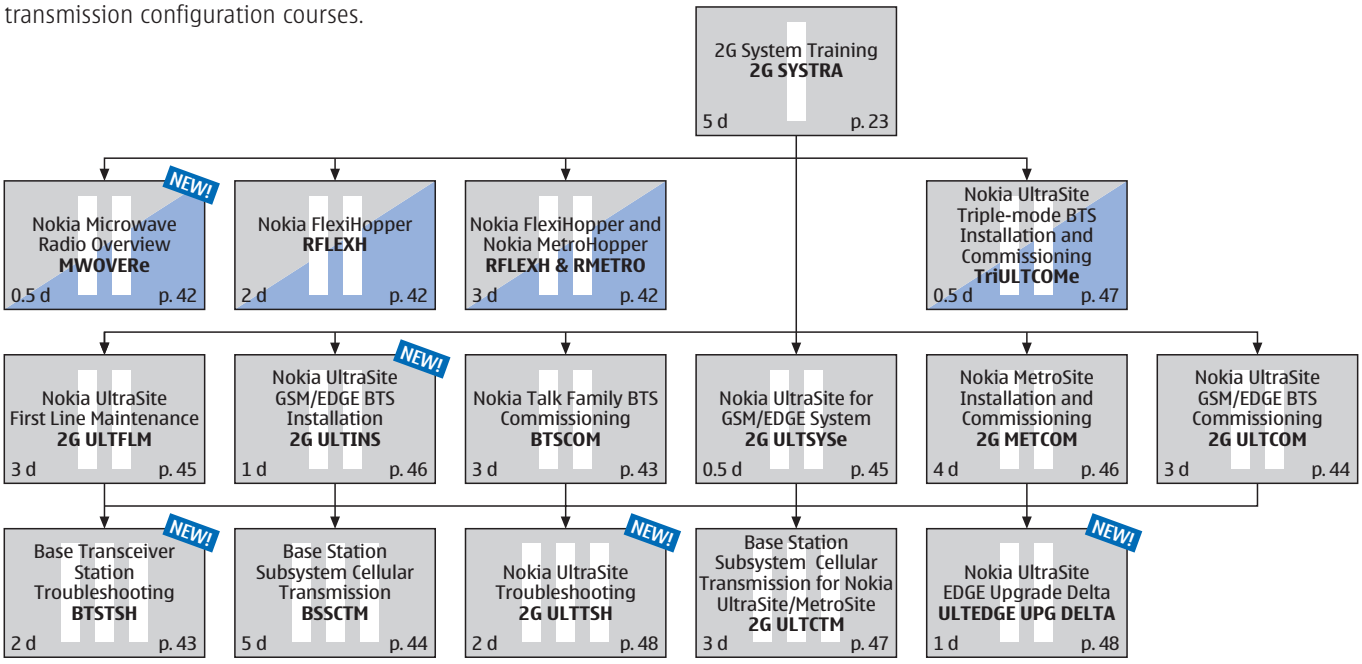
Field engineering

The field engineering group is responsible for technical tasks carried out on equipment widely distributed in the field, such as base stations and microwave equipment. The work can be grouped into installation, commissioning and first line maintenance. First line maintenance manages preventive maintenance, as well as problems under the direction of the network surveillance team. This group might also be involved in system upgrades together with engineering support.

2G field engineering

Our standard training solution covers all the aspects that your field personnel will need, including installation, commissioning, maintenance and troubleshooting courses. As transmission is becoming more challenging with the co-location of 3G base stations and changes in capacity requirements, we now provide a range of transmission configuration courses.

More information on training solutions on the Nokia Connect 10/100 Base Stations can be found on page 175 and page 177.



Nokia FlexiHopper RFLEXH

Target Group
Operating and maintenance personnel of transmission and GSM network using Nokia Microwave Radio equipment (for example, network management personnel, technical field staff and/or system specialists).

Objectives
After the training, the participant will be able to:
- Install, commission and maintain the Nokia FlexiHopper Radio.
- List principles in the use of the common RF terminology.

Prerequisites
Experience in telecommunications transmission equipment

Duration
2 days

No. of Participants
Max. 8

Modules
- Nokia FlexiHopper product overview
- Nokia FlexiHopper installation
- Nokia FlexiHopper commissioning and maintenance

Nokia FlexiHopper and Nokia MetroHopper RFLEXH & RMETRO

Target Group
Operating and maintenance personnel of transmission and GSM networks using Nokia Microwave Radio relay equipment (for example, network management personnel, technical field staff and/or system specialists).

Objectives
After the training, the participant will be able to:
- Install, commission and maintain the Nokia FlexiHopper and Nokia MetroHopper Radios.

Prerequisites
Experience in telecommunications transmission equipment

Duration
3 days

No. of Participants
Max. 8

Modules
- Nokia FlexiHopper product overview
- Nokia FlexiHopper installation
- Nokia FlexiHopper commissioning and maintenance
- Nokia MetroHopper product overview
- Nokia MetroHopper installation
- Nokia FlexiHopper and Nokia MetroHopper commissioning and maintenance with FIU 19(E) and RRIC

Nokia Microwave Radio Overview NEW! MWOVERe

Target Group
Personnel who need a theory overview on Nokia FlexiHopper and/or Nokia MetroHopper Microwave Radios.

Objectives
At the end of the e-learning the learner will have the overall/supportive technical knowledge of Nokia Microwave Radios (MWR) and their usage. Also the learner will know where to find more information.

Prerequisites
None

Duration
0.5 day

No. of Participants
N/A

Modules
- Introduction
- Microwave Radio essentials
- Nokia Microwave Radio products
- Typical Nokia Hopper applications

Nokia Talk Family BTS Commissioning BTSCOM

Target Group
Technical personnel working with 3G Nokia Talk Family BTS equipment.

Objectives
After the training, the participant will be able to:
- Understand general function of a GSM network.
- Check BTS installation.
- Understand function of Nokia BTS and function of BTS units.
- Commission the 3G Nokia Talk Family BTS, following the Nokia commissioning procedure.

Prerequisites
2G SYSTRA

Duration
3 days

No. of Participants
Max. 8

Modules
- GSM DE34 BTS / Network architecture and interfaces
- GSM BTS/DE/DF34 product family
- GSM DE34 BTS configurations
- GSM DE34 BTS function and block diagram of the units
- GSM DE34 BTS plug-in-unit description
- GSM DE34 BTS and plug-in-unit installation / Checking the installation
- GSM DE34 BTS TRU settings and branching tables
- GSM DE34 BTS MMI software
- GSM DE34 BTS commissioning

Base Transceiver Station Troubleshooting

NEW! BTSTSH

Target Group
BSS and Base Transceiver Station field maintenance and support personnel.

Objectives
After the training, the participant will be able to:
- Identify the potential problem areas affecting BTS performance.
- Use MMI PC to commission and test Nokia Talk Family BTS for correct configuration and operation.
- Analyze BTS status and alarms to localize faults.
- Use service terminal to reconfigure and test TRU devices.
- Create, edit, activate and copy TRU branching tables with service terminal.
- Localize and clear BTS faults using: alarm analysis, loop testing, quality and quality monitoring (BER, BER2, FER).
- Localize and clear A-bis faults with MML commands.
- Manage the cabling and settings for fault finding.

Prerequisites
2G SYSTRA, BSSESS, BSSPROD, BTSCOM

Duration
2 days

No. of Participants
Max. 8

Modules
- Overview/introduction
- GSM DE34 BTS plug-in-unit description
- Abis-interface integration with MML
- BSS TSH overview
- BTS TSH overview
- Cabling, installation and settings for fault finding / DE34
- SW fault cases for DE34
- HW fault cases for DE34
- BSS Abis fault cases and test calls

Base Station Subsystem Cellular Transmission BSSCTM

Target Group
BSS field engineers, engineering support personnel, technical support personnel; also network planners.

Objectives
After the training, the participant will be able to:
- Commission and configure loops for the DN2 for use in mobile networks, including Microwave Radios (optional).

Prerequisites
2G SYSTRA, BSSESS, BTSCOM

Duration
5 days

No. of Participants
Max. 8

Modules
- DN2 principles and functions
- DN2 configuration and cross-connections
- TRUA principles and functions
- TRUA configuration and branching
- Q1 management configuration
- BTS loop configuration and protection

Nokia UltraSite GSM/EDGE BTS Commissioning 2G ULTCOM

Target Group
BTS commissioning engineers.

Objectives
After the training, the participant will be able to:
- Describe the Nokia UltraSite solution.
- Commission the Nokia UltraSite elements.
- Correctly commission Nokia FlexiHopper.

Prerequisites
2G SYSTRA

Duration
3 days

No. of Participants
Max. 8

Modules
- Nokia UltraSite GSM/EDGE BTS product overview
- Nokia UltraSite GSM/EDGE BTS installation check
- Nokia UltraSite GSM/EDGE BTS unit cables and combiner options
- Nokia UltraSite GSM/EDGE BTS antenna system
- Nokia UltraSite GSM / Nokia Talk Family BTS co-locating and configuration
- Nokia UltraSite GSM/EDGE BTS unit description
- Nokia UltraSite GSM/EDGE BTS commissioning
- Nokia UltraSite FlexiHopper commissioning

Nokia UltraSite for GSM/EDGE System — 2G ULTSYSe

Target Group
Personnel who require general knowledge of the Nokia UltraSite solution.

Objectives
After the training, the participant will be able to:
- Complete an illustration of the Nokia UltraSite solution architecture.
- List the basic features and functions of each Nokia UltraSite network element.
- List and describe the process and tools used to implement the Nokia UltraSite solution.
- List the tools used to operate and maintain the Nokia UltraSite solution.

Prerequisites
2G SYSTRA

Duration
0.5 day

No. of Participants
N/A

Modules
- Nokia UltraSite product family
- Nokia UltraSite implementation
- Nokia UltraSite network solutions
- Nokia UltraSite transmission solution
- Nokia UltraSite operations and maintenance
- Network planning with Nokia UltraSite

Nokia UltraSite First Line Maintenance — 2G ULTFLM

Target Group
Field personnel who will perform first line maintenance at Nokia UltraSite 2G Base Stations.

Objectives
After the training, the participant will be able to:
- Detect faults of Nokia UltraSite BS plug-in units.
- Replace faulty units.
- Verify base station's function by testing.

Prerequisites
2G SYSTRA

Duration
3 days

No. of Participants
Max. 8

Modules
- Nokia UltraSite GSM/EDGE BTS product overview
- Nokia UltraSite GSM/EDGE BTS Antenna System
- Nokia UltraSite FlexiHopper product description
- Nokia UltraSite GSM/EDGE Manager software and software handling
- Nokia UltraSite GSM/EDGE Base Station alarm handling
- Nokia UltraSite GSM/EDGE first line maintenance

Notes
This course was formerly named ULTOP.

Nokia UltraSite GSM/EDGE BTS Installation

NEW!

2G ULTINS

Target Group
BTS installation personnel.

Objectives
After the training, the participant will be able to:
- Describe the Nokia UltraSite solution.
- Install the Nokia UltraSite BTS completely.

Prerequisites
2G SYSTRA

Duration
1 day

No. of Participants
Max. 8

Modules
- Nokia UltraSite GSM/EDGE BTS product overview
- Nokia UltraSite GSM/EDGE BTS unit description
- Nokia UltraSite GSM/EDGE BTS installation
- Nokia UltraSite GSM/EDGE BTS unit cables and combiner options

Nokia MetroSite Installation and Commissioning

2G METCOM

Target Group
Field personnel who will install and commission Nokia MetroSite sites.

Objectives
After the training, the participant will be able to:
- Install the Nokia MetroSite elements.
- Commission the Nokia MetroSite elements.

Prerequisites
2G SYSTRA

Duration
4 days

No. of Participants
Max. 8

Modules
- Nokia MetroSite solution overview
- Nokia MetroSite BTS product overview
- Nokia MetroSite BTS installation
- Nokia MetroSite BTS commissioning
- Nokia MetroSite BBU product overview
- Nokia MetroSite BBU installation
- Nokia ITN and PDH-SDH transmission units overview
- Nokia FlexiHopper product overview
- Nokia MetroHopper product overview
- Nokia FlexiHopper and Nokia MetroHopper commissioning and maintenance with FIU 19(E) and RRIC
- Nokia MetroHub product overview
- Nokia MetroHub installation
- Nokia MetroHub commissioning

Nokia UltraSite Triple-mode BTS Installation and Commissioning

TriULTCOMe

Target Group
Personnel who need to learn about installation, commissioning and maintenance of the Nokia triple-mode BTS.

Objectives
After the training, the participant will be able to:
- Describe the Nokia UltraSite triple-mode BTS configuration.
- Install and commission the WCDMA upgrade.
- Understand the basic operation and maintenance of the triple-mode BTS.

Prerequisites
UNDGSMe, 3G INTe

Duration
0.5 day

No. of Participants
N/A

Modules
- Triple-mode BTS overview
- Triple-mode BTS WCDMA upgrade installation
- Triple-mode BTS unit installation
- Triple-mode BTS commissioning and integration
- Triple-mode BTS operation and maintenance

Base Station Subsystem Cellular Transmission for Nokia UltraSite/MetroSite

2G ULTCTM

Target Group
BSS field engineers, engineering support personnel, technical support personnel, network planners.

Objectives
After the training, the participant will be able to:
- Configure the different transmission units in an Nokia UltraSite/MetroSite GSM network.
- Implement transmission loop protection in the Abis-interface.
- Configure Q1 transmission management in the BSS.

Prerequisites
2G SYSTRA, BSSESS

Duration
3 days

No. of Participants
Max. 8

Modules
- Cellular transmission principles
- Hardware and software overview
- Transmission loop protection
- Q1 transmission management

Nokia UltraSite EDGE Upgrade Delta

NEW!

ULTEDGE UPG DELTA

Target Group
BTS commissioning engineers.

Objectives
After the training, the participant will be able to:
- Describe new Nokia UltraSite EDGE features.
- Know the required versions of Nokia UltraSite elements and other network elements.
- Correctly upgrade Nokia UltraSite BTS with EDGE hardware and software.
- Commission A-bis interface with EDAP feature.

Prerequisites
2G SYSTRA, 2G ULTCOM

Duration
1 day

No. of Participants
Max. 8

Modules
- Nokia UltraSite EDGE BTS implementation overview
- Nokia UltraSite EDGE BTS upgrade features
- Nokia UltraSite EDGE BTS upgrade configurations and restrictions
- Nokia UltraSite EDGE BTS upgrade installation and cabling
- Nokia UltraSite EDGE BTS upgrade commissioning, integration and acceptance

Nokia UltraSite Troubleshooting

NEW!

2G ULTTSH

Target Group
Personnel taking care of installation, commissioning, integration, maintenance and administration of Nokia UltraSite BTS.

Objectives
After the training, the participant will be able to:
- Perform preventive maintenance.
- Read led indicators for all device in Nokia UltraSite EDGE Base Station (BTS).
- Analyze BTS status and alarms to localize faults.
- Replace faulty units.
- Expand the configuration of a Nokia UltraSite EDGE Base Station (BTS).
- Troubleshoot and solve problems in Nokia UltraSite EDGE Base Station (BTS).

Prerequisites
2G SYSTRA, 2G ULTFLM

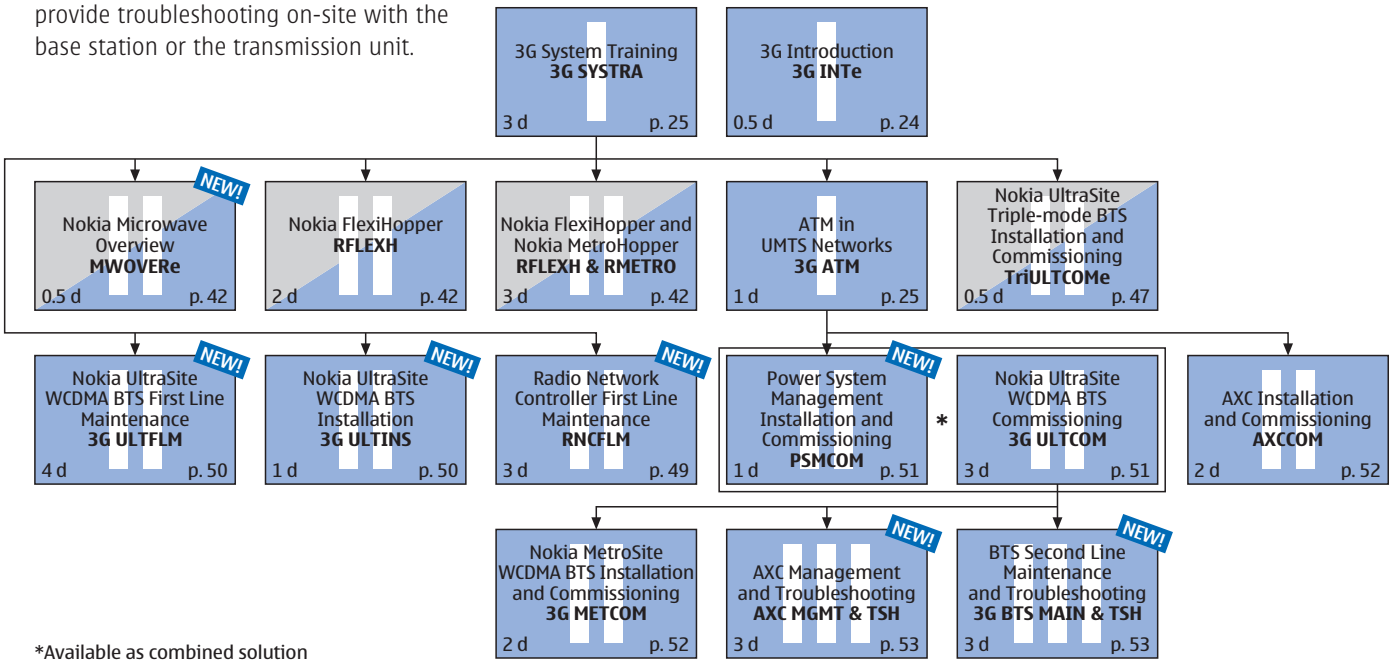
Duration
2 days

No. of Participants
Max. 8

Modules
- 2G Nokia UltraSite overview
- Cabling, installation and settings for fault finding
- Troubleshooting for four typical faults
- Troubleshooting principles, methods and tools
- Transmission unit fault cases
- Commissioning fault cases
- HW fault cases

3G field engineering

The tasks of 3G field engineering personnel include installation, commissioning and maintenance of the Nokia UltraSite, Nokia MetroSite and transmission connections. In many cases the personnel are also expected to provide troubleshooting on-site with the base station or the transmission unit.



*Available as combined solution

Radio Network Controller First Line Maintenance

NEW!

RNCFLM

Target Group
RNC first line maintenance personnel.

Objectives
After the training, the participant will be able to:
- Perform first line maintenance tasks at Nokia RNC's.

Prerequisites
3G SYSTRA, RNCARCe

Duration
3 days

No. of Participants
Max. 8

Modules
- RNC functionality
- Using Nokia Online Services NOLS
- IPA 2800 hardware configuration
- Using RNC NEMU
- Repetition of IPA 2800 alarm structure
- Unit working state administration
- Replacing of RNC plug-in units
- Basic NEMU maintenance

Notes
Participants are requested to use their own laptops during the course in order to test their own tools. The user must have local admin rights on his/her laptop. However, Nokia classrooms are equipped with PCs.

Nokia UltraSite WCDMA BTS First Line Maintenance

NEW!

3G ULTFLM

Target Group
Field personnel who will perform first line maintenance at Nokia UltraSite WCDMA Base Stations.

Objectives
After the training, the participant will be able to:
- Perform regular and preventive maintenance for the WBTS and AXC.
- Perform event based maintenance tasks for the WBTS and AXC.
- Perform first line maintenance for the site support system.

Prerequisites
3G SYSTRA

Duration
4 days

No. of Participants
Max. 8

Modules
- WCDMA BTS overview
- WCDMA BTS unit overview
- AXC product overview
- Inspection of the WBTS and AXC equipment
- Check unit parameter settings of WBTS and AXC units
- AXC performance verification
- WBTS performance verification
- Event management and site status reporting
- Removal and replacement of AXC and WBTS units
- Cabling of AXC and WBTS plug-in units
- WBTS restoration with configuration file
- AXC restoration with configuration file
- Maintenance of the site support system

Nokia UltraSite WCDMA BTS Installation

NEW!

3G ULTINS

Target Group
Personnel taking care of installation of Nokia UltraSite WCDMA BTS.

Objectives
After the training, the participant will be able to:
- Describe the Nokia UltraSite WCDMA BTS solution.
- Install the Nokia UltraSite WCDMA BTS cabinet, cables, and units.

Prerequisites
3G SYSTRA

Duration
1 day

No. of Participants
Max. 8

Modules
- WCDMA BTS Overview
- WCDMA BTS Unit Overview
- WCDMA BTS Nokia UltraSite cabinet and unit installation
- WCDMA BTS Nokia UltraSite cabinet and interface cabling

Notes
One WCDMA base station for each group of 4 participants is needed during the practical installation exercise. The base station can be either Supreme or Optima.

Nokia UltraSite WCDMA BTS Commissioning

3G ULTCOM

Target Group
BTS commissioning engineers.

Objectives
After the training, the participant will be able to:
- Describe the Nokia UltraSite WCDMA solution.
- Commission and integrate the Nokia UltraSite WCDMA BTS.

Prerequisites
3G SYSTRA, 3G ATM

Duration
3 days

No. of Participants
Max. 8

Modules
- WCDMA BTS overview
- AXC product overview
- AXC units
- AXC installation
- WCDMA BTS unit overview
- WCDMA BTS Nokia UltraSite Supreme Indoor cabinet and unit installation
- WCDMA BTS Nokia UltraSite Supreme Indoor cabinet cabling
- WCDMA BTS commissioning
- AXC commissioning
- WCDMA BTS local operation and maintenance

Power System Management Installation and Commissioning

NEW!

PSMCOM

Target Group
Field personnel and supervisors who will install, commission and integrate BBU and SSS and need deeper knowledge of the PSM.

Objectives
After the training, the participant will be able to:
- Perform the local commissioning.
- Run the local battery test.
- Perform local troubleshooting with PSM manager.
- Configure different BTS cabinets and cabling.
- Configure the BSC for Q1 management.
- List the features for remote functionality of the PSM in 2G and 3G networks.
- Connect via Windows Terminal Server to the battery backup unit and site support system.

Prerequisites
3G SYSTRA, 3G ATM

Duration
1 day

No. of Participants
Max. 8

Modules
- Power system management (PSM) overview
- Power system management (PSM) commissioning
- Power system management (PSM) maintenance and troubleshooting
- Power system management (PSM) integration and remote management

AXC Installation and Commissioning AXCCOM

Target Group
First and second line maintenance personnel, AXC commissioning engineers.

Objectives
After the training, the participant will be able to:
- Install the AXC and the interface units.
- Commission and prepare the AXC for the integration.
- Upgrade the AXC node to the required software level.

Prerequisites
3G SYSTRA, 3G ATM

Duration
2 days

No. of Participants
Max. 8

Modules
- AXC product overview
- AXC units
- AXC installation
- AXC commissioning
- AXC commissioning in practice
- AXC node software upgrade

Notes
This course was formerly named AXCOM – AXC Operation and Maintenance.

Nokia MetroSite WCDMA BTS Installation and Commissioning 3G METCOM

Target Group
Field personnel who will install and commission Nokia MetroSite WCDMA BTS.

Objectives
After the training, the participant will be able to:
- Install the Nokia MetroSite for WDCMA elements.
- Commission the Nokia MetroSite for WDCMA elements.

Prerequisites
3G SYSTRA, 3G ATM, 3G ULTCOM

Duration
2 days

No. of Participants
Max. 8

Modules
- WCDMA BTS Nokia MetroSite overview
- WCDMA BTS Nokia MetroSite unit overview
- WCDMA BTS Nokia MetroSite installation
- WCDMA BTS commissioning
- AXC commissioning
- WCDMA BTS Nokia MetroSite local operation and maintenance

AXC Management and Troubleshooting

NEW!

AXC MGMT & TSH

Target Group
Transmission personnel, engineering support, second line maintenance personnel, field engineering personnel, OM personnel.

Objectives
After the training, the participant will be able to:
- Implement and integrate AXC C2.0 in the transmission network.
- Manage AXC node locally and remotely.
- Perform AXC network planning.
- Create and Modify AXC transmission and IP parameters.
- Maintain the AXC.
- Perform AXC software, hardware and transmission related troubleshooting.

Prerequisites
3G SYSTRA, AXCCOM

Duration
3 days

No. of Participants
Max. 8

Modules
- AXC features
- AXC node software upgrade
- AXC commissioning in practice
- AXC automated commissioning
- AXC reconfiguration
- WBTS chaining and DCN configuration in AXC
- AXC operation and maintenance
- AXC management protocol
- AXC Q1 management
- AXC troubleshooting

BTS Second Line Maintenance and Troubleshooting

NEW!

3G BTS MAIN & TSH

Target Group
Personnel taking care of maintaining WCDMA BTS.

Objectives
After the training, the participant will be able to:
- Describe the WCDMA BTS solution and main features of different WBTSs.
- Describe the new software and hardware features.
- Maintain the Nokia UltraSite/MetroSite WCDMA BTSs and AXC.
- Monitor the alarms.
- Troubleshoot the alarms.
- Replace faulty units.
- Make software updates.

Prerequisites
3G SYSTRA, 2G ULTCOM, 3G ULTFLM, 3G ULTCOM, 3G ULTINS

Duration
3 days

No. of Participants
Max. 8

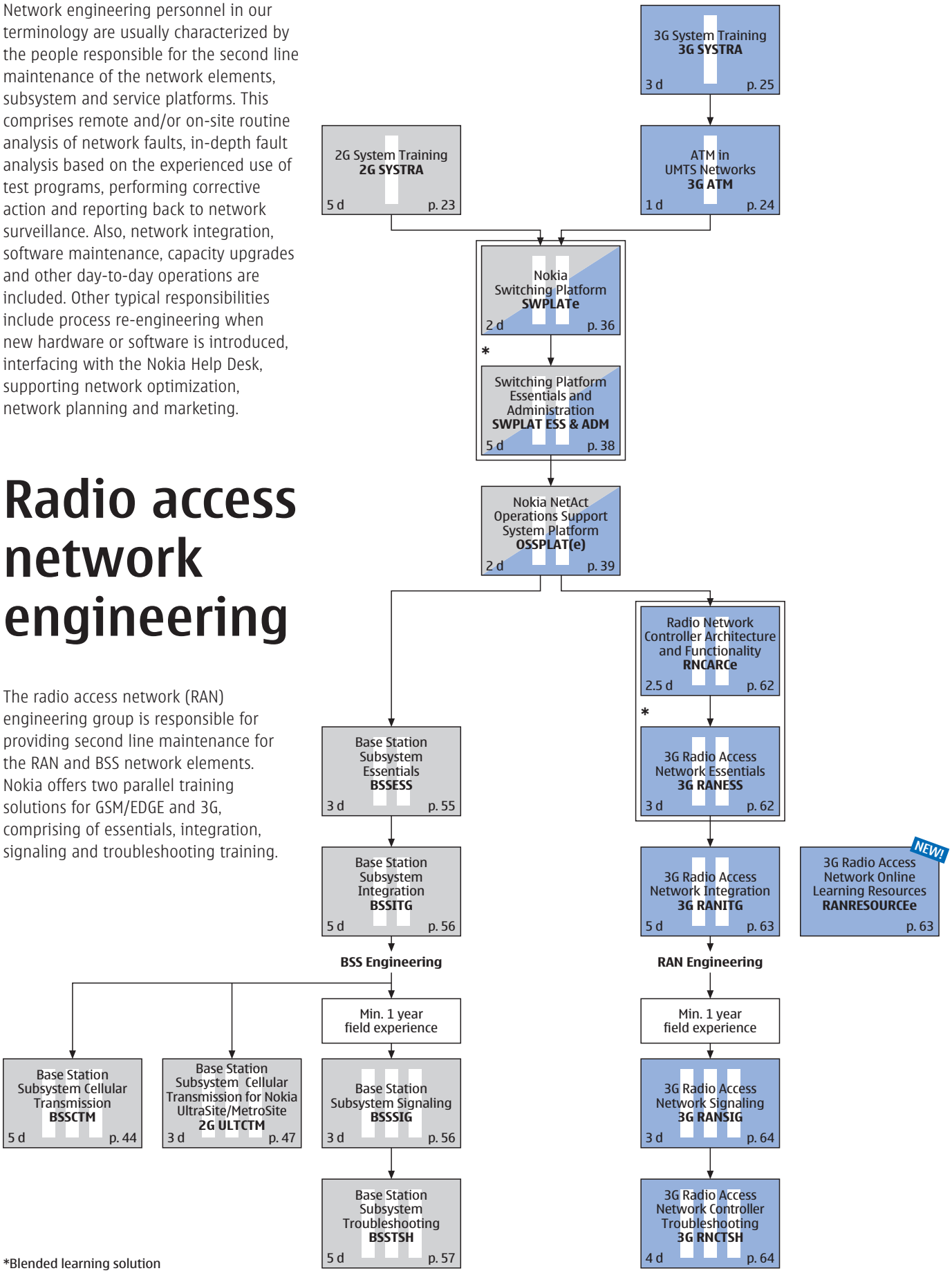
Modules
- WCDMA BTS review
- AXC features
- AXC node software upgrade
- AXC commissioning in practice
- AXC automated commissioning
- AXC reconfiguration
- AXC operation and maintenance
- AXC troubleshooting
- WBTS reconfiguration
- WBTS operation and maintenance
- WBTS troubleshooting

Network engineering

Network engineering personnel in our terminology are usually characterized by the people responsible for the second line maintenance of the network elements, subsystem and service platforms. This comprises remote and/or on-site routine analysis of network faults, in-depth fault analysis based on the experienced use of test programs, performing corrective action and reporting back to network surveillance. Also, network integration, software maintenance, capacity upgrades and other day-to-day operations are included. Other typical responsibilities include process re-engineering when new hardware or software is introduced, interfacing with the Nokia Help Desk, supporting network optimization, network planning and marketing.

Radio access network engineering

The radio access network (RAN) engineering group is responsible for providing second line maintenance for the RAN and BSS network elements. Nokia offers two parallel training solutions for GSM/EDGE and 3G, comprising of essentials, integration, signaling and troubleshooting training.

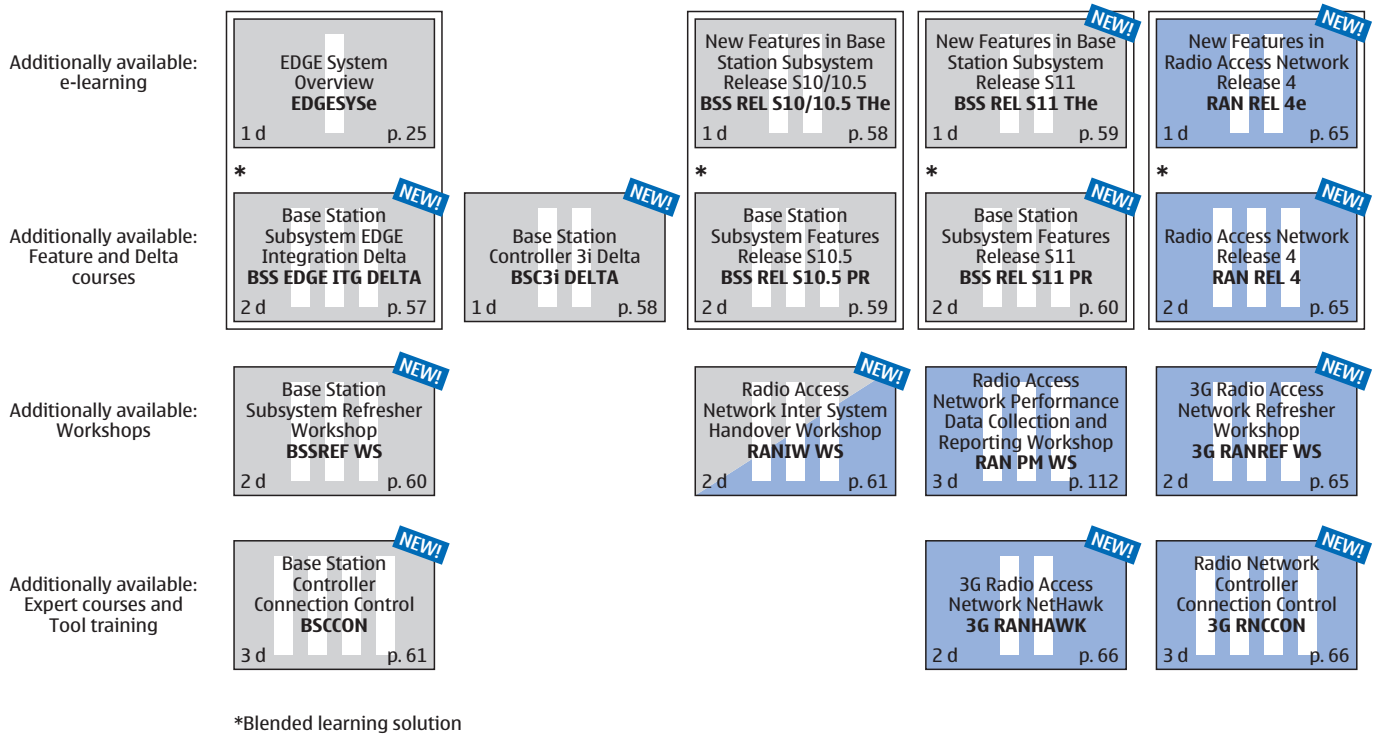


*Blended learning solution

New equipment releases are introduced by e-learning solutions on a theory level, such as the RAN REL 4e, BSS REL S11 THe or feature focused training, like the EDGESYSe. These practical aspects, prerequisites for OM personnel, are introduced in classroom training.

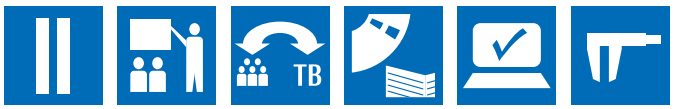
As 3G networks are now being rolled out, we provide workshops for the system experts and specialist RAN engineers which focus on the more complex areas of inter-working, handovers, call control and features.

In 2004, two new types of workshops will be introduced to maintain the capability of your experts: BSS Refresher and RAN Refresher. The workshops are aimed at people who need top-up knowledge on the Nokia solution, and who, for example, have not attended training in the BSC or RAN for three years or more.



*Blended learning solution

Base Station Subsystem Essentials BSSESS



Target Group
BSS engineering support, network surveillance personnel and NOC configuration personnel.

Objectives
After the training, the participant will be able to:
- Identify and describe the BSS network elements.
- Describe the passage of a circuit and package switched call through the BSS.
- Perform basic TCSM2 operation.
- Explain Nokia Base Station solutions.
- Describes the functions of the BSC, its capacity and configuration.
- Describe the BSS radio network object model.
- Identify and describe the radio network parameters.
- Modify and interrogate the radio network by MML, including adjacent cells.
- Describe the concepts of radio network configuration management and the representation of radio network parameters in the Nokia network management system Nokia NetAct.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, OSSPLAT

Duration
3 days

No. of Participants
Max. 8

Modules
- BSS overview
- Traffic channels
- TCSM2E basic operation
- Introduction to Nokia Base Stations
- BSC architecture and functions
- Introduction to radio network administration
- Adjacent cell handling
- Radio network parameters
- RNW configuration management 2G – principles and concepts

Notes
Remote access available in Q3/04.

Base Station Subsystem Integration BSSITG

Target Group
BSS engineering personnel.

Objectives
After the training, the participant will be able to:
- Configure and integrate the TCSM2E.
- Integrate the A interface using MML commands.
- Integrate Abis interface using MML commands.
- Monitor the restart phases of base stations.
- Integrate Gb interface and GPRS/EGPRS radio network capacity.
- Create GPRS capacity in the BSC.
- Verify X.25 integration.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, OSSPLAT, BSSESS

Duration
5 days

No. of Participants
Max. 8

Modules
- TCSM2E configuration
- TCSM2E integration in the BSC
- A-interface integration with MML
- Abis-interface integration with MML
- Restart phase monitoring
- GPRS and EGPRS integration in BSC
- Verify X.25 integration

Base Station Subsystem Signaling BSSSIG

Target Group
BSS personnel and system specialists, who have at least half a year of practical experience in the field.

Objectives
After the training, the participant will be able to:
- Provide BSS personnel with knowledge about signaling in the BSS focusing on troubleshooting principles.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, BSSSOM

Duration
3 days

No. of Participants
Max. 6

Modules
- BSS signaling
- Signaling examples (BSS)
- BSS signaling: Nethawk Protocol Analyzer User Guide
- Useful BSC/MSC commands
- Successful call cases
- Failing call cases

Notes
Additional material: “GSM Switching, Services and Protocols” (Eberspächer), page 16.

Base Station Subsystem Troubleshooting BSSTSH

Target Group
BSS personnel and system specialists, who will be responsible for fault finding and troubleshooting and who have at least half a year of practical experience in the field.

Objectives
After the training, the participant will be able to:
- Provide BSS personnel with knowledge to be able to perform troubleshooting on a various aspects of the BSS subsystem.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, BSSSIG, BSSSOM

Duration
5 days

No. of Participants
Max. 4

Modules
- DX 200 debugger (service terminal essentials)
- BSC specific debugger extensions
- DX 200 file system
- Changing of mass memory units
- BSC database administration
- Radio network supervision in BSC
- Print-out of BSC radio network supervision parameters
- Preventive maintenance
- BSS safecopy handling
- Fault cases in BSC; BTS and BSS transmission

Base Station Subsystem EDGE Integration Delta

NEW!

BSS EDGE ITG DELTA

Target Group
GSM radio network integration personnel, operation and maintenance personnel, network management personnel, system specialists operating BSC.

Objectives
After the training, the participant will be able to:
- Describe, what EDGE is.
- Explain impacts on Nokia BSS solution.
- Describe the impact on core network, network management system and network planning.
- Perform all necessary task to implement EDGE in BSS.
- Verify EDGE related parameters to ensure EDGE functionality.

Prerequisites
2G SYSTRA, BSSESS, BSSITG, SWPLATe

Duration
2 days

No. of Participants
Max. 8

Modules
- EDGE basics
- 2G Nokia UltraSite Base Station EDGE upgrade
- Nokia EDGE solution
- Nokia UltraSite EDGE Base Station co-siting
- Nokia UltraSite EDGE BS local OM routines and TSH

Notes
Module names may change.

Base Station Controller 3i Delta

NEW!

BSC3i DELTA

Target Group
GSM radio network integration personnel, operation and maintenance personnel, network management personnel, BSS field personnel, system specialists operating BSC.

Objectives
After the training, the participant will be able to:
- Describe the functions and architecture of the BSC3i.
- Inspect the BSC3i.
- Operate the BSC3i using MML.

Prerequisites
2G SYSTRA, BSSESS, BSSITG, knowledge and skills of an earlier Nokia BSC.

Duration
1 day

No. of Participants
Max. 8

Modules
- Introduction to BSC3i
- Differences between BSC3i and BSC2
- Ethernet switch ESB20
- BSC3i inspection
- BSC3i operation using MML

Notes
E-seminar available in Q3/04.

New Features in Base Station Subsystem Release S10/10.5

BSS REL S10/10.5 THe

Target Group
Personnel in BSS network engineering, network operation and control, first line maintenance and site engineering, network planning, marketing.

Objectives
After the training, the participant will be able to:
- Investigate enhancements to the BSS arising from release S10/10.5.

Prerequisites
UndGSMe, 2G SYSTRA, SWPLATe, SWPLAT ESS, BSSESS

Duration
1 day

No. of Participants
N/A

Modules
- S10/10.5 BTS features
- S10/10.5 RNW performance
- S10/10.5 data solutions
- S10/10.5 macrocellular
- S10/10.5 microcellular
- S10/10.5 value added services
- S10/10.5 hardware requirements

Base Station Subsystem Features Release S10.5

BSS REL S10.5 PR

Target Group
Configuration management personnel, engineering support, and system specialists operating BSS.

Objectives
After the training, the participant will be able to:
- Provide an overview and basic explanations of the new features in the BSS S10.5 software release in Nokia Base Station Subsystem and activation procedures.

Prerequisites
2G SYSTRA, BSSESS, BSSITG, BSS REL S10/10.5 THe

Duration
2 days

No. of Participants
Max. 8

Modules
- S10/10.5 hardware requirements
- S10/10.5 compatability matrix
- S10/10.5 features
- MML changes between Release S9 and S10 (reference material)
- NED 5.1 for BSSREL reference

Notes
Addition to BSSREL e-learning.

New Features in Base Station Subsystem Release S11

NEW!

BSS REL S11 THe

Target Group
Personnel in BSS network engineering, network operation and control, first line maintenance and site engineering, network planning, marketing.

Objectives
After the training, the participant will be able to:
- Identify the features under development for the BSS S11 software release.
- Give a general description of the purpose and function of each of the enhancements and new features, covered in each category.
- Identify the minimum software and hardware revisions required in each network element to implement each new feature.
- Define the minimum BSC hardware requirements for S11.
- Define the minimum BTS hardware and software requirements.
- Suggest possible benefits from implementing each enhancement and new feature.
- Summarize those new features in S11 (in software and hardware) which may be utilized to enhance Nokia BSS performance statistics for coverage, capacity, quality, spectral efficiency and service delivery.
- Explain the effects of parameter changes in S11.
- Define changes in statistics and measurements for BSS S11 software release.
- Define changes in man machine language involve with BSS S11 software release.

Prerequisites
UndGSMe, 2G SYSTRA, SWPLATe, SWPLAT ESS, BSSESS

Duration
1 day

No. of Participants
N/A

Modules
- S11 hardware requirements
- S11 BTS features
- S11 RNW performance
- S11 packet switched data
- S11 macrocellular
- S11 operability
- S11 value added services

Base Station Subsystem Features Release S11

NEW!

BSS REL S11 PR

Target Group
Configuration management personnel, engineering support, and system specialists operating BSS.

Objectives
After the training, the participant will be able to:
- Provide an overview and basic explanations of the new features in the BSS S11 software release in Nokia Base Station Subsystem and activation procedures.

Prerequisites
2G SYSTRA, BSSESS, BSSITG, BSS REL S11 THe

Duration
2 days

No. of Participants
Max. 8

Modules
- S11 hardware requirements
- S11 compatability matrix
- S11 features
- MML changes between Release S10 and S11 (reference material)

Notes
Addition to BSSREL e-learning. Content may change when S11 released.

Base Station Subsystem Refresher Workshop

NEW!

BSSREF WS

Target Group
Advanced BSS personnel, system specialists.

Objectives
After the training, the participant will be able to:
- Utilize the latest information in their jobs.
- Fulfill the possible gaps related signaling and troubleshooting.
- Troubleshoot the BSS network with latest updates.

Prerequisites
BSSSIG, BSSTSH

Duration
2 days

No. of Participants
Max. 8

Modules
- Useful BSC/MSC commands
- Failing call cases
- Successful call cases
- DX 200 debugger (Service Terminal Essentials)
- Preventive maintenance
- Fault cases in BSC; BTS and BSS Transmission

Notes
Available in Q2/04.

Base Station Controller Connection Control

NEW!

BSCCON

Target Group
2G BSS customer expert, who wants to understand internal DX 200 messages in connection establishment.

Objectives
After the training, the participant will be able to:
- Describe the main program block involved in a connection.
- List the computer units to which the program involved in various stages of connection belongs.
- Monitor and interpret messages between connection control processes.
- Explain where and when different connection control analyses are executed.
- Pick up important information from messages.
- Use message monitoring as a possible troubleshooting tool.

Prerequisites
SERVTE, BSSITG, BSSESS, BSSSIG, BSSTSH

Duration
3 days

No. of Participants
Max. 4

Modules
- Connection control test
- Introduction to connect control
- Connection control software
- Message monitoring exercises
- Messages in call setup
- Connection control analysis
- Statistics
- Connection control zoom

Notes
Available in Q3/04.

Radio Access Network Inter System Handover Workshop

NEW!

RANIW WS

Target Group
GSM/UMTS radio network integration, operations and maintenance personnel, system specialists operating Nokia BSC and RNC.

Objectives
After the training, the participant will be able to:
- Describe inter system handover functionality in Nokia BSS and RAN.
- Explain the meaning of important radio parameters.
- Describe the handover procedure and verify it with help of protocol analyzer.
- Verify intersystem handover related parameters to ensure functionality and perform troubleshooting.

Prerequisites
2G SYSTRA, BSSESS, BSSITG, 3G RANESS, 3G RANITG

Duration
2 days

No. of Participants
Max. 8

Modules
- UMTS-GSM intersystem handover introduction
- UMTS-GSM intersystem handover parameters
- UMTS-GSM intersystem handover specifications
- UMTS-GSM intersystem handover troubleshooting

Notes
Available in Q2/04.

Radio Network Controller Architecture and Functionality

RNCARCe

Target Group
Personnel in RAN network engineering, network operation and control, network planning, technical management.

Objectives
After the training, the participant will be able to:
- Describe the benefits and usage of the Nokia RNC in 3G mobile networks.
- List the functional units in RNC and explain their function.
- Describe the major RAN procedures applicable in the Nokia RNC.

Prerequisites
3G INTe, 3G SYSTRA, SWPLATe, SWPLAT ESS

Duration
2.5 days

No. of Participants
N/A

Modules
- RAN overview – RAN Release 4
- RAN interfaces and protocols – RAN Release 4
- Nokia RNC architecture and functionality – RAN Release 4

3G Radio Access Network Essentials

3G RANESS

Target Group
RAN engineering support, 3G network operation with practical experience on the Nokia Network Management System.

Objectives
After the training, the participant will be able to:
- Explain the radio network operating principles.
- Interrogate and modify the radio network by NEMU.
- Describe the concepts of radio network configuration management and the representation of radio network parameters in the Nokia network management system Nokia NetAct.
- List routine radio network operational tasks in a mobile network dependant on the individual responsibilities and describe the process of execution.
- Perform routine radio network operational tasks using NEMU as a tool that are part of the regular operation of a radio network. In addition, the student should identify service effecting tasks and follow the correct procedures.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS

Duration
3 days

No. of Participants
Max. 8

Modules
- RAN overview
- UTRAN interfaces and protocols
- Radio network controller solution
- WCDMA BTS solutions
- Migration and co-location of Nokia 2G and 3G sites
- RAN operation and configuration
- RNW configuration management 3G – principles and concepts
- UMTS radio path and transmission

3G Radio Access Network Integration

3G RANITG

Target Group
RAN engineering support.

Objectives
After the training, the participant will be able to:
- Configure ATM resources at RNC.
- Integrate IuPS interface using MML commands.
- Integrate IuCS interface using MML commands.
- Integrate Iur interface using MML commands.
- Integrate Iub interface using NEMU tools.
- Integrate the RAN to DCN (IP configuration).

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G RANESS

Duration
5 days

No. of Participants
Max. 8

Modules
- ATM resource management and digit analysis
- Iu-Cs integration in IPA 2800
- Iu-PS integration in 3G SGSN
- RNW integration and expansion – method NEMU/MML
- Integration to DCN in IPA 2800

3G Radio Access Network Online Learning Resources

NEW!

RANRESOURCEe

E-JobAid
- Using Nokia tools in RAN engineering
- Change in commands and procedures after SW upgrade, feature activation etc.

E-Forum
- Supporting Commonly asked Questions and Answers
- Mailing list specific for members

E-Reference
- Additional Slides from training

Notes
- The content of this material is comparable with our intermediate training.
- Available during summer 2004.

3G Radio Access Network Signaling — 3G RANSIG

Target Group
RAN personnel and system specialists with the need to analyze network element communication and procedures.

Objectives
After the training, the participant will be able to:
- Explain and monitor the interfaces in RAN by using the 3G NetHawk protocol analyzer.
- Describe the different call phases.
- Check the signaling setting in RNC.
- Analyze the signaling traffic in all RAN interfaces.

Prerequisites
3G SYSTRA, SWPLATe, 3G ATM, SWPLAT ESS & ADM, 3G RANITG, BSSSIG

Duration
3 days

No. of Participants
Max. 6

Modules
- Introduction to 3G/UMTS signaling and interfaces
- UTRAN interfaces and protocols
- Protocol models in UTRAN
- UTRAN application protocols
- UTRAN signaling flows
- Use of Nethawk protocol analyzer

Notes
This course was formerly named 3G RANMAC.

3G Radio Access Network Controller Troubleshooting — 3G RNCTSH

Target Group
Advanced RAN engineering personnel.

Objectives
This course has been designed for experienced RAN engineering personnel that are strongly involved in network rollout and start up.

After the training, the participant will be able to:
- Find faults with help of user documentation.
- Handle various RNC service terminal extension in IPA 2800.
- Recover RNC after system crash.
- Configure WBTS/AXC remotely with configuration files.
- Use Nethawk protocol analyzer to monitor basic signaling procedures on UTRAN interfaces.
- Handle various UTRAN faults.

Prerequisites
3G SYSTRA, SWPLATe, 3G ATM, SWPLAT ESS & ADM, 3G RANESS, 3G RANITG, 3G RANSIG

Duration
4 days

No. of Participants
Max. 4

Modules
- Introduction to RAN troubleshooting
- Interrogation exercise RAN
- File system (operating system and software)
- Service terminal essentials + exercises RAN
- RNC restoration (recovery)
- Signaling review and NetHawk (call setup and release)
- NEMU configuration management and Nokia NetAct (integrating RNC to Nokia NetAct)
- AXC and BTS Manager
- IP and DCN in RAN (DCN management/ IP connection configuration)
- Various RAN troubleshooting fault cases

Notes
This course was formerly named 3G RANTSH.

New Features in Radio Access Network Release 4

NEW!

RAN REL 4e

Target Group
Personnel in RAN network engineering, network operation and control, first line maintenance and site engineering, network planning.

Objectives
After the training, the participant will be able to:
- Describe the features available with Nokia RAN Release 4.

Prerequisites
3G INTe, 3G SYSTRA, SWPLATe, SWPLAT ESS, RNCARCe, 3G RANESS

Duration
1 day

No. of Participants
N/A

Modules
- Site solutions – RAN Release 4
- Telecom features and radio resource utilization – RAN Release 4
- Transmission and transport – RAN Release 4
- Operability – RAN Release 4
- Performance management – RAN Release 4

Radio Access Network Release 4

NEW!

RAN REL 4

Target Group
Configuration management personnel, engineering support, and system specialists operating RAN.

Objectives
After the training, the participant will be able to:
- Provide an overview and basic explanations of the new features in the RAN Release 4 software release in Nokia UTRAN Radio Access Subsystem and activation procedures.

Prerequisites
3G SYSTRA, RANESS, 3G RANITG, RAN REL 4e

Duration
2 days

No. of Participants
Max. 8

Modules
- RAN Release 4 hardware requirements
- RAN Release 4 compatability matrix
- RAN Release 4 features
- MML changes between Release RAN Release 3 and RAN Release 4 (reference material)

Notes
Addition to RAN REL 4 e-learning.
Content may change when S11 released.

3G Radio Access Network Refresher Workshop

NEW!

3G RANREF WS

Target Group
RAN engineers, system specialists, advanced RNC OM personnel.

Objectives
After the training, the participant will be able to:
- Utilize the latest information in their jobs.
- Fulfill the possible gaps related signaling and troubleshooting.
- Troubleshoot the RAN network with latest updates.

Prerequisites
3G RANSIG, 3G RNCTSH

Duration
2 days

No. of Participants
Max. 8

Modules
- UTRAN signaling flows
- Signaling review and NetHawk (call setup and release)
- Use of Nethawk protocol analyzer
- Service terminal essentials + exercises RAN
- AXC and BTS Manager (Pr)
- Various RAN troubleshooting fault cases

Notes
Available in Q3/04.

3G Radio Access Network NetHawk

NEW!

3G RANHAWK

Target Group
3G RAN engineers that need NetHawk knowledge in order to bring up or integrate interfaces in the 3G RAN area.

Objectives
- The purpose of this course is to develop competence and skills in using the NetHawk signaling analyzer to establish interfaces during the integration process.
- Signaling knowledge as well as integration is included in the course.

After the training, the participant will be able to:
- Fully utilize the NetHawk analyzer tool in RAN integration or RAN signaling.

Prerequisites
3G SYSTRA, SWPLATe, RANSYS, 3G RANESS, 3G RANITG

Duration
2 days

No. of Participants
Max. 8

Modules
- RAN overview and architecture
- Use of Nethawk protocol analyzer
- Protocol analyzer introduction: ATM NetHawk
- Protocol analyzer introduction: NetHawk N2
- Protocol analyzer introduction: PCM NetHawk

Radio Network Controller Connection Control

NEW!

3G RNCCON

Target Group
RAN expert, who wants to understand internal IPA 2800 messages in connection establishments.

Objectives
After the training, the participant will be able to:
- List the programs involved in various stages of a call, as well as the computer units in which they reside.
- Monitor and interpret messages between connection control processes in IPA 2800 platform.
- Explain where and when different connection control analyses are executed.
- Study control and user plane messages.
- Pick up important information from messages.
- Use message monitoring as a possible troubleshooting tool.

Prerequisites
SERVTE, 3G RANESS, 3G RANITG, 3G RANSIG, 3G RNCTSH

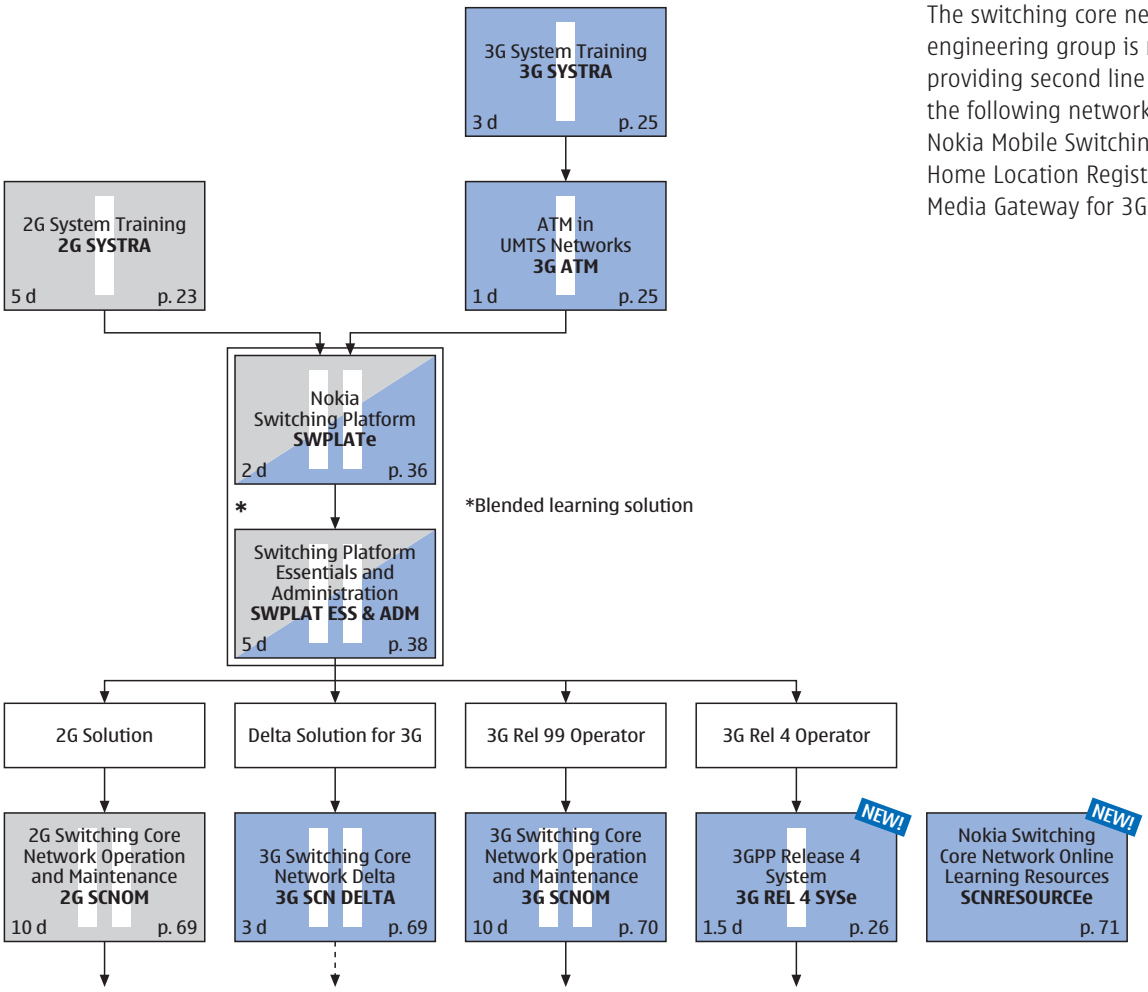
Duration
3 days

No. of Participants
Max. 4

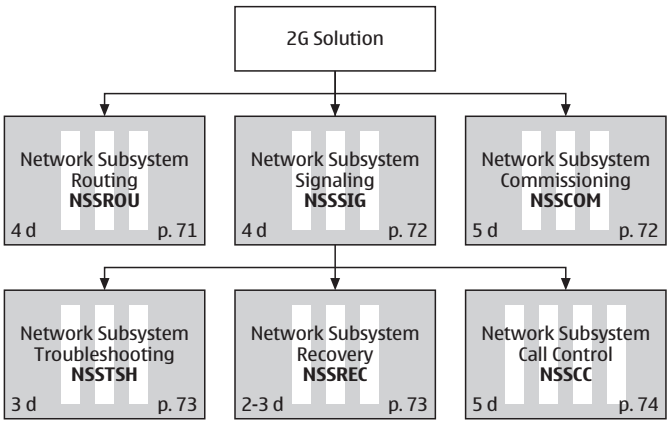
Modules
- Connection control test
- Introduction to connect control
- Connection control software
- Message handling
- Messages in call setup
- Connection control analysis
- Connection control zoom

Notes
Available in Q3/04.

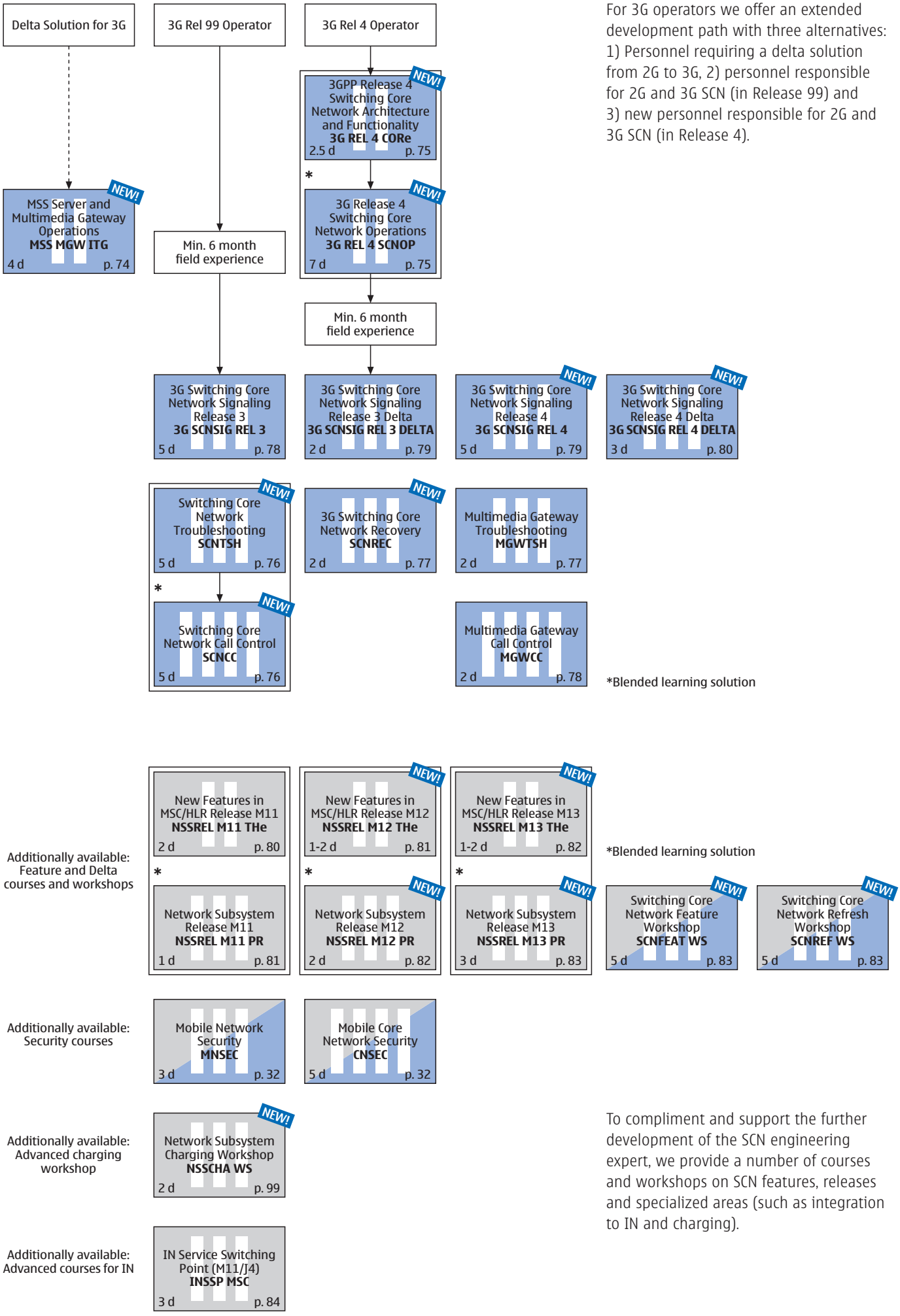
Switching core network engineering



The switching core network (SCN) engineering group is responsible for providing second line maintenance for the following network elements: Nokia Mobile Switching Center (MSC/MSCi), Home Location Register (HLR/HLRi) and Media Gateway for 3G MSC (MGW).



For personnel purely working on switching core for 2G networks, we provide the recommended solution presented on the left. Each course/ workshop provides specialized skills in routing, troubleshooting and recovery. In addition, the commissioning, signaling and call control provide the individual with the deepest of knowledge of the product to support their work.



For 3G operators we offer an extended development path with three alternatives: 1) Personnel requiring a delta solution from 2G to 3G, 2) personnel responsible for 2G and 3G SCN (in Release 99) and 3) new personnel responsible for 2G and 3G SCN (in Release 4).

To compliment and support the further development of the SCN engineering expert, we provide a number of courses and workshops on SCN features, releases and specialized areas (such as integration to IN and charging).

2G Switching Core Network Operation and Maintenance

2G SCNOM

Target Group
Personnel working with Nokia 2G SCN (MSC/HLR).

Objectives
After the training, the participant will be able to:
- Describe the basic architecture of MSC/VLR and HLR/AC/EIR.
- Manage the subscriber services in MSC/VLR and HLR/AC/EIR.
- Maintain the cellular radio network elements from the NSS point of view.
- Create the definitions for signaling between network elements and for a new roaming contract.
- Identify the definitions for the short message service.
- Identify the principles of routing and create routing definitions.
- Identify the charging principles and perform the procedures.
- Describe various traffic measurement and observation methods.
- Perform necessary daily first line operational tasks.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM

Duration
10 days

No. of Participants
Max. 8

Modules
- Subrack and cartridge MSC/HLR architecture
- Subscriber administration
- Cellular radio network administration
- Common channel signaling system (SCN)
- Short message service
- Basics of routing
- Basics of charging
- Traffic administration

3G Switching Core Network Delta

3G SCN DELTA

Target Group
Personnel working with Nokia 3G SCN network, experienced with Nokia NSS.

Objectives
After the training, the participant will be able to:
- List the necessary definitions needed in the MSC for the UMTS network compared to the GSM network.
- Describe the ATM protocol reference model and at an overview level, explain the main functions of AAL type 2 signaling protocol.
- Describe the main purposes of ATM resource management.
- Identify the procedures and demonstrate the ability to successfully perform integration between the MGW for 3G MSC (ATM Module) and the MSC.
- Identify the procedures and demonstrate the ability to successfully perform integration between the MGW for 3G MSC (ATM Module) and the RNC.
- Explain the transcoding principle and
- demonstrate the ability to configure TCUs.

Prerequisites
3G SYSTRA, SWPLATe, 3G ATM, 2G SCNOM

Duration
3 days

No. of Participants
Max. 8

Modules
- MGW for 3G MSC (ATM module) overview and architecture
- 2G to 3G MSC operations
- ATM resource management and digit analysis
- Interfaces and signaling in MGW for 3G MSC (ATM module)
- Iu-Cs integration in IPA 2800
- Configuration of TCU in MGW for 3G MSC
- MSC integration in MGW for 3G MSC

3G Switching Core Network Operation and Maintenance

3G SCNOM

Target Group
Personnel working with Nokia 3G SCN (3G MSC/HLR).

Objectives
After the training, the participant will be able to:
- Describe the basic architecture of the DX 200 MSC/VLR and HLR/AC/EIR.
- Create and manage the subscriber's basic and supplementary services in the MSC/VLR and HLR/AC/EIR.
- Create and manage cellular radio network elements from the network subsystem point of view.
- Create the definitions for signaling between network elements within the own network as well as between different networks, including the definitions needed for a new roaming contract.
- Identify the necessary definitions for the short message service.
- Identify the principles of routing and create routing definitions in the MSC.
- Perform necessary daily first line operational tasks.
- Provide knowledge and skills to operate and maintain Nokia Multimedia Gateway in a 3G environment.

Prerequisites
3G SYSTRA, SWPLATe, SWPLAT ESS & ADM

Duration
10 days

No. of Participants
Max. 8

Modules
- NSS architecture
- Subscriber administration
- Cellular radio network administration
- Common channel signaling system
- Basics of routing
- Short message service
- Core network overview and architecture
- MGW for 3G MSC overview and architecture
- Interfaces and signaling in MGW for 3G MSC (ATM module)
- Configuration of TCU in MGW for 3G MSC
- ATM resource management and digit analysis
- MSC integration in MGW for 3G MSC
- Iu-Cs integration in IPA 2800

Nokia Switching Core Network Online Learning Resources

NEW!

SCNRESOURCEe

E-JobAid
- Using Nokia tools in SCN engineering
- Change in commands and procedures after software upgrade, feature activation etc.

E-Forum
- Supporting commonly asked questions and answers
- Mailing list specific for members

E-Reference
- Additional slides from training

Notes
- The content of this material is comparable with our intermediate training.
- Available during summer 2004.

Network Subsystem Routing

NSSROU

Target Group
NSS experts, routing specialists.

Objectives
After the training, the participant will be able to:
- Plan and define the application of most of major routing features of the DX 200 MSC (e.g. alternative routing, selective circuit reservation, attribute analysis).
- Explain the interdependencies of the features.
- Use the analysis test state and test calls to verify the new analysis before taking it into use.
- Explain impact and use of the most important routing parameters.
- Give at one typical application example for each feature.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
4 days

No. of Participants
Max. 8

Modules
- Routing review (CS-CN)
- Focus on hunting
- Time controlled routing
- Percentage routing (random traffic dispersion to trunks)
- Alternative routing
- Dynamic routing for non-hierarchical networks
- Selective circuit reservation
- Rate based traffic filtering
- Automatic congestion control
- Test call handling
- Attribute analysis
- Extended preanalysis

Network Subsystem Signaling NSSSIG

Target Group
NSS personnel who require a detailed understanding of network subsystem (NSS) signaling (CCS7) of GSM network.

Objectives
After the training, the participant will be able to:
- Explain in more details messages and procedures concerning CCS#7 protocols.
- Explain interaction of different CCS#7 protocols in the protocol stack.
- Create necessary signaling definitions for inter-PLMN roaming contract.
- Explain basics of CCS#7 signaling network planning.
- Configure, activate, collect and output statistical information about signaling.
- With the help of the documentation, draw the signaling flow charts in DX 200 NSS.
- Trace (protocol analyzer) the signaling messages on different transmission interfaces (from NSS) and interpret the significance of parameters.
- Use the signaling knowledge and tools in troubleshooting process.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
4 days

No. of Participants
Max. 6

Modules
- Introduction to SS7 signaling
- MTP
- SCCP
- TCAP
- MAP and INAP and CAP
- Basics of CCS#7 network planning
- ISUP
- Statistics of signaling network
- Signaling related troubleshooting cases

Network Subsystem Commissioning NSSCOM

Target Group
Experienced NSS personnel.

Objectives
After the training, the participant will be able to:
- Explain the basic configurations done in DX 200 MSCi.
- Create the basic hardware definitions in DX 200 MSCi.
- Explain the functions of the pre-processors in DX 200 MSCi.
- List and explain the phases in commissioning and integrating DX 200 MSCi.
- Explain the relation between signaling, cellular network, routing and charging definitions in DX 200 MSCi.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
5 days

No. of Participants
Max. 8

Modules
- Introduction to commissioning
- Installation, commissioning and integration manuals
- Commissioning
- Integration
- Other necessary definitions

Notes
This course has been upgraded during year 2003.

Network Subsystem Troubleshooting NSSTSH

Target Group
Second line NSS operation and maintenance personnel and system specialists.

Objectives
After the training, the participant will be able to:
- List the NSS troubleshooting tools.
- Define different troubleshooting techniques.
- Locate and solve problems related to the Nokia DX 200 MSC/VLR and HLR/AC/EIR.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM, NSSROU, NSSSIG, NSSCOM

Duration
3 days

No. of Participants
Max. 6

Modules
- Introduction to troubleshooting in core networks
- Troubleshooting tools in Nokia circuit switched core networks (CS CN)
- CS CN troubleshooting cases

Network Subsystem Recovery NSSREC

Target Group
DX 200 OM personnel responsible for recovering the switch after a major system crash.

Objectives
After the training, the participant will be able to:
- Deploy the current fallback software build, both from disk and DAT.
- Minimize the loss of traffic in the switch.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM, NSSROU, NSSSIG, NSSCOM

Duration
2–3 days (3 day course including and 2 day course excluding Service Terminal)

No. of Participants
Max. 4

Modules
- Introduction to recovery related service terminal extensions
- Recovery principles and scenarios in CS CN
- Database recovery in CS CN
- Changing hard disks in MSC/HLR
- Recovery cases in CS CN

Network Subsystem Call Control NSSCC

Target Group
NSS expert who wants to understand internal DX 200 messages in call establishment.

Objectives
After the training, the participant will be able to:
- List the programs involved in various stages of a call, as well as the computer units in which they reside.
- Monitor and interpret messages between call control processes.
- Explain where and when different call control analyses are executed.
- Pick up important information from messages.
- Use message monitoring as a possible troubleshooting tool.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM, NSSROU, NSSSIG, NSSCOM

Duration
5 days

No. of Participants
Max. 4

Modules
- Call control test
- Introduction to call control
- Call control software
- Message monitoring exercises
- Messages in call setup
- Cause codes
- Call control analysis
- Call control zoom
- Charging and statistics in call control
- Troubleshooting guide for call control

MSS Server and Multimedia Gateway Operations

NEW!

MSS MGW ITG

Target Group
Experienced mobile circuit core engineers who require basic hands-on experience with Nokia Release 4 MSS and MGW.

Objectives
After the training, the participant will be able to:
- Have basic hands-on experience with Nokia Release 4 MSS and MGW.

Prerequisites
2G SYSTRA or 3G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM or 3G SCNOM

Duration
4 days

No. of participants
Max. 8

Modules
- Overview of 2G to 3G evolution
- Overview of Nokia MSS Release 4
- Overview of Nokia U2 MGW
- Commissioning/Integration of M12 MSS
- Commissioning/Integration of U2 MGW

3GPP Release 4 Switching Core Network Architecture and Functionality

NEW!

3G REL 4 CORe

Target Group
Personnel in network engineering, network operations and control, network planning.

Objectives
At the end of this e-learning, the participant will be able to point out the differences between Nokia MSC implementation in 3GPP Release 99 and 3GPP Release 4, in particular:
- Name the most important functions of MSS.
- List the primary functions of the Nokia MGW for 3GPP Release 4 networks.
- Describe the necessary steps when configuring the Multimedia Gateway from release R99 to Release 4.
- Outline the main idea behind the MSC server upgrade and site connectivity.
- List basic steps for UE to UE basic call setup establishment in Nokia Release 4 networks.
- Outline the IP topology of the Nokia MSC server system.
- List the main MSS system features.
- Outline the GSM to UMTS inter system handovers.
- Describe the new services introduced in Nokia 3G Release 4 MSS.

Prerequisites
3G INTe, 3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS, 3G SCN DELTA

Duration
2.5 days

No. of Participants
N/A

Modules
- Nokia Solution for 3GPP Release 4 Core – MSS, GCS and CDS architecture and functionality
- Nokia Solution for 3GPP Release 4 Core – MGW architecture and functionality
- Nokia Solution for 3GPP Release 4 Core – MSC server resilience and site solution
- Nokia Solution for 3GPP Release 4 Core – Call handling in MSC server system
- Nokia Solution for 3GPP Release 4 Core – Handovers and Relocations
- Nokia Solution for 3GPP Release 4 Core – Migrating to MSC server system

3G Release 4 Switching Core Network Operations

NEW!

3G REL 4 SCNOP

Target Group
Engineering support, NOC personnel and network planning personnel who requires to operate and maintain CS CN.

Objectives
After the training, the participant will be able to:
- Have an understanding of the architecture of MSS/MSC and MGW.
- Manage the subscriber services granted through CS CN.
- Create, delete and modify the cellular radio networks database in CS CN.
- Configure the CCS7 definitions in CS CN and configure SCCP and IMSI analysis for roaming definitions.
- Configure the control plane definitions in MSS and MGW for the interfaces.
- Create the basic routing definitions in MSS for call handling.
- Create the userplane definitions in MGW.
- List the charging and charging data transfer principles in CS CN.

Prerequisites
3G SYSTRA, 3G ATM, SWPLAT ESS & ADM, 3G REL 4 SYSe, 3G REL 4 CORe

Duration
7 days

No. of Participants
Max. 8

Modules
- MSC/HLR/MSS i-series architecture
- Subscriber administration
- Cellular radio network administration
- Common channel signaling system (SCN)
- Configuring control plane in MSS (MTP/M3UA/MTP3/SCCP/BICC/SIP/SIP-T/ISUP/H.248/RANAP/BSSAP)
- Basics of routing
- User plane resource creation in MGW (IP/ATM/TDM/Transcoder)
- ATM resource management and digit analysis
- Basics of charging

Switching Core Network Troubleshooting

NEW!

SCNTSH

Target Group
SCN experts and OM personnel.

Objectives
After the training, the participant will be able to:
- List troubleshooting tools.
- Collect fault related background information.
- Analyze the nature of the fault.
- Whenever possible, provide a local solution.
- Use needed tools.
- Perform call failure troubleshooting.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, 3G SCNSIG

Duration
5 days

No. of Participants
Max. 4

Modules
- Introduction to troubleshooting in core networks
- Troubleshooting tools in Nokia CS CN
- Service terminal for troubleshooting for SCN
- Start-up troubleshooting
- Call troubleshooting
- CS CN troubleshooting cases

Notes
Available in Q1/04.

Switching Core Network Call Control

NEW!

SCNCC

Target Group
NSS expert who wants to understand internal DX 200 and IPA 2800 messages in call establishment.

Objectives
After the training, the participant will be able to:
- List the programs involved in various stages of a call, as well as the computer units in which they reside.
- Monitor and interpret messages between call control processes in DX 200 and IPA 2800 platform.
- Explain where and when different call control analyses are executed.
- Study control and user plane messages.
- Pick up important information from messages.
- Use message monitoring as a possible troubleshooting tool.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, 3G SCNSIG, SCNTSH

Duration
5 days

No. of Participants
Max. 4

Modules
- Call control test
- Introduction to call control
- Call control software
- Message handling
- Messages in call setup
- Cause codes
- Call control analysis
- Call control zoom
- Charging and statistics in call control

Notes
Available in Q1/04.

3G Switching Core Network Recovery

NEW! SCNREC

Target Group
DX 200 and IPA 2800 OM personnel responsible for recovering the switch after a major system crash.

Objectives
After the training, the participant will be able to:
- Deploy the current fallback software build, both from disk, DAT or optical magnetic tape.
- Minimize the loss of traffic in the switch.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, 3G SCNSIG, SCNTSH

Duration
2 days

No. of Participants
Max. 4

Modules
- Recovery principles and scenarios in CS CN
- Database recovery in CS CN
- Changing hard disks in MSC/HLR
- Exercises with various crash scenarios
- NEMU recovery

Notes
Available in Q3/04.

Multimedia Gateway Troubleshooting

MGWTSH

Target Group
SCN experts and OM personnel.

Objectives
After the training, the participant will be able to:
- List troubleshooting tools.
- Collect fault related background information.
- Analyze the nature of the fault.
- Whenever possible, provide a local solution.
- Use needed tools.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, 3G SCNSIG

Duration
2 days

No. of Participants
Max. 4

Modules
- MGW introduction to troubleshooting
- MGW service terminal for troubleshooting
- MGW start-up troubleshooting
- MGW troubleshooting case

Multimedia Gateway Call Control MGWCC

Target Group
SCN experts.

Objectives
After the training, the participant will be able to:
- List the programs involved in various stages of a call, as well as the computer units in which they reside.
- Monitor and interpret messages between processes involved in call establishment.
- Pick up important information from messages.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, 3G SCNSIG / 3G SCNSIG REL 4, NSSCC

Duration
2 days

No. of Participants
Max. 4

Modules
- MGW call control software
- MGW call control message handling
- MGW message in call setup
- MGW call control zoom

3G Switching Core Network Signaling Release 3 3G SCNSIG REL 3

Target Group
System level experts in 3G SCN (SCN Release 3).

Objectives
The aim of the course is to provide further knowledge about GSM/UMTS Network Messaging and signaling.

After the training, the participant will be able to:
- Produce and interpret statistical info about signaling.
- List at least 3 GSM/UMTS MAP signaling procedures.
- With the help of the documentation, draw the signaling flow charts in Nokia core network.
- With the help of the documentation, analyze the processes involved in signaling internally, and thus get to the cause of faults.
- Trace and interpret the signaling on different transmission interface, (from CN) and interpret the significance of parameters.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA

Duration
5 days

No. of Participants
Max. 4

Modules
- Introduction to SCN signaling
- MTP
- MTP3b over ATM
- SCCP/SCCPb
- TCAP
- Statistics of signaling network
- MAP and INAP and CAP
- ISUP
- BSSAP/RANAP
- AAL2 signaling
- SIGTRAN
- Signaling in Nokia SCN

Notes
This course was formerly named 3G SCNMAC.

3G Switching Core Network Signaling Release 3 Delta

3G SCNSIG REL 3 DELTA

Target Group
Personnel experienced in SS7 signaling and requiring knowledge on new signaling protocols and features specific for 3G core networks (SCN Release 3).

Objectives
The aim of this course is to provide further knowledge about GSM/UMTS network subsystem signaling.

After the training, the participant will be able to:
- Produce and interpret statistical information about signaling.
- List at least three GSM/UMTS map signaling procedures.
- With the help of the documentation, draw the signaling flow charts in Nokia core network.
- With the help of the documentation, analyze the process involved in signaling internally and thus get to the cause of faults.
- Trace and interpret the signaling on different transmission interface (from CN) and interpret the significance of parameters.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, NSSSIG

Duration
2 days

No. of Participants
Max. 6

Modules
- Introduction to SCN signaling
- MTP3b over ATM
- SCCPb
- RANAP/BSSAP and AAL2 signaling
- SIGTRAN

Notes
This course was formerly named 3G SCNMAC DELTA.

3G Switching Core Network Signaling Release 4

NEW!

3G SCNSIG REL 4

Target Group
Personnel needing an advanced knowledge of UMTS Release 4 core network signaling.

Objectives
The aim of this course is to provide knowledge about GSM/UMTS core network signaling protocols.

After the training, the participant will be able to:
- Explain, in more detail, messages and procedures concerning CCS7 protocols.
- Explain the interaction of different CCS7 protocols in the protocol stack.
- With the help of the documentation, draw the signaling flow charts in Nokia core network.
- With the help of the documentation, analyze the processes involved in signaling internally, and thus get to the cause of faults.
- Trace and interpret the signaling on different transmission interface (from CN) and interpret the significance of parameters.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA

Duration
5 days

No. of Participants
Max. 4

Modules
- Introduction to core network signaling
- MTP
- MTP3b
- SCCP
- TCAP
- MAP and INAP and CAP
- ISUP
- BSSAP/RANAP
- AAL2 signaling
- SIGTRAN
- BICC
- MEGACO
- SIP
- Statistics of signaling network

3G Switching Core Network Signaling Release 4 Delta

NEW!

3G SCNSIG REL 4 DELTA

Target Group
Personnel experienced in SS7 signaling and willing to learn new signaling protocols and features specific for UMTS Release 4 core network.

Objectives
The aim of this course is to provide further knowledge about GSM/UMTS core network signaling protocols and procedures.

After the training, the participant will be able to:
- List at least three GSM/UMTS signaling procedures.
- With the help of the documentation, draw the signaling flow charts in Nokia core network.
- With the help of the documentation, analyze the processes involved in signaling internally, and thus get to the cause of faults.
- Trace and interpret the signaling on different transmission interface (from CN) and interpret the significance of parameters.

Prerequisites
3G SYSTRA, 3G ATM, SWPLATe, SWPLAT ESS & ADM, 3G SCNOM / 3G SCN DELTA, NSSSIG

Duration
3 days

No. of Participants
Max. 6

Modules
- Introduction to SCN signaling
- MTP3b over ATM
- SCCPb
- BSSAP/RANAP
- AAL2 signaling
- SIGTRAN
- BICC
- MEGACO
- SIP

New Features in MSC/HLR Release M11

NSSREL M11 THe

Target Group
NSS network engineering and network planning personnel.

Objectives
After the training, the participant will be able to:
- Describe the enhancements and new functions brought to the mobility services and user services.
- Illustrate new GSM functionality implemented in the Nokia MSC and HLR.
- Identify the enhancements offered by CAMEL phase 3 in the Nokia implementation.
- Describe the functionality of the new IP features and enhancement to the NSS interfaces.
- Illustrate the improved routing functionality.
- Identify the enhanced handling of charging data functionality.
- Describe the main improvements and new functionality introduced for the operation and maintenance of network element and statistical data collection.
- Describe the subscriber data handling and software management tasks of the network element management unit (NEMU) implementation.
- Describe the UMTS security functionalities, main UMTS data features, and new functions supported.

Prerequisites
2G SYSTRA, SWPLAT ESS, 2G SCNOM

Duration
2 days

No. of Participants
N/A

Modules
- M11 GSM end user services
- M11 GSM functions
- M11 intelligent network
- M11 NEMU features
- M11 operations and maintenance functions
- M11 routing functions
- M11 UMTS functions
- M11 charging functions
- M11 interfaces and signaling protocols

Network Subsystem Release M11

NSSREL M11 PR

Target Group
First and second line NSS operation and maintenance personnel and system specialists.

Objectives
After the training, the participant will be able to:
- Describe the changes between the M10 and M11 software deliveries.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
1 day

No. of Participants
Max. 8

Modules
- M11 DX 200 MML functions
- M11 GSM end-user services
- M11 GSM functions
- M11 interfaces and signaling protocols
- M11 routing functions
- M11 charging functions
- M11 operation and maintenance functions
- M11 UMTS functions

Notes
This course should be taken together with NSSREL M11 THe e-learning.

New Features in MSC/HLR Release M12

NEW!

NSSREL M12 THe

Target Group
NSS network engineering and network planning personnel.

Objectives
After the training, the participant will be able to:
- Describe the enhancements and new functions brought to the mobility services and user services.
- Illustrate new GSM functionality implemented in the Nokia MSC and HLR.
- Describe the functionality of the new IP features and enhancement to the NSS interfaces.
- Illustrate the improved functionality.
- Identify the enhanced handling of charging data functionality.
- Describe the main improvements and new functionality introduced for the operation and maintenance of network element and statistical data collection.
- Describe the subscriber data handling and software management tasks of the network element management unit (NEMU) implementation.
- Describe the UMTS security functionalities, main UMTS data features, and new functions supported.

Prerequisites
2G SYSTRA, SWPLAT ESS, 2G SCNOM

Duration
1–2 days

No. of Participants
N/A

Modules
- M12 GSM end user services
- M12 GSM functions
- M12 intelligent network
- M12 NEMU features
- M12 operations and maintenance functions
- M12 routing functions
- M12 UMTS functions
- M12 charging functions
- M12 interfaces and signaling protocols

Network Subsystem Release M12

NEW!

NSSREL M12 PR

Target Group
Experienced NSS personnel.

Objectives
After the training, the participant will be familiar with the M12 release features.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
2 days

No. of Participants
Max. 8

Modules
- M12 cellular radio network administration
- M12 performance evaluation
- M12 short message services
- M12 subscriber administration
- M12 traffic administration
- M12 integration and configuration of CDS
- M12 integration of interfaces between two MSS\s

Notes
- This course should be taken together with NSSREL M12 THe e-learning
- Duration varies from 1 to 2 days, depending on the chosen modules

New Features in MSC/HLR Release M13

NEW!

NSSREL M13 THe

Target Group
NSS network engineering and network planning personnel.

Objectives
After the training, the participant will be able to:
- Describe the enhancements and new functions brought to the mobility services and user services.
- Illustrate new GSM functionality implemented in the Nokia MSC and HLR.
- Describe the functionality of the new IP features and enhancement to the NSS interfaces.
- Illustrate the improved functionality.
- Identify the enhanced handling of charging data functionality.
- Describe the main improvements and new functionality introduced for the operation and maintenance of network element and statistical data collection.
- Describe the subscriber data handling and software management tasks of the network element management unit (NEMU) implementation.
- Describe the UMTS security functionalities, main UMTS data features, and new functions supported.

Prerequisites
2G SYSTRA, SWPLAT ESS, 2G SCNOM

Duration
1–2 days

No. of Participants
N/A

Modules
- M13 GSM end user services
- M13 GSM functions
- M13 intelligent network
- M13 NEMU features
- M13 operations and maintenance functions
- M13 routing functions
- M13 UMTS functions
- M13 charging functions
- M13 interfaces and signaling protocols

Network Subsystem Release M13

NEW!

NSSREL M13 PR

Target Group
Experienced NSS personnel.

Objectives
After the training, the participant will be familiar with Nokia Network Subsystem M13 features.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
3 days

No. of Participants
Max. 8

Modules
- M13 features
- M13 software upgrade
- M13 NEMU upgrade

Notes
- Available in Q4/04.
- Modules will be updated closer to the time of release.
- This course should be taken together with NSSREL M13 THe e-learning.
- Duration varies from 1 to 3 days, depending on the chosen modules.

Switching Core Network Feature Workshop

NEW!

SCNFEAT WS

Target Group
First and second line NSS operation and maintenance personnel, system specialists.

Objectives
After the training, the participant will be able to:
- Describe and use the selected features of the NSS.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
5 days

No. of Participants
Max. 4–6

Modules
- Depending on features used.

Notes
Duration varies from 3 to 5 days, depending on the chosen modules.

Switching Core Network Refresh Workshop

NEW!

SCNREF WS

Target Group
Experienced NSS personnel who need refreshing of selected features (including routing, signaling) after certain release.

Objectives
After the training, the participant will be able to:
- Use available routing features effectively.
- Use available signaling related features.
- Use available end user features.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM, NSSROU, NSSSIG, NSSCOM, NSSTSH (NSSCC, NSSREC)

Duration
5 days

No. of Participants
Max. 6

Modules
- SCN refresher
- SCN feature refresher
- SCN configuration and optimization refresher

Notes
Available in Q3/04.

IN Service Switching Point (M11/J4)

INSSP MSC

Target Group
Technical personnel involved in IN-related MSC/HLR configuration.

Objectives
After the training, the participant will be able to:
- Prepare the switch for connections to new SCPs.
- Prepare the switch for new services.
- Prepare the switch for new IN subscriptions.

Prerequisites
IN INTRO, 2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

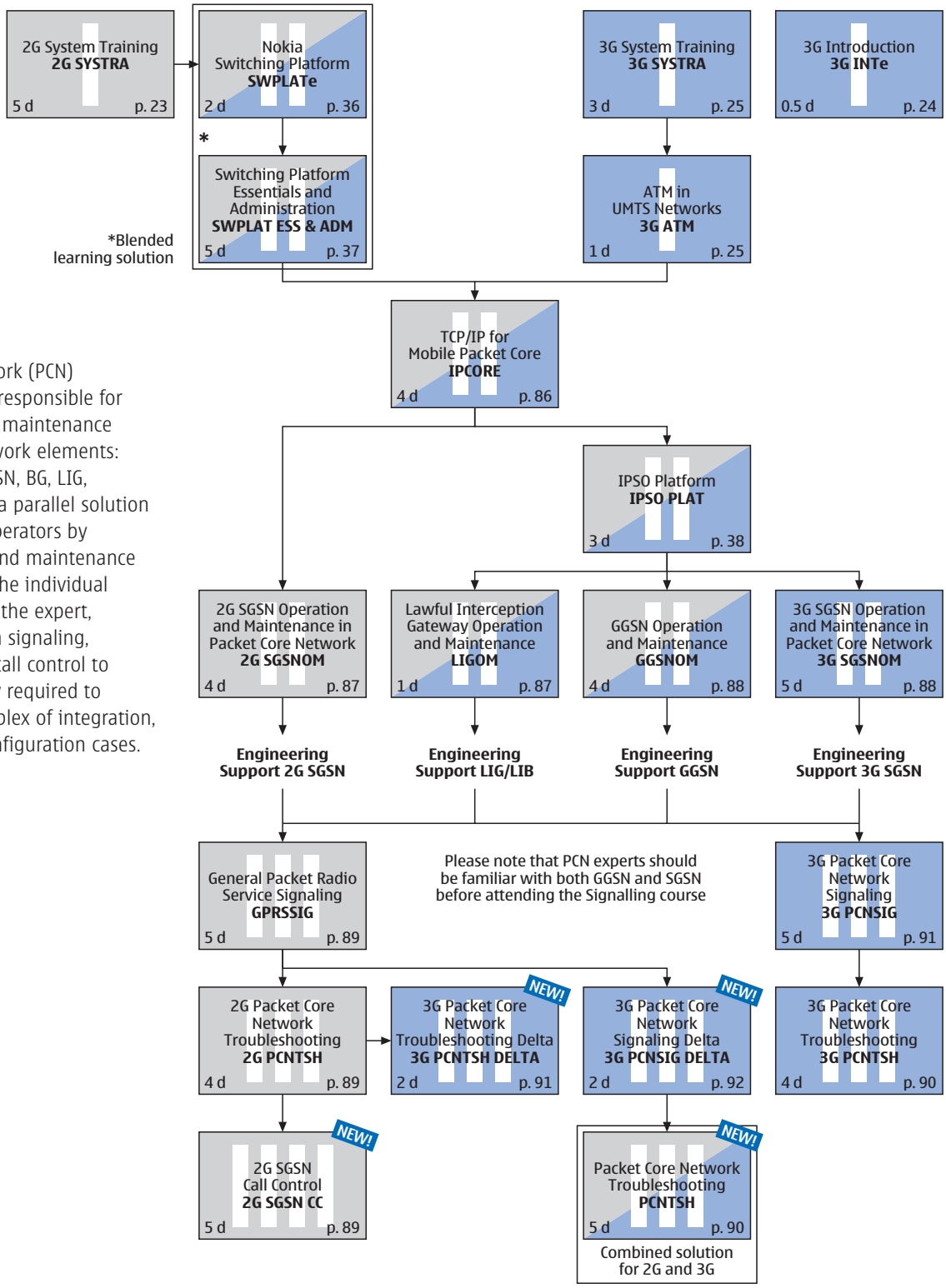
Duration
3 days

No. of Participants
Max. 8

Modules
- Review INAP/CAMEL architecture
- SSP-SCP connection creation
- Basic call state models INAP/CAMEL
- Call related INAP subscription info
- Final INAP/CAP operations
- Dynamically armed detection points
- IN announcements
- IN charging modifications
- Online call accounting INAP/CAMEL
- CAMEL subscription information
- CAMEL – INAP service interworking control in SSP
- IN mobility management state model
- Mobility management INAP subscription info
- Service examples (INSSP)

Packet core network engineering

The packet core network (PCN) engineering group is responsible for providing second line maintenance for the following network elements: 2G SGSN, 3G SGSN, GGSN, BG, LIG, and DNS. We provide a parallel solution for both 2G and 3G operators by providing operation and maintenance training based upon the individual network element. For the expert, we provide training in signaling, troubleshooting and call control to develop the capability required to handle the most complex of integration, fault recovery and configuration cases.



We also provide courses and workshops for the engineers who specialize in feature implementation, security, quality and charging.

Additionally available: Feature e-learning

System Level Features with Nokia PCN/GPRS Release 2 **GPRS REL 2e** 2 d p. 92

NEW! New Features in Packet Core Network Release 3 **MPC REL 3e** 2 d p. 93

Additionally available: Quality of Service Courses

End-to-End Quality of Service **EtE QoS** 3 d p. 93

Additionally available: Security Courses

Mobile Network Security **MNSEC** 3 d p. 32

Mobile Core Network Security **CNSEC** 5 d p. 32

Additionally available: Workshops

Packet Core Network Performance Data Collection and Reporting Workshop **PCN PM WS** 3 d p. 112

Charging Gateway Operation and Maintenance **CGOM** 3 d p. 97

TCP/IP for Mobile Packet Core — IPCORE

Target Group
Personnel requiring good knowledge of TCP/IP for GPRS and 3G networks.

Objectives
After the training, the participant will be able to:
- Describe the main packet switching transmission technologies used in MPC.
- Recognize the role of the TCP/IP protocol family with MPC as well as the relationship between them (also including practical implementations).
- Explain the IP addressing and address management functionality.
- Review the functionality of different protocols with TCP/IP.
- Review the basics of IP routing and the functionality of different routing protocols.
- Explain the functionality of DNS.
- Recognize IP security from the MPC point of view.
- Recognize the implementation of network management with MPC and TCP/IP (SNMP).
- Explain important aspects when connecting MPC backbone to external networks.
- Describe the impact of IPv6 on the mobile packet core network.
- Explain how roaming is achieved.

Prerequisites
3G SYSTRA, GPRSSYS

Duration
4 days

No. of Participants
Max. 24

Modules
- Introduction to IPCORE
- Transmission technologies
- TCP/IP suite protocols
- IP addressing
- IP address management
- IP routing protocols
- Tunnelling in MPC
- External connectivity
- IP security in MPC
- Domain name server
- SNMP
- Roaming
- IPv6
- IP applications

2G SGSN Operation and Maintenance in Packet Core Network

2G SGSNOM

Target Group
Personnel taking care of configuration and operations of the 2G SGSN.

Objectives
After the training, the participant will be able to:
- Identify and list the functions of the Nokia 2G SGSN.
- Identify and list the key architecture components and interfaces of the Nokia 2G SGSN.
- Integrate the interfaces with other NE in the network.
- Describe in detail all the mobility management and session management procedures.
- Explain the charging functionality in Nokia 2G SGSN.
- Explain procedures and usage of the essential parameters to successfully perform integration of 2G SGSN in the GPRS network.
- Explain the interaction with MSC/VLR.

Prerequisites
2G SYSTRA, SWPLATe, IPCORE, SWPLAT ESS & ADM

Duration
4 days

No. of Participants
Max. 8

Modules
- 2G SGSN in GPRS
- 2G SGSN architecture
- 2G SGSN interfaces
- Integrating CCS7 interfaces in 2G SGSN
- 2G SGSN and mobility management
- Integrating Gb interface in 2G SGSN
- Integrating Gn interface in 2G SGSN
- Integrating Ga interface in 2G SGSN
- 2G SGSN and session management
- 2G SGSN packet data transfer
- 2G SGSN charging
- 2G SGSN and MSC/VLR interaction
- 2G SGSN and SMS delivery
- 2G SGSN capacity and configuration
- Visiting GPRS subscriber database
- 2G SGSN troubleshooting guide

Lawful Interception Gateway Operation and Maintenance

LIGOM

Target Group
Packet core network personnel responsible for maintaining LIG.

Objectives
After the training, the participant will be able to:
- Explain LIG functionality.
- Configure LIG operation.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, IPCORE, 2G SGSNOM, GGSNOM

Duration
1 day

No. of Participants
Max. 8

Modules
- Lawful interception in 2G and 3G PS networks
- LIG configuration and operation
- LIG troubleshooting guide

Notes
Available as e-seminar in Q3/04.

GGSN Operation and Maintenance

GGSNOM

Target Group
Personnel taking care of operation and configuration of the GGSN and GPRS/3G backbone.

Objectives
After the training, the participant will be able to:
- Integrate the GGSN interfaces towards Internet/Intranet, backbone elements, OSS and charging gateway.
- Configure the GGSN (QoS, routing, charging, FM).
- Configure APNs (DNS, roaming, corporate / Internet access).

Prerequisites
3G SYSTRA, IPCORE, IPSO PLAT

Duration
4 days

No. of Participants
Max. 8

Modules
- GPRS / Core network IP overview
- GGSN features
- Installing GGSN software
- Basic configuration in GGSN
- QoS configuration in GGSN
- GGSN access point configuration
- Nokia NetAct packet core configurator
- GPRS and 3G roaming
- Introduction to security in GGSN and GPRS packet core network
- Nokia GGSN software package reference Guide, Release 3.5

3G SGSN Operation and Maintenance in Packet Core Network

3G SGSNOM

Target Group
Second line maintenance personnel handling OM tasks for 3G SGSN.

Objectives
After the training, the participant will be able to:
- Identify and list the functions and key architectural components of the Nokia router based 3G SGSN.
- Describe the handling of mobility and session management in 3G SGSN.
- At an overview level, identify and list the signaling interfaces and protocols used in the 3G SGSN.
- Identify the procedure and demonstrate the ability to successfully perform integration between 3G SGSN and RNC.
- Identify the procedure and demonstrate the ability to successfully perform integration between 3G SGSN and IP backbone.
- Identify principles of CCS7 configuration in 3G SGSN.
- Integrate the Nokia 3G SGSN into SS7 (IP/NB/BB) networks.

Prerequisites
3G SYSTRA, IPCORE, IPSO PLAT, 3G ATM

Duration
5 days

No. of Participants
Max. 8

Modules
- Nokia 3G SGSN SGN2 overview and architecture
- Mobility and session management in 3G SGSN
- Interfaces and signaling in 3G SGSN SGN2
- IPSO on the IP3400 platform
- Router integration in 3G SGSN
- CCS7 for mobile packet core
- Narrowband SS7 configuration in 3G SGSN
- Broadband SS7 configuration in 3G SGSN
- SS7 over IP configuration in 3G SGSN
- 3G SGSN configuration
- Configuration of additional features in 3G SGSN
- Basic debugging in 3G SGSN SGN2

General Packet Radio Service Signaling GPRSSIG

Target Group
Second line maintenance personnel with the need to analyze the GPRS network elements communications and procedures.

Objectives
After the training, the participant will be able to:
- Take a focused look at GPRS interfaces using protocol analyzers.
- Explain and analyze GPRS related messages on various signaling planes.
- Configure, monitor and explain selected relevant GPRS procedures (DHCP, RADIUS, name lookup).
- Use message monitoring as a possible troubleshooting tool.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, IPCORE, 2G SGSNOM, GGSNOM

Duration
5 days

No. of Participants
Max. 4

Modules
- Training network structure for signaling
- Protocol analyzer introduction: Nethawk N2
- Gb interface (signaling)
- Gr interface
- Gs interface
- Protocol analyzer introduction: Ethereal
- DNS message debugging
- Gn interface
- Tracing GPRS procedures
- Roaming messages
- DHCP and RADIUS
- Tunneled message analysis

2G Packet Core Network Troubleshooting 2G PCNTSH

Target Group
Personnel taking care of the 2G packet core network elements and who need practical experience on the known troubleshooting cases.

Objectives
After the training, the participant will be able to:
- Identify the essentials of effective troubleshooting.
- Deal with troubles in the packet core network with a structured process.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, IPCORE, 2G SGSNOM, GGSNOM, GPRSSIG

Duration
4 days

No. of Participants
Max. 4

Modules
- Introduction to troubleshooting in 2G/3G MPC network
- Network interface troubleshooting tools (content and task based) for PCNTSH
- Network element troubleshooting (content and task based) for PCNTSH
- PCN troubleshooting cases

2G SGSN Call Control NEW! 2G SGSN CC

Target Group
Packet core network experts.

Objectives
After the training, the participant will be able to:
- List the programs involved in various stages of GPRS connection, as well as the computer units in which they reside.
- Monitor and interpret messages between processes involved in connection establishment.
- Pick up important information from messages.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, IPCORE, 2G SGSNOM, GGSNOM

Duration
5 days

No. of Participants
Max. 4

Modules
- SGSN call control software
- SGSN call control message handling
- SGSN message monitoring exercises
- SGSN message in GPRS mobility and session management
- SGSN call control zoom

Packet Core Network Troubleshooting (2G and 3G combined)

NEW!

PCNTSH

Target Group
Personnel taking care of the 2G and 3G packet core network elements and who need structured approach to troubleshooting cases.

Objectives
After the training, the participant will be able to:
- Identify the essentials of effective troubleshooting.
- Deal with troubles in the packet core network with a structured process.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, IPCORE, 2G SGSNOM, GGSNOM, 3G SYSTRA, 3G ATM, 3G SGSNOM, 3G PCNSIG, GPRSSIG

Duration
5 days

No. of Participants
Max. 4

Modules
- Introduction to troubleshooting in 2G/3G MPC network
- Network interface troubleshooting tools (content and task based) for PCNTSH
- Network element troubleshooting (content and task based) for PCNTSH
- PCN troubleshooting cases

3G Packet Core Network Troubleshooting

3G PCNTSH

Target Group
Personnel taking care of the 3G packet core network elements and who need structured approach to troubleshooting cases.

Objectives
After the training, the participant will be able to:
- Identify the essentials of effective troubleshooting.
- Deal with troubles in the packet core network with a structured process.

Prerequisites
3G SYSTRA, 3G ATM, IPCORE, IPSO PLAT, GGSNOM, 3G SGSNOM, 3G PCNSIG

Duration
4 days

No. of Participants
Max. 4

Modules
- Introduction to troubleshooting in 2G/3G MPC network
- Network interface troubleshooting tools (content and task based) for PCNTSH
- Network element troubleshooting (content and task based) for PCNTSH
- PCN troubleshooting cases

3G Packet Core Network Troubleshooting Delta

NEW!

3G PCNTSH DELTA

Target Group
Personnel taking care of the 3G packet core network elements and who need structured approach to troubleshooting cases.

Objectives
After the training, the participant will be able to:
- Identify the essentials of effective troubleshooting.
- Deal with troubles in the packet core network with a structured process.

Prerequisites
3G SYSTRA, 3G ATM, IPCORE, GGSNOM, 3G SGSNOM, 3G PCNSIG, 2G PCNTSH

Duration
2 days

No. of Participants
Max. 4

Modules
- Introduction to troubleshooting in 2G/3G MPC network
- Network interface troubleshooting tools (content and task based) for PCNTSH
- Network element troubleshooting (content and task based) for PCNTSH
- PCN troubleshooting cases

Notes
- This course focuses on the differences between 2G/GPRS and 3G.
- The participants will have the complete 3G PCNTSH course material but only the modules mentioned in the course description will be trained.

3G Packet Core Network Signaling

3G PCNSIG

Target Group
System level experts in 3G packet core.

Objectives
After the training, the participant will be able to:
- Analyze and explain MM and SM procedures, such as PDP context activation in local and in roaming cases, involving DHCP or RADIUS and tunneled messages.
- List and explain the most relevant interfaces in the packet core network, the protocols on these interfaces and their significant messages and contents.
- Practically take a focused look at UMTS Release 99 interfaces using PCM, ATM and IP protocol analyzers.
- Contribute to troubleshooting and optimizing parameters of the PCN network elements.

Prerequisites
3G SYSTRA, 3G ATM, IPCORE, IPSO PLAT, 3G SGSNOM, GGSNOM

Duration
5 days

No. of Participants
Max. 4

Modules
- Training network structure for signaling
- Protocol analyzer introduction: ATM Nethawk
- Iu-PS interface
- Protocol analyzer introduction: PCM Nethawk
- Gr interface
- Protocol analyzer introduction: Ethereal
- DNS message debugging
- Gn interface
- Tracing MM/SM procedures of 3G PCN calls
- Messages in roaming cases
- DHCP and RADIUS
- Tunneled message analysis

Notes
This course was formerly named 3G PCNMAC.

3G Packet Core Network Signaling Delta

NEW!

3G PCNSIG DELTA

Target Group
System level experts in 3G packet core networks.

Objectives
After the training, the participant will be able to:
- Practically analyze complex MM and SM procedures covering all relevant interfaces of the 3G packet core network.
- Analyze and explain MM and SM procedures, such as PDP context activation in local and in roaming cases, involving DHCP or RADIUS and tunneled messages.
- List and explain the most relevant interfaces in the packet core network, the protocols on these interfaces and their significant messages and contents.
- Practically take a focused look at UMTS Release 99 interfaces using PCM, ATM and IP protocol analyzers.
- Contribute to troubleshooting and optimizing parameters of the PCN network elements.

Prerequisites
3G SYSTRA, 3G ATM, IPCORE, IPSO PLAT, GGSNOM, 3G SGSNOM, GPRSSIG

Duration
2 days

No. of Participants
Max. 4

Modules
- Training network structure for signaling
- Protocol analyzer introduction: ATM Nethawk
- Iu-PS interface
- Protocol analyzer introduction: PCM Nethawk
- Gr interface
- Protocol analyzer introduction: Ethereal
- DNS message debugging
- Gn interface
- Tracing MM/SM procedures of 3G PCN calls
- Messages in roaming cases
- DHCP and RADIUS
- Tunneled message analysis

Notes
- This course was formerly named 3G PCNMAC DELTA.
- This course focuses on the differences between 2G/GPRS and 3G. The participants will have the complete 3G PCNSIG course material but only the modules mentioned in the course description will be trained.

System Level Features with Nokia PCN/GPRS Release 2

GPRS REL 2e

Target Group
Network engineering personnel operating the mobile packet core network.

Objectives
After the training, the participant will be able to:
- List the GPRS features new with release 2 and explain their implementation.

Prerequisites
GPRSOVe

Duration
2 days

No. of Participants
N/A

Modules
- Quality of Service – end to end solution in GPRS Release 2
- System level tracing – end to end solution in GPRS Release 2
- Location information retrieval – end to end solution in GPRS Release 2
- Prepaid – end to end solution in GPRS Release 2

New Features in Packet Core Network Release 3

NEW!

MPC REL 3e

Target Group
Core network engineering personnel, core network planning personnel.

Objectives
After the training, the participant will be able to:
- Understand the new features coming with GGSN release GGN3, 2G SGSN release SG3 and/or 3G SGSN release SGN2.

Prerequisites
IPCORE, GPRSOVe, IPSO PLAT, GGSNOM, 2G SGSNOM, 3G SGSNOM

Duration
2 days

No. of Participants
N/A

Modules
- New features in GGSN Release 3 (GGN3)
- New features in 2G SGSN Release 3 (SG3)
- New features in 3G SGSN Release 3 (SGN2)

End-to-End Quality of Service

EtE QoS

Target Group
Second line engineering personnel taking care of configuration of end-to-end quality of service.

Objectives
After the training, the participant will be able to:
- Explain the meaning of end-to-end QoS.
- Explain the network elements that involve QoS in GPRS and UMTS.
- List four R97/98 and four R99 attributes and explain a meaning of each attribute.
- List two main functions in terminal equipment (TE).
- List one function in mobile termination (MT).
- Explain the radio priority based algorithm in BSS.
- Explain the purpose of the priority based QoS.
- Explain the meaning of primary and secondary PDP context.
- Explain the usage of TFT, TI, linked TI, and teardown indicator in PDP context activation/modification/deactivation.
- Explain the principles of packet data transfer.
- State the new statistics introduced by QoS.
- Implement QoS in Nokia GGSN.
- Explain the QoS in radio access bearer.
- Explain the QoS in 3G packet core network bearer.
- Explain the QoS in external bearer.
- Implement charging in GPRS and UMTS.

Prerequisites
None

Duration
3 days

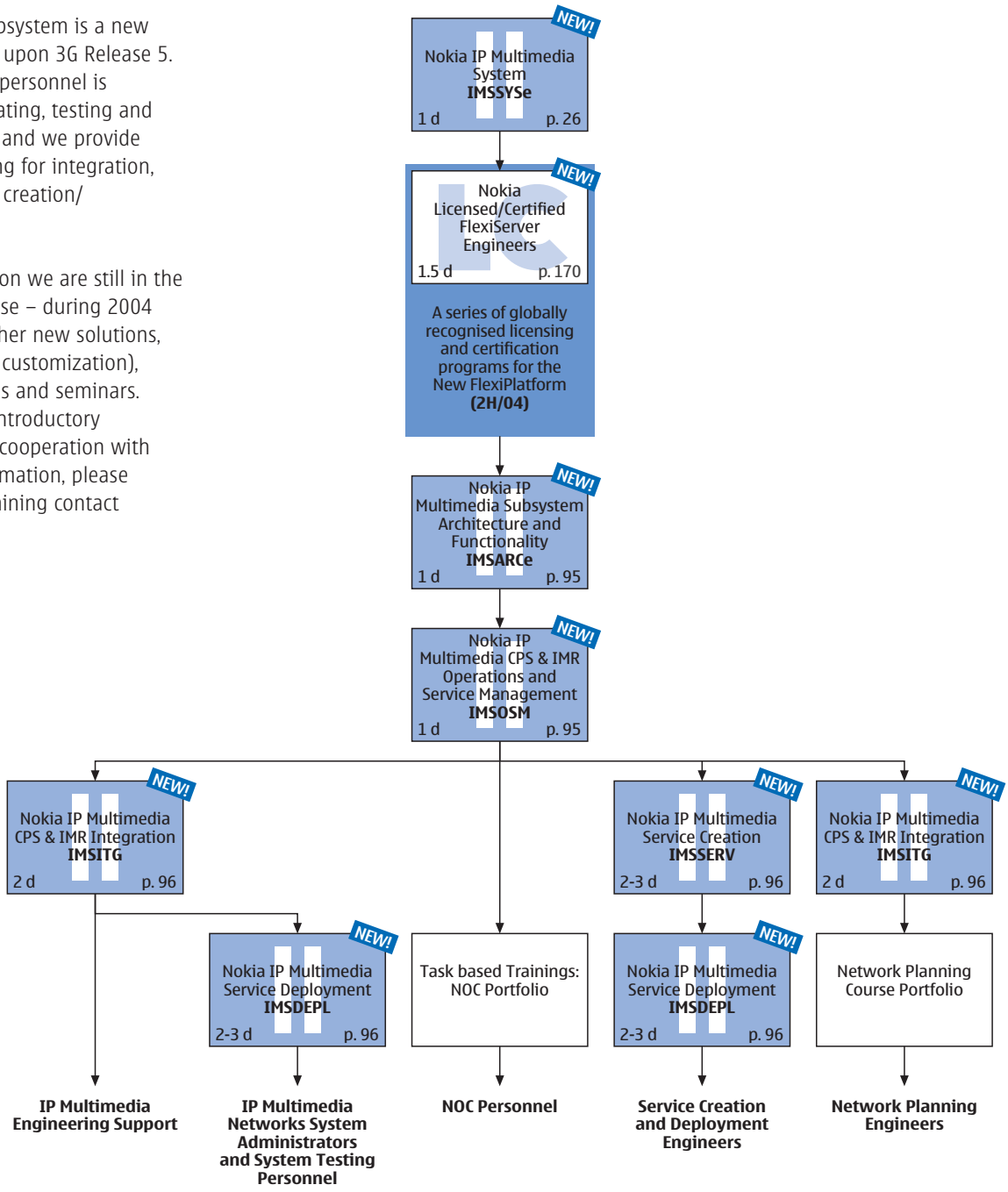
No. of Participants
Max. 8

Modules
- Introduction to Quality of Service
- End-to-end QoS in the GPRS
- End-to-end QoS in the UMTS
- Quality of Service profile
- QoS in TE/MT bearer
- QoS in 2G radio access bearer
- QoS in 2G packet core network bearer
- QoS in 3G radio access bearer
- QoS in 3G packet core network bearer
- QoS in external bearer
- Charging in GPRS related QoS
- Charging in UMTS related QoS

IP multimedia system engineering

The IP multimedia subsystem is a new solution that is based upon 3G Release 5. Network engineering personnel is responsible for integrating, testing and deploying the system and we provide comprehensive training for integration, operation and service creation/ deployment.

As this is a new solution we are still in the early deployment phase – during 2004 we will introduce further new solutions, such as courses (with customization), e-solutions, workshops and seminars. We can also provide introductory classroom training in cooperation with Cefriel. For more information, please contact your Nokia training contact person.



Nokia IP Multimedia Subsystem Architecture and Functionality

NEW!

IMSARCe

Target Group
Engineering support, system administrators, NOC personnel.

Objectives
After the training, the participant will be able to:
- Describe the IP multimedia subsystem network elements.
- Describe the architecture of IP multimedia subsystem.
- List the main system components of CPS and IMR and describe their functionalities.
- List the most important features of IMM1.
- Describe the hardware and software architecture of CPS and IMR.
- Describe the interfaces between network elements and other related subsystems in Nokia IMS architecture.
- Describe the interfaces supplied by each network element in Nokia IP multimedia subsystem.
- Describe the hardware architecture of CPS and IMR and blade structure.
- Describe the implementation of QoS and security in Nokia IMM.
- Explain the IP multimedia subsystem signaling flow.
- Explain the network element specific operation and maintenance.
- Explain the evolution of Nokia IP multimedia subsystems.

Prerequisites
IMSSYSe, Nokia FlexiServer License

Duration
1 day

No. of Participants
N/A

Modules
- IMS overview
- Nokia connection processing server
- Nokia IP multimedia register

Nokia IP Multimedia CPS & IMR Operations and Service Management

NEW!

IMSOSM

Target Group
NOC personnel, engineering support personnel who are responsible for the second line maintenance of the network, service creation and integration engineer and system administrators.

Objectives
After the training, the participant will be able to:
- Create, modify and delete an IP multimedia service for subscribers.
- Execute basic configuration tasks required in Nokia CPS and HSS for the operations of the network.

Prerequisites
IMSSYSe, Nokia FlexiServer License, IMSARCe

Duration
1 day

No. of Participants
Max. 8

Modules
- Introduction to the Nokia IP multimedia subsystem
- Operation and maintenance of Nokia IP multimedia system
- Deployment of the basic services in Nokia IP multimedia subsystem

Nokia IP Multimedia CPS & IMR Integration NEW! IMSITG

Target Group
Engineering support personnel who are responsible for the second line maintenance of the network and system administrators.

Objectives
After the training, the participant will be able to:
- Build needed configuration in Nokia IP multimedia subsystem for establishing a basic SIP session.
- Integrate all the interfaces in Nokia CPS to neighbor network elements.
- Integrate all the interfaces in Nokia IMR to neighboring network elements as well as to DX 200 HLR to form a HSS.
- Handle basic level troubleshooting cases raised in Nokia CPS and IMR.

Prerequisites
IMSSYSe, Nokia FlexiServer License, IMSARCe, IMSOSM

Duration
2 days

No. of Participants
Max. 8

Modules
- CPS and IMR specific hardware installation
- Software installation and configuration in Nokia CPS and IMR
- System integration in Nokia IP multimedia subsystem
- Troubleshooting in the Nokia IP multimedia system operations

Nokia IP Multimedia Service Creation NEW! IMSSERV

Target Group
Service creation and deployment engineers.

Objectives
After the training, the participant will be able to:
- Describe service creation based on CPL scripts.
- Create CPL scripts.
- Describe the service creation on SIP servlet API.
- Create servlets which can be deployed to Nokia IP multimedia subsystem.

Prerequisites
IMSSYSe, Nokia FlexiServer License, IMSARCe, IMSOSM

Duration
2–3 days

No. of Participants
Max. 8

Modules
- Creation of CPL scripts
- SIP servlet API
- Creation of services on Nokia IMS solution

Nokia IP Multimedia Service Deployment NEW! IMSDEPL

Target Group
Service creation and deployment engineers.

Objectives
After the training, the participant will be able to:
- Deploy services with deployment tool.
- Provide deployed service to users.
- Unprovide service from users.
- Undeploy services from IMS system.

Prerequisites
IMSSYSe, Nokia FlexiServer License, IMSARCe, IMSOSM, IMSSERV

Duration
2–3 days

No. of Participants
Max. 8

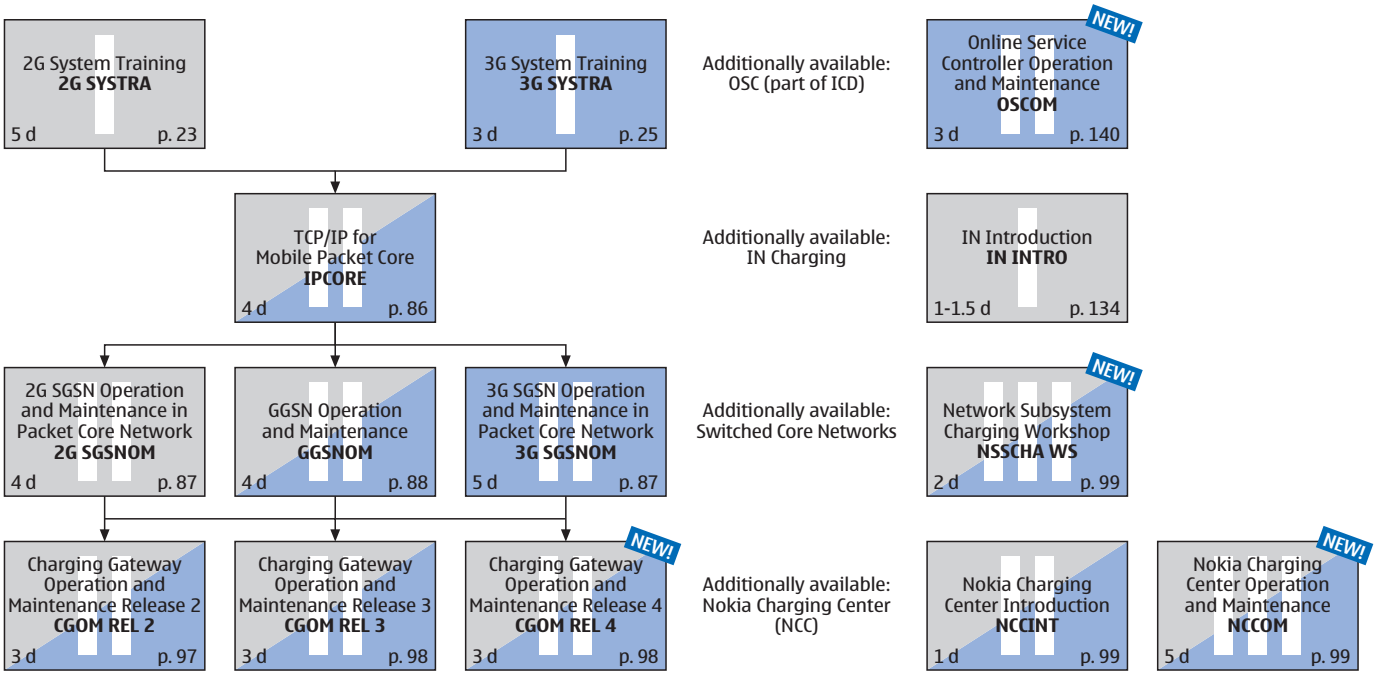
Modules
- Introduction to Nokia IMS service deployment
- IMS deployment tools and parameters
- IMS service installation and verification
- Service provisioning in IMS
- Troubleshooting in IMS service deployment

Charging and billing

Because of the multitude of core network subsystem and charging solutions, we provide specialized training to network engineering people responsible for the planning, development and implementation of charging solutions.

Charging and billing in the GPRS/3G packet core is addressed by this group of courses covering 'Charging Gateway Operation and Maintenance (CGOM)'. HP Unix is a mandatory prerequisite. For the NSS experts we provide a customized workshop as the demand is very customer-specific. The workshop can include topics such as charging administration, time charging and accounting, charging attribute analysis, regional charging features and call control charging and statistics. These can be combined with elements of the CGOM course.

Aimed at customers of the Nokia Charging Center (NCC) for GPRS, this training combines courses from Nokia and Portal, the NCC platform vendor.



Charging Gateway Operation and Maintenance Release 2

CGOM REL 2

Target Group
Personnel taking care of OM and/or engineering of the GPRS Charging Gateway 2.0.

Objectives
After the training, the participant will be able to:
- Explain the general charging issues in GPRS.
- Configure the charging gateway and charging parameters in other network elements.
- Efficiently utilize the Nokia charging gateway features.

Prerequisites
2G SYSTRA or 3G SYSTRA, IPCORE, 2G SGSN OM, IPSO PLAT, GGSNOM

Duration
3 days

No. of Participants
Max. 8

Modules
- Packet core network overview for charging gateway
- Charging in packet core network
- Charging gateway architecture
- Operating the charging gateway
- Charging exercises for CG

Charging Gateway Operation and Maintenance Release 3

CGOM REL 3

Target Group
Personnel taking care of OM and/or engineering of the GPRS Charging Gateway 3.0.

Objectives
After the training, the participant will be able to:
- Explain the general charging issues in GPRS.
- Configure the charging gateway and charging parameters in other network elements.
- Efficiently utilize the Nokia charging gateway features.

Prerequisites
2G SYSTRA or 3G SYSTRA, IPCORE, 2G SGSN OM, IPSO PLAT, GGSNOM

Duration
3 days

No. of Participants
Max. 8

Modules
- Packet core network overview for charging gateway
- Charging in packet core network
- Charging gateway architecture
- Operating the charging gateway
- Charging exercises for CG

Charging Gateway Operation and Maintenance Release 4

NEW!

CGOM REL 4

Target Group
Personnel requiring technical knowledge of the Charging Gateway (CG) Release 4.0 functionality, architecture, daily operating and maintaining tasks and troubleshooting.

Objectives
After the training, the participant will be able to:
- Describe the architecture of Nokia Charging Gateway.
- Install and configure the Charging Gateway 4.0 software.
- Run daily operating and maintenance tasks.
- Understand troubleshooting principles.

Prerequisites
2G SYSTRA or 3G SYSTRA, IPCORE, 2G SGSN OM, IPSO PLAT, GGSNOM

Duration
3 days

No. of Participants
Max. 8

Modules
- Introduction to Charging Gateway
- CG architecture
- Installation of CG
- Configuration of CDR generating network elements
- Basic configuration and OM tasks
- Configuration of CG collector and CG distributor
- Configuration of CG core
- Reports, indicators and troubleshooting for CG
- Back-up and recovery for CG

Network Subsystem Charging Workshop

NEW!

NSSCHA WS

Target Group
First and second line NSS OM personnel responsible for the definition and collection of charging data.

Objectives
After the training, the participant will be able to:
- Identify the charging principles.
- Perform the relevant charging procedures.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS & ADM, 2G SCNOM

Duration
2 days

No. of Participants
Max. 6

Modules
- X.25 and LAN settings in charging
- Charging administration exercises
- Time charging and accounting exercises
- Test calls and charging attribute analysis
- Regional charging features
- Call control charging and statistics
- Charging in GPRS (content based)

Notes
Preferred as tailored solution (modules selected by customers).

Nokia Charging Center Introduction

NCCINT

Target Group
Personnel requiring general understanding of Nokia Charging Center.

Objectives
To give a general understanding of Nokia Charging Center 3.0.

Prerequisites
None

Duration
1 day

No. of Participants
Max. 24

Modules
- NCC introduction
- NCC architecture
- NCC 3.0 out of the box
- Service management

Nokia Charging Center Operation and Maintenance

NEW!

NCCOM

Target Group
NCC 3.0 operation and maintenance engineers.

Objectives
After the training, the participant will be able to:
- Configure the NCC charging center.
- List commands used in the starting and stopping of NCC services.
- Monitor and detect faults in the NCC.
- List the commands to manage the accounts.
- Create and manage pricing plans.
- Explain the flow of CDRs.

Prerequisites
NCCINT

Duration
5 days

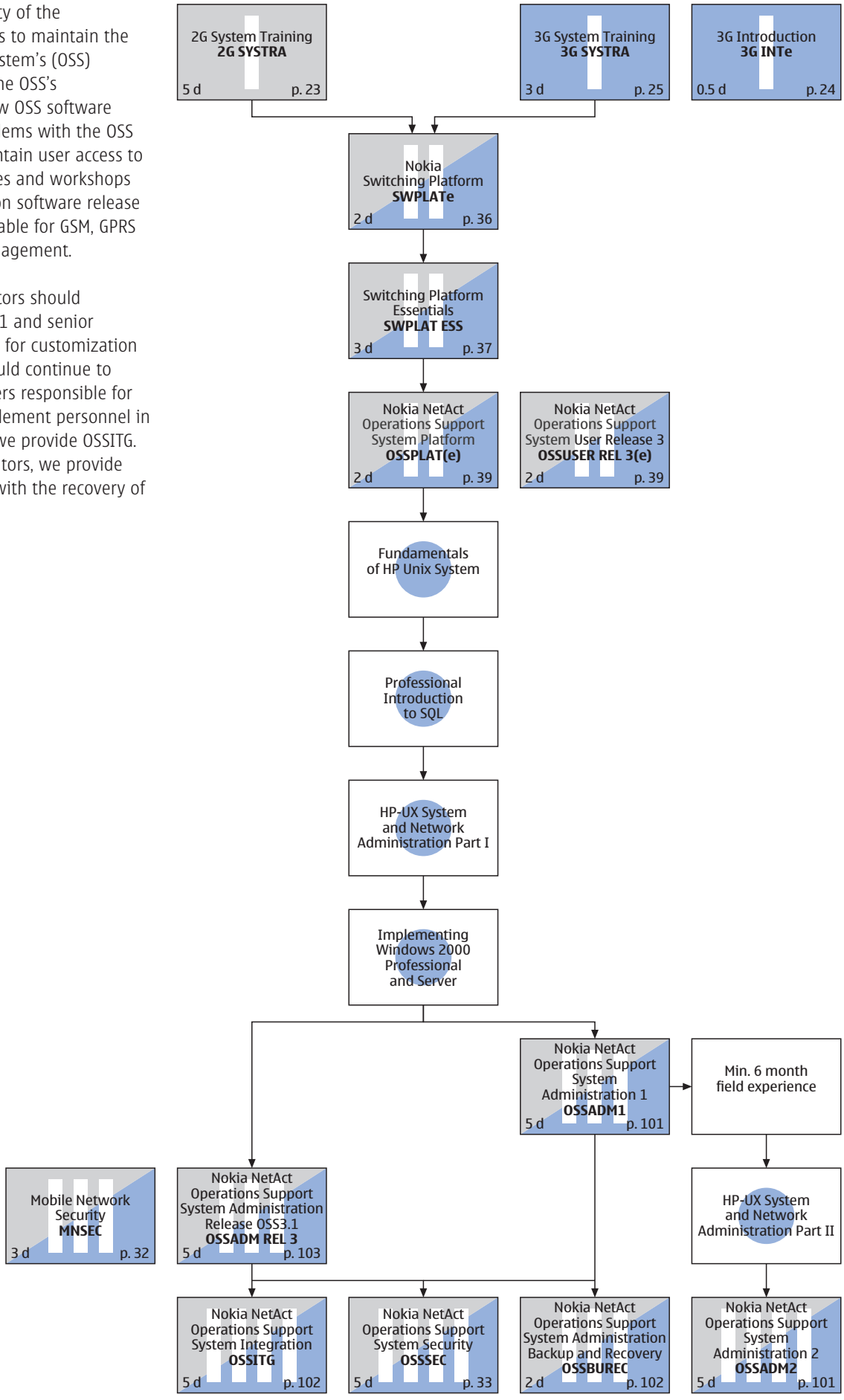
No. of Participants
Max. 4-8

Modules
- NCC introduction
- NCC system set-up overview
- Configuring NCC
- Starting and stopping the system
- NCC system log files
- NCC monitoring the system
- NCC maintaining the database
- NCC account and subscriber management
- NCC GUI
- NCC price plan creation and maintenance
- NCC CDR's flow

OSS administration

The main responsibility of the administration team is to maintain the operations support system's (OSS) availability, monitor the OSS's performance, plan new OSS software releases, resolve problems with the OSS and to issue and maintain user access to the OSS. All our courses and workshops address the systems on software release OSS3.1 and are applicable for GSM, GPRS and 3G networks management.

All system administrators should complete the OSSADM1 and senior engineers responsible for customization and optimization should continue to OSSADM2. For engineers responsible for supporting network element personnel in network integration, we provide OSSITG. For system administrators, we provide workshops that deal with the recovery of the OSS (OSSBUREC).



Nokia NetAct Operations Support System Administration 1 OSSADM1

Target Group
Nokia NetAct administration personnel.

Objectives
After the training, the participant will be able to:
- Describe the components of the OSS3.1 framework.
- List components and configurations for OSS3.1 hardware and storage solutions.
- Navigate the OSS3.1 file system and inquire about the RTE of their OSS3.1 installation.
- Use the OSS3.1 availability assurance features to keep the Nokia NetAct system in a stable running condition.
- Check the OSS3.1 processes and use the OSS3.1 process supervision.
- Use dynamic configuration to configure OSS3.1 processes.
- Describe the OSS3.1 database concept and environment, and employ disk supervision.
- Administer users for Nokia NetAct and for network elements.
- Describe Windows administration procedures relevant for the Windows application server in Nokia NetAct.

Prerequisites
2G SYSTRA, 3G SYSTRA, SWPLAT ESS, OSSPLAT

Duration
5 days

No. of Participants
Max. 8

Modules
- OSS3.1 framework
- OSS3.1 hardware
- OSS3.1 run-time environment tools
- OSS3.1 availability assurance
- OSS3.1 processes
- OSS3.1 configuration
- OSS3.1 database maintenance
- OSS3.1 user management
- OSS3.1 Windows application server

Nokia NetAct Operations Support System Administration 2 OSSADM2

Target Group
Nokia NetAct (OSS) administration personnel.

Objectives
After the training, the participant will be able to:
- Perform platform administration beyond the scope of day to day maintenance.
- Perform database administration beyond the scope of day to day maintenance.
- Describe the connectivity of 2G, 3G and packet core network elements with Nokia NetAct.
- Explain, and when necessary, configure the flow of event and alarm data into Nokia NetAct.
- Explain, and when necessary, configure the flow of measurement data into Nokia NetAct.
- Find and correct specific Nokia NetAct problems using the knowledge gained in the preceding course topics.

Prerequisites
2G SYSTRA, 3G SYSTRA, SWPLAT ESS, OSSPLAT, OSSADM1

Duration
5 days

No. of Participants
Max. 4

Modules
- OSS3.1 platform administration
- OSS3.1 database administration
- OSS3.1 connectivity
- OSS3.1 event and alarm flow
- OSS3.1 measurement data flow
- OSS3.1 troubleshooting

Nokia NetAct Operations Support System Integration — OSSITG

Target Group
Nokia NetAct administration personnel.

Objectives
After the training, the participant will be able to:
- Integrate a new network element into the Nokia NetAct system.
- Troubleshoot existing network element connections.

Prerequisites
IP CORE, OSSADM1

Duration
5 days

No. of Participants
Max. 4

Modules
- Modules for DCN integration to CLNS, SNMP, NWI3, DX 200, IPA2800, IPSO

Notes
This course was formerly named NMSINT. Please order a tailored solution.

Nokia NetAct Operations Support System Administration Backup and Recovery — OSSBUREC

Target Group
Nokia NetAct administration personnel.

Objectives
After the training, the participant will be able to:
- Take backups from the Nokia NetAct system.
- Recover the Nokia NetAct database and file system.

Prerequisites
OSSPLAT, OSSADM1

Duration
2 days

No. of Participants
Max. 4

Modules
- Backup strategies
- Online database backup
- Backup and recovery
- Backup and recovery of systems outside of Nokia NetAct using Nokia NetAct tools

Nokia NetAct Operations Support System Administration Release OSS3.1

OSSADM REL 3

Target Group
Nokia NetAct administration personnel.

Objectives
After the training, the participant will be able to:
- Describe the components of the OSS3.1 framework.
- List components and configurations for OSS3.1 hardware and storage solutions.
- Navigate the OSS3.1 file system and inquire about the RTE of their OSS3.1 installation.
- Incorporate changes in using availability assurance tools into their daily work and describe the changes in process startup and supervision from T12 to OSS3.1.
- Use dynamic configuration to configure OSS3.1 processes.
- Incorporate changes in database management into their daily work and describe new advanced database features employed in OSS3.1.
- Incorporate changes in user management from T12 to OSS3.1 into their daily work.
- Describe the new data flow for 3G network elements (RNC/MGW) and the changes in SNMP data flow from T12 to OSS3.1.
- Describe Windows administration procedures relevant for the Windows application server in Nokia NetAct.

Prerequisites
OSSPLAT, OSSADM1, OSSADM2

Duration
5 days

No. of Participants
Max. 8

Modules
- OSS3.1 framework
- OSS 3.1 hardware
- T12-OSS3.1: Changes in file systems and run-time environment
- T12-OSS3.1: Changes in availability assurance and processes
- OSS3.1 configuration
- T12-OSS3.1: Changes in database management
- T12-OSS3.1: Changes in user management
- T12-OSS3.1: Changes in alarm and performance management data flow
- OSS3.1 Windows application server

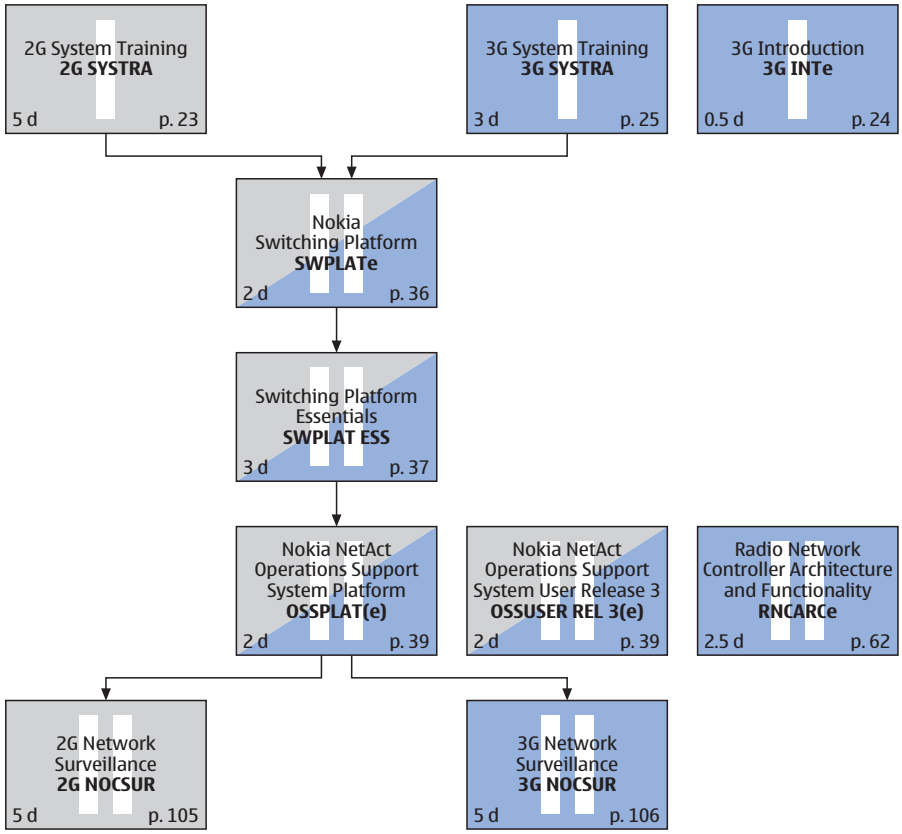
Network operations and control

Generally, persons working in Network Operations and Control (NOC) are performing the network wide tasks of surveillance, maintenance co-ordination, configuration, reporting and administration. In our terminology, these persons are the first line for handling fault situations in the network and escalating problems on specific network elements to network engineering. Characteristically, NOC personnel work in a central location supporting regional or national operations and have specific task-based knowledge on a wide range of equipment.

Network surveillance

The network surveillance group typically monitors the telecom network 24 hours a day, seven days a week. The main responsibilities are to detect and analyze network faults, take corrective actions and track them in a trouble ticket system. The network surveillance team also guides the field maintenance teams through trouble management. We provide parallel training for 2G and 3G (although these can be combined in a customized solution). Furthermore we offer two advanced courses 2G/3G NOCTSH, which are aimed at senior personnel such as supervisors and deal with customization, optimization and more complex cases.

Note: For training on the Nokia Service Quality Manager please refer to page 165.



2G Network Surveillance

2G NOCSUR

Target Group
Network operation and control personnel responsible for network monitoring tasks in BSS, SCN and PCN using the Nokia NetAct OSS.

Objectives
After the training, the participant will be able to:

- List and explain on overview level the architecture and function of Nokia BSS, SCN and PCN.
- Explain the basic concept of signaling in Nokia GSM solution in order to analyze the fault situation and verify the availability of service.
- Monitor a network to a sufficient level, in order to identify the location of fault, effect on service and identify a course of action to take.
- Handle BSS, SCN and PCN network faults to a stage where the target group rectifies the problem, on the provision that the type of fault is solvable. Should the fault not be solvable then the student should identify the correct reporting procedures to take.
- Perform defined preventive maintenance tasks on BSS and core network elements, and report any problems. In addition, identify service affecting tasks and follow the correct working and reporting procedures.
- Monitor the network performance and service levels to ensure that the network is maintained at a sufficient level to support operations and quality of service.
- Handle preventive maintenance tasks of network elements.

Prerequisites
2G SYSTRA, SWPLAT ESS, OSSPLAT

Duration
5 days

No. of Participants
Max. 8

Modules

- BSS overview and architecture
- SCN overview and architecture
- PCN overview and architecture
- Signaling in DX 200 – NOC
- Alarm monitoring – process
- Handling BSS alarm monitoring
- Handling SCN alarm monitoring
- Handling PCN alarm monitoring
- Handling network faults – process
- Handling BSS faults
- Handling SCN faults
- Handling PCN faults
- Handling preventive maintenance tasks – process
- Handling BSS preventive maintenance tasks
- Handling SCN preventive maintenance tasks
- Performance and service monitoring – process
- Handling BSS performance and service monitoring
- Handling SCN performance and service monitoring

3G Network Surveillance

3G NOCSUR

Target Group
Network operation and control personnel responsible for network monitoring tasks in RAN, SCN and PCN using the Nokia NetAct OSS.

Objectives
After the training, the participant will be able to:

- List and explain on overview level the architecture and function of Nokia 3G RAN, SCN and PCN.
- Briefly explain the radio network configuration of the Nokia 3G RAN.
- Explain the basic concept of signaling in Nokia GSM solution in order to analyze the fault situation and verify the availability of service.
- Monitor a network to a sufficient level, in order to identify the location of fault, effect on service and identify a course of action to take.
- Demonstrate the ability to monitor the Nokia RAN and core network to a sufficient level using the Nokia NetAct.
- Handle 3G RAN and core network faults to a stage where the target group rectifies the problem, on the provision that the type of fault is solvable. Should the fault not be solvable then the student should identify the correct reporting procedures to take.
- Perform defined preventive maintenance tasks on 3G RAN and core network elements, and report any problems. In addition, identify service affecting tasks and follow the correct working and reporting procedures.
- Monitor the network performance and service levels to ensure that the network is maintained at a sufficient level to support operations and quality of service.

Prerequisites
3G SYSTRA, SWPLAT ESS, OSSPLAT

Duration
5 days

No. of Participants
Max. 8

Modules

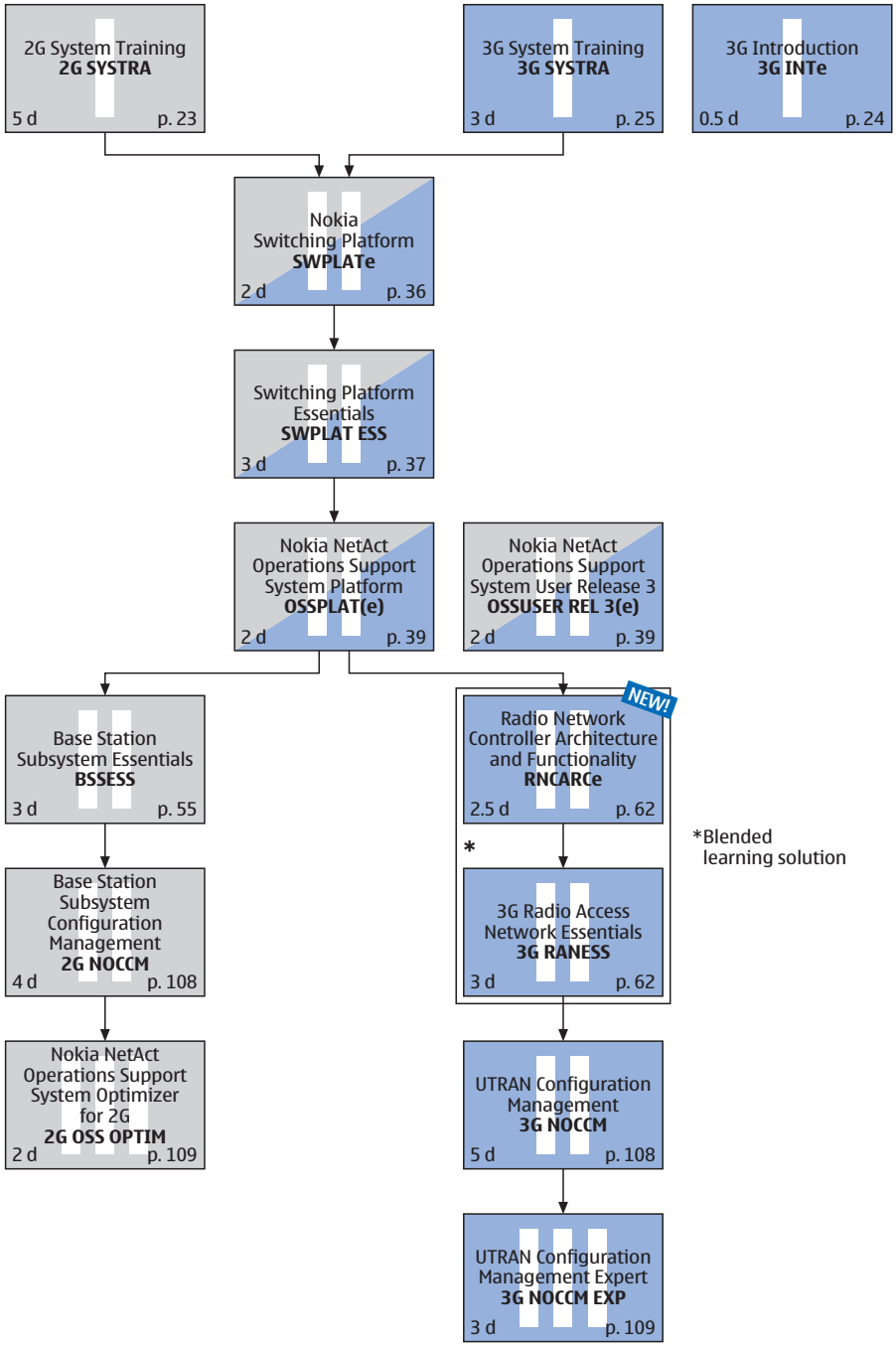
- RAN overview and architecture
- SCN overview and architecture
- PCN overview and architecture
- RAN configuration and operation
- Signaling in DX 200 – NOC
- Signaling in IPA2800 – NOC
- Signaling in IPSO – NOC
- Alarm Monitoring – process
- Handling RAN alarm monitoring
- Handling PCN alarm monitoring
- Handling SCN alarm monitoring
- Handling network faults – process
- Handling Preventive Maintenance Tasks – process
- Handling RAN preventive maintenance tasks
- Handling PCN preventive maintenance tasks
- Handling SCN preventive maintenance tasks

Radio network configuration

The radio network configuration personnel group typically implements enhancements and changes to the network elements' configuration on a network or area level. Other tasks are to maintain network documentation and manage software and hardware.
The radio network configuration group co-operates closely with the network rollout and network planning departments.

Even though the operating principles are the same, the tools required by radio network configuration personnel are different for 2G and 3G networks so the training presents two alternatives for the different networks.

In the advanced area there is demand for very customer-specific training, so no standard training solutions are offered. However, courses and workshops can be tailored to cover advanced topics like:
- Radio access optimization
- Retuning 2G and 3G networks
- Re-hosting base stations
- Managing inter-OSS adjacencies
- Splitting routing and location areas
- Splitting SGSNs or BSCs



Base Station Subsystem Configuration Management

2G NOCCM

Target Group
Network configuration personnel; engineering support BSS.

Objectives
After the training, the participant will be able to:
- Review the concepts of radio network configuration management and the representation of radio network parameters in the Nokia network management system NetAct.
- Explain the operation and maintenance task in a radio network and list the various OSS tools for it.
- Interrogate, modify, delete and create radio network parameters with various OSS tools.
- Interrogate, modify, delete and create adjacencies in the radio network with various OSS tools.
- Check the data consistency.
- Assign software to BCFs.
- Use the new plan management tools CM Editor, CM Plan Manager and CM Provisioner.
- Handle the offline tool Plan Editor in order to handle plans and actual data.
- Explain the different ways of integrating BCF sites depending on the tools and site types including single and mass operation.
- Integrate BCF sites to the Nokia NetAct OSS and the network with the Nokia NetAct OSS tools in single and mass operation.

Prerequisites
2G SYSTRA, SWPLATe, SWPLAT ESS, OSSPLAT, BSSESS

Duration
4 days

No. of Participants
Max. 8

Modules
- RNW configuration management 2G – principles and concepts
- RNW operational tasks 2G – OSS
- Plan management – OSS
- Handling OSS3 offline tool Plan Editor
- RNW integration and expansion 2G – OSS

UTRAN Configuration Management

3G NOCCM

Target Group
Personnel responsible for building, expanding and monitoring the UTRAN radio network.

Objectives
After the training, the participant will be able to:
- Review the concepts of radio network configuration management and the representation of radio network parameters in the Nokia network management system NetAct.
- List routine radio network operational tasks in a mobile network dependant on the individual responsibilities and describe the process of execution.
- Perform routine radio network operational tasks using OSS as tool, that are part of the regular operation of a radio network. In addition, the participant should identify service effecting tasks and follow the correct procedures.
- Understand how the integration and expansion of base stations are embedded in the rollout process and explain the principle steps and process flow of integration a base station to the network.
- Use the new plan management tools CM Editor, CM Plan Manager and CM Provisioner.
- Handle the offline tool Plan Editor in order to handle plans and actual data.
- Perform the integration and expansion of base stations to the network using NEMU/MML or OSS as tools.

Prerequisites
3G SYSTRA, SWPLAT ESS, OSSPLAT, 3G RANESS

Duration
5 days

No. of Participants
Max. 8

Modules
- RNW configuration management 3G – principles and concepts
- RNW operational tasks 3G – OSS
- RNW integration and expansion – method NEMU/MML
- Plan management – OSS
- Handling OSS3 offline tool Plan Editor
- RNW integration and expansion 3G – OSS

UTRAN Configuration Management Expert 3G NOCCM EXP

Target Group
Network configuration personnel; engineering support RAN.

Objectives
After the training, the participant will be able to:
- Perform rehosting of node Bs.
- Handle adjacencies at Nokia NetAct OSS borders in mass operations and with graphical tools.

Prerequisites
3G SYSTRA, 3G ATM, OSSPLAT, 3G RANESS, 3G NOCCM

Duration
3 days

No. of Participants
Max 4

Modules
- Rehosting WCDMA sites (node Bs)
- Advanced WCDMA adjacency handling
- Intersystem WCDMA adjacency handling

Nokia NetAct Operations Support System Optimizer for 2G 2G OSS OPTIM

Target Group
Personnel planning and optimizing the GSM radio network.

Objectives
After the training, the participant will be able to:
- Explain the optimization process generally.
- List the features of Nokia NetAct Optimizer 1.1 generally.
- Outline the interfaces of Nokia NetAct Optimizer 1.1.
- Manage the general functions of Nokia NetAct Optimizer 1.1.
- Explain the manual and automated optimization solutions of Nokia NetAct Optimizer 1.1.
- Perform manual optimization with graphical adjacency manager.
- Execute automated adjacency optimization.
- Carry out a frequency allocation.
- Outline the principle of measurement an interference matrix.
- List the system requirements fro installing Nokia NetAct Optimizer 1.1.
- Illustrate the principle of advanced visualization with GIS.
- Explain, how to handle digital maps in Nokia NetAct.

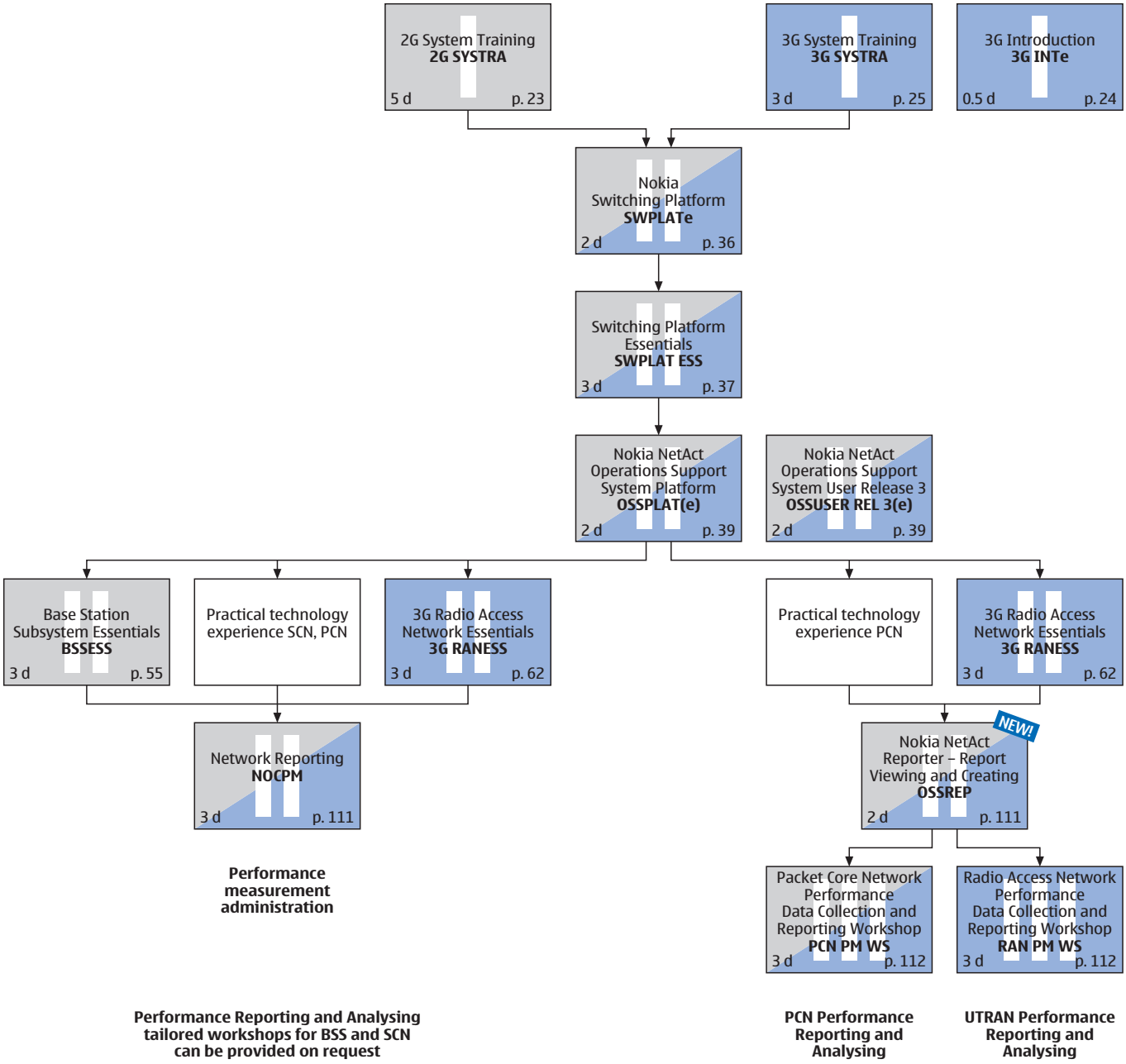
Prerequisites
2G SYSTRA, OSSPLAT, 2G NOCCM

Duration
2 days

No. of Participants
Max. 8

Modules
- Nokia NetAct Optimizer 1.1 functionality overview
- Nokia NetAct Optimizer functionality for 2G and 3G
- Manual adjacency generation
- Measurement based adjacency generation
- Measurement based frequency allocation
- Performance visualization and analysis on top of digital maps
- Installing Nokia NetAct Optimizer and GIS
- GIS and digital map overview

Network performance reporting



The network performance reporting group is responsible for monitoring the quality of service in the network and looking for potential faults and service-related problems through the use of network statistics.

The first part of our training explains how to collect and understand the key statistics from the network in the NOCPM course. In the Nokia solution, the performance data is in the OSS solution, and we provide a special course focused on using the tool to gain the data you need (OSSREP).

The analysis of the data, where it comes from and how to interpret is the basis of two workshops, one for the packet core network (PCN PM WS) and another for the radio access network (RAN PM WS). These provide the basic understanding.

If you need more consultative workshops on defining or analyzing specific elements in your own network, please contact your local Nokia training contact person.

Network Reporting

NOCPM

Target Group
3G network reporting personnel.

Objectives
After the training, the participant will be able to:
- Describe the NOC performance management process and discuss the interdependence to the other NOC processes like monitor network or proactive maintenance.
- Describe the administration of network performance data process and embed it into whole NOC performance management process.
- Describe and perform the administration of network performance data with Nokia NetAct.
- Describe and perform the administration of network performance data locally in the RAN, BSS and core network (CS and PS). If possible use local applications to generate example reports in network elements.
- Generate example network reports using Nokia NetAct Reporter application.

Prerequisites
3G SYSTRA, SWPLAT ESS, OSSPLAT, 3G RANESS

Duration
3 days

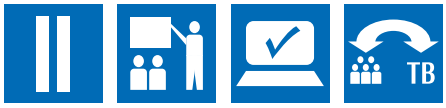
No. of Participants
Max. 8

Modules
- Performance management principles in network operation and control (Process)
- Administration of performance data – process
- Nokia NetAct – centralized administration of performance data
- UTRAN – administration of performance data
- BSS – administration of performance data
- Core network CS – administration of performance data
- Core network PS – administration of performance data
- Using Nokia NetAct Reporter

Nokia NetAct Reporter – Report Viewing and Creating

NEW!

OSSREP



Target Group
Network reporting and performance management personnel.

Objectives
After the training, the participant will be able to:
- Describe PM process, report definition process, measurement administration process and reporting process.
- Explain purpose and scope of Nokia NetAct Reporter tools and discuss these tools and the accordant user groups.
- Demonstrate how to view predefined reports with report browser and KPI browser.
- Apply the report builder tools to define, organize and store KPI formulas.
- Define a new example report with report builder and organize this report for regular reporting in the report tree using the report creation process previously defined.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 8

Modules
- Reporting processes and Nokia NetAct reporter introduction
- Report viewing and KPI viewing process
- Report creating and KPI creating process

Packet Core Network Performance Data Collection and Reporting Workshop — PCN PM WS

Target Group
Network operation and control personnel, network performance reporting group, packet switched core network planning personnel.

Objectives
After the training, the participant will be able to:
- Describe the process of performance management within the operator's organization and explain the PS CN and OSS3 PM documentation structure.
- Implement the performance data collection in the PS CN elements and in the NMS. Recall its principal properties like collection intervals and summarization.
- List the measurements collected in the PS CN, describe their storages tables in the NMS and list typical analysis applications.
- Know the OSS3 reporting tools and demonstrate their usage for generating PS CN performance report.
- Know at an overview level the PS CN Key Performance Indicators (KPIs) and their relation to network performance and quality of service (QoS). Generate and analyze example PS CN reports from network data.

Prerequisites
2G SYSTRA, 3G SYSTRA, OSSPLAT, OSSREP

Duration
3 days

No. of Participants
Max. 4

Modules
- PCN statistics and the OSS database
- PCN reporting tools
- PCN Key Performance Indicators and reports

Notes
This course was formerly named PS CN PM WS.

Radio Access Network Performance Data Collection and Reporting Workshop — RAN PM WS

Target Group
Network operation and control personnel, network performance reporting group, RAN network planning personnel.

Objectives
After the training, the participant will be able to:
- Describe the process of performance management within the operator's organization and explain the RAN and OSS3 PM documentation structure.
- Implement the performance data collection in the RNC and in the NMS. Recall its principal properties like collection intervals and summarization.
- List the measurements collected in the RAN, describe their storage tables in the NMS and list typical analysis applications.
- Know the OSS3 reporting tools and demonstrate their usage for generating RAN performance reports.
- Know at an overview level the RAN Key Performance Indicators (KPIs) and their relation to network performance and quality of service (QoS). Generate and analyze example RAN reports from network data.

Prerequisites
3G SYSTRA, OSSPLAT, OSSREP

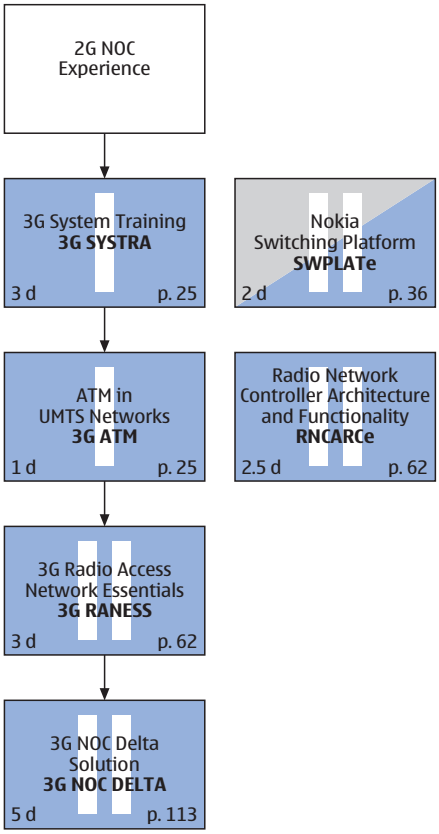
Duration
3 days

No. of Participants
Max. 4

Modules
- RNC statistics and OSS database
- RAN reporting tools
- RAN Key Performance Indicators and reports

3G NOC delta solution

The NOC personnel for 3G group have experience of network operations in a Nokia 2G network and are now required to operate the Nokia 3G RAN and core network.



3G NOC Delta Solution

3G NOC DELTA

Target Group
Experienced network operation and control personnel (GSM and GPRS) responsible for network surveillance, configuration management and performance management tasks in 3G network.

Objectives
Please check for more details on NOLS.

Prerequisites
3G SYSTRA, 3G RANESS, network operation and control experience in GSM and GPRS networks using the Nokia NetAct, GSM and GPRS experience minimum 6–12 months'

Duration
5 days

No. of Participants
Max. 8

Modules
- Core network overview and architecture
- MGW for 3G MSC (ATM module) overview and architecture
- Nokia 3G SGSN overview and architecture
- Alarm monitoring (process)
- Handling RAN alarm monitoring (exercise)
- Handling CS CN alarm monitoring (MGW exercise)
- Handling PS CN alarm monitoring (3G SGSN exercise)
- Performance and service monitoring (process)
- Handling RAN performance and service monitoring (exercise)
- Handling preventive maintenance tasks (process)
- Handling RAN preventive maintenance tasks (exercise)
- Handling SCN preventive maintenance tasks (MGW exercise)
- Handling network faults (process)
- Handling RAN network faults (exercise)
- Review: RNW configuration management – common principles and concepts
- Routine RNW operational tasks (process)
- Routine RNW operational tasks – method NEMU/MML (exercises)
- Routine RNW operational tasks – method OSS
- Radio network integration and expansion (process)
- RNW integration and expansion – method NEMU/MML (exercise)
- RNW integration and expansion – method OSS
- Performance management principles in network operation and control (process)
- Administration of performance data (process)
- UTRAN – measurement administration and report creation in network element using NEMU/MML
- Using Nokia NetAct Reporter

Network planning

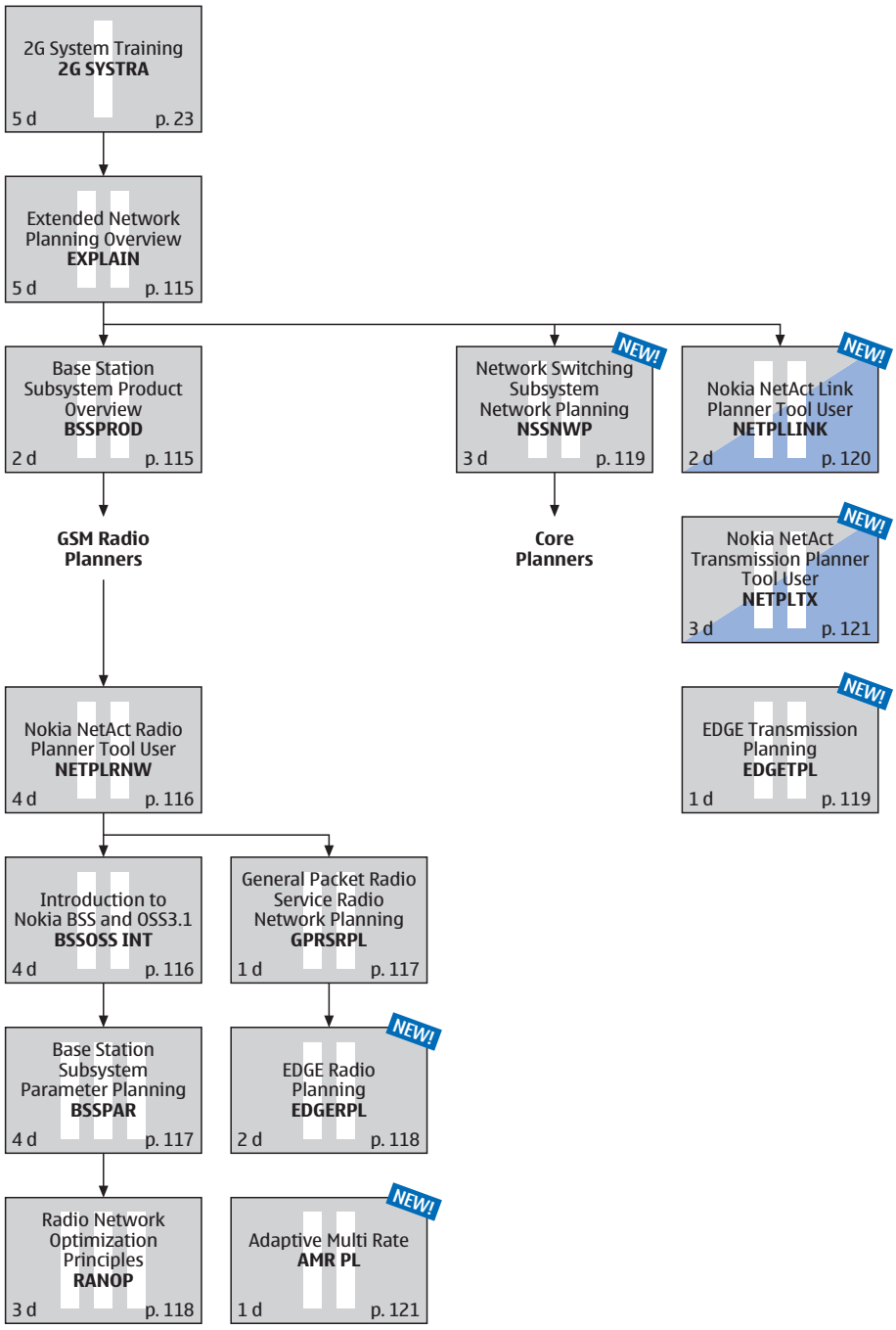
Network planning covers a wide area of personnel responsible for planning, parameter configuration, performance and optimization. This target group typically supports the operation and maintenance people, as well as the customer care and project management functions. Network planners are required to have a deep understanding of the technology and a proficiency in using the appropriate planning tools. Furthermore, network optimization personnel typically provide network status reports and trigger pro-active maintenance.

The Nokia recommended learning solution is focused on developing the knowledge and skills needed to plan and optimize the radio and core network.

When you have a more specific and practical requirement, the development solution could be a consultancy workshop by our Network Performance Services.

Our recommended flow for GSM, GPRS and EDGE network planners comprises of introductory training on network technology (courses 2G SYSTRA, and e-learnings EDGESYSe, GPRSOVe), with release updates (BSS REL S10/S10.5 THe, BSS REL S11 THe), principles of network planning and optimization (courses EXPLAIN, RANOP), planning knowledge on the Nokia equipment (courses BSSPROD, BSSPAR, GPRSRPL, NSSNWP, EDGERPL, EDGETPL), and hands-on training for Nokia network planning tools and network management system (courses NETPLRNW, BSSOSS INT, NETPLTX, NETPLLINK).

GSM, GPRS, EDGE



Extended Network Planning Overview EXPLAIN

Target Group
Network planning and network optimization personnel.

Objectives
After the training, the participant will be able to:
- Name and describe the main network elements in GSM.
- Understand radio wave propagation physics.
- Explain basic network planning methods, tasks to be done during the entire planning process.
- Describe different planning tools used.

Prerequisites
2G SYSTRA

Duration
5 days

No. of Participants
Max. 24

Modules
- GSM standardisation and technology
- Radio propagation channel
- Radio network planning process
- Configuration planning
- Coverage planning
- Capacity planning
- Frequency planning
- Optimization and radio network functionality
- Transmission planning
- Radio network planning tools
- Special cases: indoor and tunnel environments
- Other technologies: TETRA, GPRS, EDGE and UMTS
- EXPLAIN exercise

Notes
Additional material: “GSM, GPRS and EDGE Performance: Evolution Towards 3G/UMTS” (Halonen et al), page 15.

Base Station Subsystem Product Overview BSSPROD

Target Group
Network planning and network optimizing personnel.

Objectives
After the training, the participant will be able to:
- Name different BTS types.
- List installation requirements.
- Describe capacity and configuration possibilities.
- List different BSC configurations.
- Know the maximum number of TRXs per BSC.

Prerequisites
2G SYSTRA, EXPLAIN

Duration
2 days

No. of Participants
Max. 24

Modules
- Nokia Talk Family BTS products: dimensions, capacity and functionality
- Nokia MetroSite elements: dimensions, capacity and functionality
- Nokia UltraSite elements: dimensions, capacity and functionality
- Nokia InSite Site BTS dimensions, capacity and functionality
- Microwave products for Nokia Talk Family, Nokia MetroSite and Nokia UltraSite solutions
- Transmission units and configuration examples
- TCSM2 and BSC2E / BSC2I dimensions and capacity

Nokia NetAct Radio Planner Tool User NETPLRNW

Target Group
Engineers who will use the Nokia NetAct Radio Planner tool.

Objectives
After the training, the participant will be able to:
- Set up the tool.
- Create new projects.
- Understand how to use the GIS.
- Perform coverage planning.
- Perform neighbors planning.
- Understand the planning of multi layered networks.
- Perform traffic planning and analyze the carrier requirements.
- Perform frequency planning manually.
- Generate coverage and interference analysis reports.
- Set up a frequency plan with ILSA.
- Improve an existing frequency plan.
- Understand the steps involved in planning with a few new cells.
- Plan using frequency hopping.
- Plan with multiple reuse patterns.

Prerequisites
EXPLAIN

Duration
4 days

No. of Participants
Max. 12

Modules
- Introduction to Nokia NetAct Planner
- Setting up a new project
- Using the GIS and other visual tools
- Polygons and vectors
- Flags and filters
- Concepts behind the 3G planning tool
- The 3G user interface
- Configuring a 3G network
- Simulating 3G performance
- Generating reports
- Additional procedures
- Simulating a WCDMA network
- Nokia NetAct Radio Planner exercises
- Introduction to ILSA
- Using ILSA
- Frequency plan for a network of sites
- Make improvements to an ILSA plan
- Re-plan a network with new sites
- Planning with groups
- Planning a frequency hopping network
- Planning with multiple reuse patterns

Introduction to Nokia BSS and OSS3.1 BSSOSS INT

Target Group
Network planning and network optimization personnel.

Objectives
After the training, the participant will be able to:
- Describe the functions of the BSC and TCSM2E, their capacity and configuration.
- Know, how to handle the radio network with MML.
- Review the concepts of radio network configuration management and the representation of radio network parameters in the Nokia network management system NetAct.
- Explain the operation and maintenance task in a radio network and can list the various Nokia NetAct OSS tools for it.
- Interrogate, modify, delete and create radio network parameters with various OSS tools.
- Interrogate, modify, delete and create adjacencies in the radio network with various NMS tools.
- Check the data consistency.
- Explain the different ways of integrating BCF sites depending on the tools and site types including single and mass operation.
- Integrate BCF sites to the Nokia NetAct OSS and the network with the Nokia NetAct tools in single and mass operation.

Prerequisites
2G SYSTRA, EXPLAIN, BSSPROD

Duration
4 days

No. of Participants
Max. 8

Modules
- BSS overview
- TCSM2E basic operation
- BSC general description
- Handling radio network parameters with MML
- Handling adjacencies by MML
- Nokia NetAct basic architecture
- Nokia NetAct documentation
- RNW configuration management 2G – principles and concepts

Base Station Subsystem Parameter Planning BSSPAR

Target Group
GSM radio network planning and optimization engineers.

Objectives
After the training, the participant will be able to:
- Define parameter values for idle mode operation.
- Identify parameters for radio resource management.
- Discuss the power control and handover processes.
- Describe the parameters for selected Nokia BSS features.
- Plan the parameters for several types of cells.
- List the parameters that are used for (E)GPRS radio timeslot classification.
- List the parameters that are used for providing HSCSD services.

Prerequisites
2G SYSTRA, BSSPROD, BSSOSS INT, EXPLAIN

Duration
4 days

No. of Participants
Max. 12

Modules
- BSSPAR course introduction
- Introduction to parameter planning
- Radio channel configurations
- Idle mode operation
- BSS protocols and signaling capacity
- Radio resource management
- Measurement processing
- Power control (GSM)
- Handover control and adjacencies
- Coverage enhancement features
- Capacity and spectral efficiency features
- Radio network performance features
- Voice and channel coding (FR, HR, EFR, AMR)
- Dual band features
- Intelligent underlay overlay
- High speed circuit switched data
- GPRS and EGPRS (EDGE)
- MS location services

Notes
The course is modular. EGPRS is optional on dedicated courses.

General Packet Radio Service Radio Network Planning GPRSRPL

Target Group
Radio network planners with little or no GPRS planning experience.

Objectives
After the training, the participant will be able to:
- Explain how territory allocation algorithm works and how it affects delays and throughputs in GPRS networks.
- Explain how to dimension the radio network capacity in a GPRS network.
- Describe how to use the measurements and counters to monitor effectively GPRS network performance.

Prerequisites
2G SYSTRA, EXPLAIN, GPRSOVe

Duration
1 day

No. of Participants
Max. 12

Modules
- MS location services
- GPRS review
- Protocols and signaling
- Radio network planning and dimensioning
- GPRS performance, counters and KPIs

Notes
- Only little GPRS optimization included in this training.
- Additional material: “GSM, GPRS and EDGE Performance: Evolution Towards 3G/UMTS” (Halonen et al), page 15.

Radio Network Optimization Principles RANOP

Target Group
Network planning personnel, employees that are involved in comprehensive radio network optimization, such as NMS operating personnel.

Objectives
To provide participants with the knowledge and skills to optimize Nokia GSM networks. The participant will be introduced to the general network optimization process, get to know how to calculate quality indicating figures and learn about important BSC counters. Moreover, measurement types and counter numbers will be explained. Many case studies and practice oriented group works are part of the training as well as optimization related Nokia features.

Prerequisites
2G SYSTRA, BSSPAR, EXPLAIN

Duration
3 days

No. of Participants
Max. 12

Modules
- Course introduction
- Network quality cycle
- Quality targets
- Monitor quality
- Quality reporting
- Network configuration analysis
- Quality in detail
- General quality improvement
- Reference material

Notes
Additional material: "GSM, GPRS and EDGE Performance: Evolution Towards 3G/UMTS" (Halonen et al), page 15.

EDGE Radio Planning

NEW! EDGERPL

Target Group
Network planning personnel needing good theoretical knowledge of the EDGE system.

Objectives
After the training, the participant will be able to:
- Know what is the Nokia EGPRS solution.
- Discuss the effect of EDGE to radio network planning.
- Explain the different modulation and coding schemes.
- Describe the structure of EGPRS radio block.
- Perform link budget calculations for all modulation and coding schemes.
- Discuss TRS planning issues introduced by EDGE.

Prerequisites
BSSPAR, GPRSRPL, EDGESYSe

Duration
2 days

No. of Participants
Max. 12

Modules
- EDGE introduction
- EGPRS implementation
- EGPRS radio planning
- EGPRS transmission overview

Options
Additional material: "GSM, GPRS and EDGE Performance: Evolution Towards 3G/UMTS" (Halonen et al), page 15.

EDGE Transmission Planning

NEW!

EDGETPL

Target Group
Transmission network planning engineers needing a good theoretical understanding of how to do EDGE planning.

Objectives
After the training, the participant will be able to:
- Describe the EDGE coding schemes in Abis interface.
- Understand the air-TCH throughput limited by air- and Abis interfaces.
- Define the traffic mix of different services.
- Understand dynamic Abis, BSC, A-ter and Gb interface dimensioning.
- Make detailed planning of dynamic Abis interfaces.

Prerequisites
2G SYSTRA, EDGESYSe

Duration
1 day

No. of Participants
Max. 12

Modules
- Detailed planning examples
- Dimensioning examples
- Introduction
- Pre-planning or dynamic Abis interface
- Transmission requirements

Network Switching Subsystem Network Planning

NEW!

NSSNWP

Target Group
Network planning engineers needing good theoretical and practical knowledge of the network switching subsystem (NSS) planning.

Objectives
After the training, the participant will be able to:
- List the most important planning/ dimensioning factors.
- Use an excel sheet for NSS dimensioning and modify it for own needs.
- Provide MSC and HLR detailed planning information.
- Describe the functionalities of Nokia SRRi and solution of SIGTRAN and IP-trunk describe the NSS measurements and statistics.
- Describe the most important improvements in M12 and their impact.

Prerequisites
NSSROU, NSSSIG

Duration
3 days

No. of Participants
Max. 12

Modules
- Detailed planning
- Measurements and statistics
- NSS dimensioning
- SIGTRAN, IP-trunk planning and M12 Delta
- SRRi planning

Nokia NetAct Link Planner Tool User

NEW! NETPLLINK

Target Group
Engineers involved in maintenance and planning of digital microwave radio links, which have to work with Nokia NetAct Planner.

Objectives
After the training, the participant will be able to:
- Set up Nokia NetAct, create projects, and work with the GIS.
- Explain the Nokia NetAct Link Planner concept, set up the equipment parameters, synchronize with transmission planner.
- Configure the physical network using the link database and view window.
- Use correctly propagation prediction models and create the link budget tab.
- Create and analyze the link performance tabs.
- Plan frequency channels and use the interference tool to assess levels of interference between microwave sites.
- Calculate the route, capacity and map timeslots.
- Produce and analyze various types of reports.

Prerequisites
3G RPESS

Duration
2 days

No. of Participants
Max. 12

Modules
- Nokia NetAct software fundamentals
- Nokia NetAct Link Planner software fundamentals, radio equipment characteristic, antenna consideration
- Designing the physical network (initial planning)
- Link budget and microwave propagation
- Quality and performance calculation
- Frequency planning and interference analysis
- Planning routes and timeslots
- Reports in Link Planner

Nokia NetAct Transmission Planner Tool User

NEW!

NETPLTX

Target Group
TX planning personnel dealing with fixed and cellular networks both for voice and data transmission, and working with Nokia NetAct Transmission Planner.

Objectives
After the training, the participant will be able to:
- Set up Nokia NetAct, create projects, and work with the GIS.
- Explain the module concept, create plans, synchronize with link planner.
- Plan the conduit and transmission topology and route logical connections.
- Design circuit switch networks and dimension links.
- Design interswitch networks, generate traffic and dimension links.
- Design 3G and IP networks and dimension links.
- Design signaling networks, generate traffic and dimension links.
- Plan ATM networks according to overlying data traffic.
- Plan SDH networks according to overlying data and voice traffic.
- Plan optical networks according to overlying SDH and transmission networks.
- Plan low-level properties of physical network devices.

Prerequisites
2G SYSTRA

Duration
3 days

No. of Participants
Max. 12

Modules
- Nokia NetAct software fundamentals
- Nokia NetAct Transmission Planner software fundamentals
- Basic transmission network planning
- Interswitch network planning
- 3G ATM and IP cellular network planning
- Signaling network planning
- ATM transmission planning
- PDH/SDH transmission planning
- Optical transmission planning
- Detail network planning

Adaptive Multi Rate

NEW!

AMR PL

Target Group
Personnel who need knowledge of AMR to plan, implement and maintain AMR.

Objectives
After the training, the participant will be able to:
- Explain basic of AMR, AMR link adaptation and codec adaptation principles, AMR benefits, AMR interaction with other BSS solutions and AMR parameters and implementation.

Prerequisites
2G SYSTRA

Duration
1 day

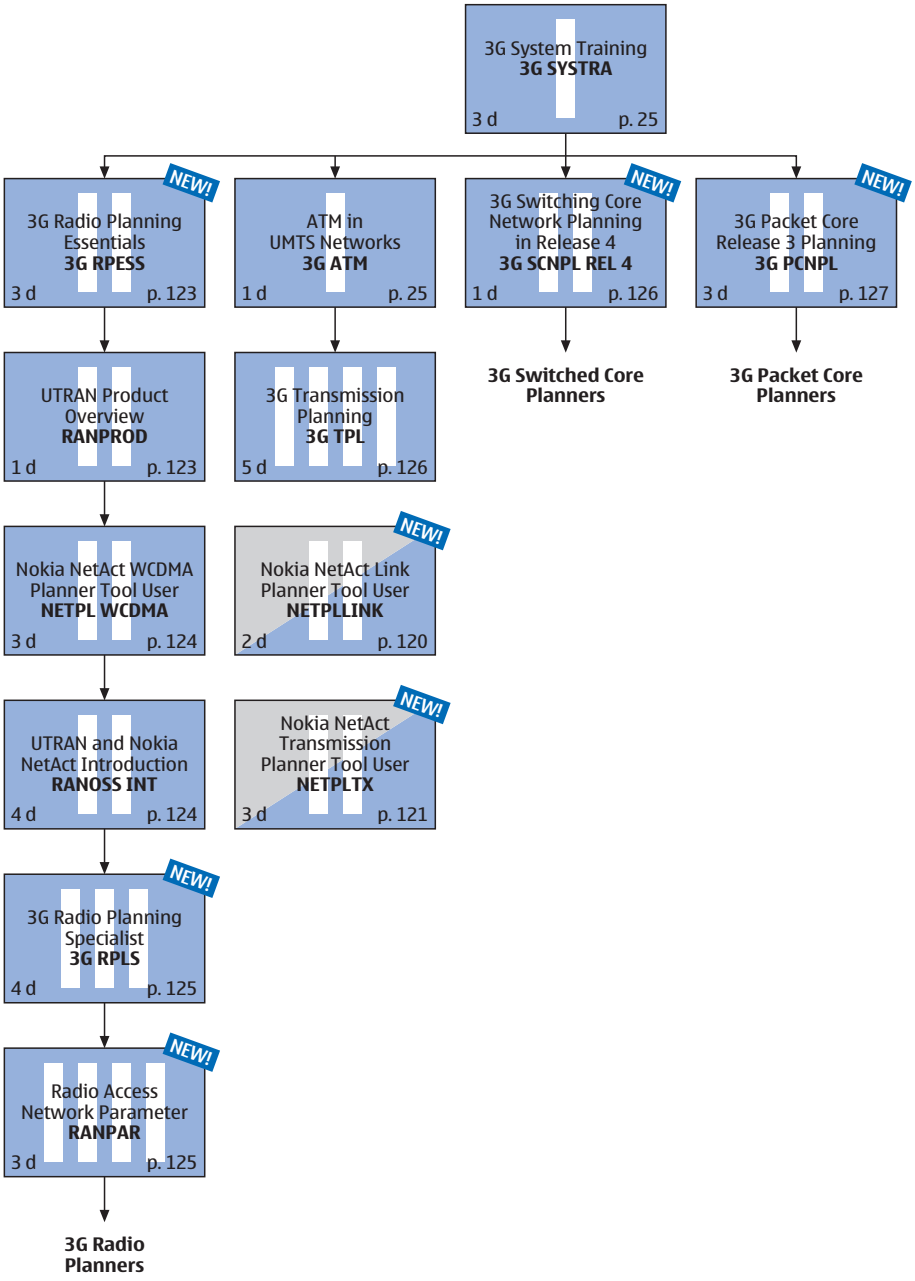
No. of Participants
Max. 12

Modules
- Overview of AMR Technology
- Implementation of AMR in Nokia Solution
- Nokia AMR planning aspects
- AMR performance

Notes
Nokia does not provide release training specifically for planners. Instead, we recommend that network planners use our release e-learning to study new features (BSS REL S10/10.5 THe, BSS REL S11 THe).

3G network planning

Our recommended course flow for 3G network planning comprises of introductions to network technology training (courses 3G SYSTRA, 3G ATM), principles of network planning and optimization (courses 3G RPESS, 3G PCNPL, 3G SCNPL REL 4) followed by comprehensive planning knowledge on the Nokia equipment (courses RANPROD, RANPAR, 3G RPLS, 3G TPL), and hands-on training for Nokia network planning tools and network management system (courses NETPL WCDMA, RANOSS INT, NETPLTX, NETPLLINK).



3G Radio Planning Essentials

NEW!

3G RPESS

Target Group
Radio planners having a GSM background with a basic understanding of a 3G network.

Objectives
The aim of this course is to provide participants with the knowledge about 3G radio network planning. The key factors affecting a WCDMA power budget calculation and capacity and coverage planning issues will be discussed. Co-siting with GSM as well as coverage and capacity improvement alternatives will be presented. Many case studies and practice oriented group works are also part of the training.

Prerequisites
3G SYSTRA

Duration
3 days

No. of Participants
Max. 12

Modules
- WCDMA fundamentals concerning network planning
- Radio network dimensioning
- Power budget calculation
- Coverage and capacity planning
- Capacity and coverage improvement
- Pre-launch optimization
- Nokia WCDMA Base Station Family
- WCDMA/GSM co-Siting
- RAN sharing
- Multilayer planning
- Planning support for 3G rollout
- Case study

Notes
- 3G RPESS replaces 3G RPFUN and 3G RDIM. 3G RPESS has been updated to focus on the differencies between UMTS radio network planning and GSM radio network planning.
- Additional material: “Radio Network Planning and Optimisation for UMTS” (Laiho et al), page 15.

UTRAN Product Overview

RANPROD

Target Group
Radio network planning personnel, civil works personnel.

Objectives
After the training, the participant will be able to:
- List the basic RAN products.
- Understand their configurations.

Prerequisites
3G SYSTRA

Duration
1 day

No. of Participants
Max. 24

Modules
- Nokia UltraSite WBTS Product Family
- General WBTS system architecture
- Mechanical size, weight, cable entry, footprints, power consumption
- Cooling system
- Installation requirements for building static, required space
- Battery back-up system
- Site support cabinet, cabinet chaining
- WBTS sensitivities
- WBTS power
- Capacity and configuration possibilities
- Transmission capabilities
- Cositing/interworking 3G-2G equipment
- Antenna configurations
- Nokia duplexer and combiner
- Mast head amplifier

Notes
Additional material: “Radio Network Planning and Optimisation for UMTS” (Laiho et al), page 15.

Nokia NetAct WCDMA Planner Tool User — NETPL WCDMA

Target Group
Radio planners who are migrating to 3G UMTS planning. The course is equally beneficial to the fresh telecommunication engineers who want to perform 3G planning.

Objectives
After the training, the participant will be able to:
- Set up Nokia NetAct, create projects, and work with the GIS.
- Explain the module concept, set up the equipment and simulation parameters.
- Define requirements and strategy for coverage, quality and capacity, configure initial radio network.
- Create coverage plan, select and configure sites, optimize coverage by tuning models parameters.
- Define neighbors and apply codes to carriers.
- Run and compare different types of simulation methods.
- Analyze simulation results and applying needed changes.
- Produce various types of reports to view the performance of the simulated area.

Prerequisites
3G RPESS

Duration
3 days

No. of Participants
Max. 12

Modules
- Nokia NetAct software fundamentals
- WCDMA Planner software fundamentals
- WCDMA radio network dimensioning
- Propagation models in Nokia NetAct WCDMA Planner
- Neighbors and code planning
- Network simulations with WCDMA Planner
- Parameter tuning
- Reports in WCDMA Planner

UTRAN and Nokia NetAct Introduction — RANOSS INT

Target Group
3G radio network planning and network optimization personnel.

Objectives
After the training, the participant will be able to:
- Describe function, capacity and configurations of the UTRAN network elements including WCDMA base stations.
- Explain the radio network operating principles.
- Explain the usage of Nokia NetAct common desktop environment.
- Explain basic architecture of Nokia NetAct and the connection to the network elements.
- Explain how to use Nokia NetAct customer documentation.
- Explain concepts of radio network configuration management and representation of radio network parameters in Nokia NetAct.
- Explain how expansion of base stations is embedded in the rollout process and explain the process flow for base station integration.
- Use the radio access configurator tools of Nokia NetAct (Plan Editor and Plan Management).

Prerequisites
3G SYSTRA, 3G RPESS, RANPROD

Duration
4 days

No. of Participants
Max. 8

Modules
- RAN overview
- Radio network controller solution
- WCDMA BTS solutions
- Migration and co-location of Nokia 2G and 3G sites
- RAN operation and configuration
- Introduction to Nokia NetAct
- Nokia NetAct basic architecture
- Using Nokia NetAct
- Nokia NetAct documentation
- Radio network configuration management 3G – principles and concepts
- Handling OSS3 offline tool Plan Editor
- Radio network integration and expansion 3G – OSS

3G Radio Planning Specialist

NEW!

3G RPLS

Target Group
Personnel needing good theoretical knowledge of the main WCDMA system procedures of the access and non-access stratum. 3G radio network planners.

Objectives
After the training, the participant will be able to:
- Explain how UTRAN controls the UE's behaviour. As part of the network planning process, wide ranges of parameters have to be set. Their meaning, the context of their usage, potential impact on coverage and capacity, and the equivalent Nokia parameters are covered. Procedures for parameter exchange between the UE and UTRAN are presented.
- Many procedures are timer driven, and its impact on the network performance is outlined. UTRAN also commands the UE to perform measurements, which are required by RNC to perform tasks such as handover control and admission control. Finally, the impact of higher layer procedures mobility and connection management on UTRAN and WCDMA is covered.

Prerequisites
3G SYSTRA, 3G RPESS

Duration
4 days

No. of Participants
Max. 12

Modules
- Warm-up
- Physical layer
- RRC modes, system information, paging, and update procedures
- Cell selection and reselection
- RRC connection establishment
- WCDMA measurements in the UE
- GSM measurements for inter-RAT cell reselection and handover
- Mobility management and connection management
- UTRAN control protocol overview (without RRC)

Notes
- Replaces 3G RPLS1 and 3G RPLS2.
- Additional material: "Radio Network Planning and Optimisation for UMTS" (Laiho et al), page 15.

Radio Access Network Parameter

NEW!

RANPAR

Target Group
Personnel needing good theoretical knowledge of the main WCDMA RRM system parameters.

Objectives
After the training, the participant will be able to:
- Describe the purpose of RRM.
- List the RRM functional entities.
- Describe the purpose of each of the RRM functional entities.
- Identify the location of RRM entities.
- Identify relationships between RRM entities.
- Describe the Nokia RAN parameter database structure.

Prerequisites
3G RPESS, 3G RPLS, RANOSS INT

Duration
3 days

No. of Participants
Max. 12

Modules
- Radio resource management functions overview
- Physical channels
- Load control
- Admission control algorithms and parameters
- Packet scheduler algorithm and parameters
- Handover control
- Power control
- Resource manager

3G Transmission Planning

3G TPL

Target Group
Personnel needing good theoretical knowledge of 3G transmission network planning and available network elements.

Objectives
After the training, the participant will be able to:
- Understand CES and IMA and some 2G and 3G co-siting solutions.
- Review Nokia cellular transmission PDH and SDH equipments and explain the basics about Nokia MetroHub, FIU19, Marconi SDH nodes, Nokia PowerHopper and DMC Altium.
- Describe the Iub ATM connections to BS.
- Understand AXC different units and interfaces.
- Understand LACE process and the usage of transmission planner.
- Understand the different ATM transmission and cross-connections parameters of the AXC.
- Understand the RNC different interfaces.
- Understand the RNC ATM transmission and cross-connections parameters.
- Understand the basics of ATM AAL2 traffic, addressing and routing and their RNC parameters.
- Understand the basic of IP over ATM for user data and their RNC parameters.
- Understand synchronization principles of 3G transmission network.
- Understand how synchronization takes place at each network elements (SDH/PDH equipment, AXC, RNC, SGSN).

Prerequisites
3G SYSTRA, 3G ATM

Duration
5 days

No. of Participants
Max. 12

Modules
- Course introduction
- ATM overview

Notes
The course is meant for transmission planners working with networks with Nokia RNC and AXC. If the network is equipped with either RNC or AXC, the course can be customized to be shorter.

3G Switching Core Network Planning in Release 4

NEW!

3G SCNPL REL 4

Target Group
Switching core network planners, switching core network engineering support (recommended).

Objectives
After the training, the participant will be able to:
- Have an overview understanding of circuit core network evolution.
- Learn how to plan and dimension the MSC server concept based network (excluding detailed source data planning).

Prerequisites
3GPP Release 4 System e-learning

Duration
1 day

No. of Participants
Max. 12

Modules
- Introduction to MSS concept
- Network topology in 3G Release 4
- Network planning process in 3G Release 4
- Evolutions of MSS concept towards 3G Release 5–6

Notes
Available as e-seminar in Q2/04.

3G Packet Core Release 3 Planning

NEW!

3G PCNPL

Target Group
Network planners who need good foundation knowledge and understanding of the Nokia 3G packet core network solution and need to learn 3G PS core network planning.

Objectives
After the training, the participant will be able to:
- Understand process for 3G network with focus on MPC network.
- Explain network planning considerations for various scenarios, including GSM/GPRS to 3G network evolution.
- Describe important functionalities in 3G MPC network elements required for network planning.
- Explain 3G interfaces and planning considerations for all MPC related interfaces.
- Describe PS core network connectivity and infrastructure planning.
- Explain how to dimension 3G MPC network elements including future evolutions possibilities.
- Understand quality of service in 3G network with particular focus on MPC from planning point of view.
- List security considerations while planning 3G MPC network.

Prerequisites
3G SYSTRA

Duration
3 days

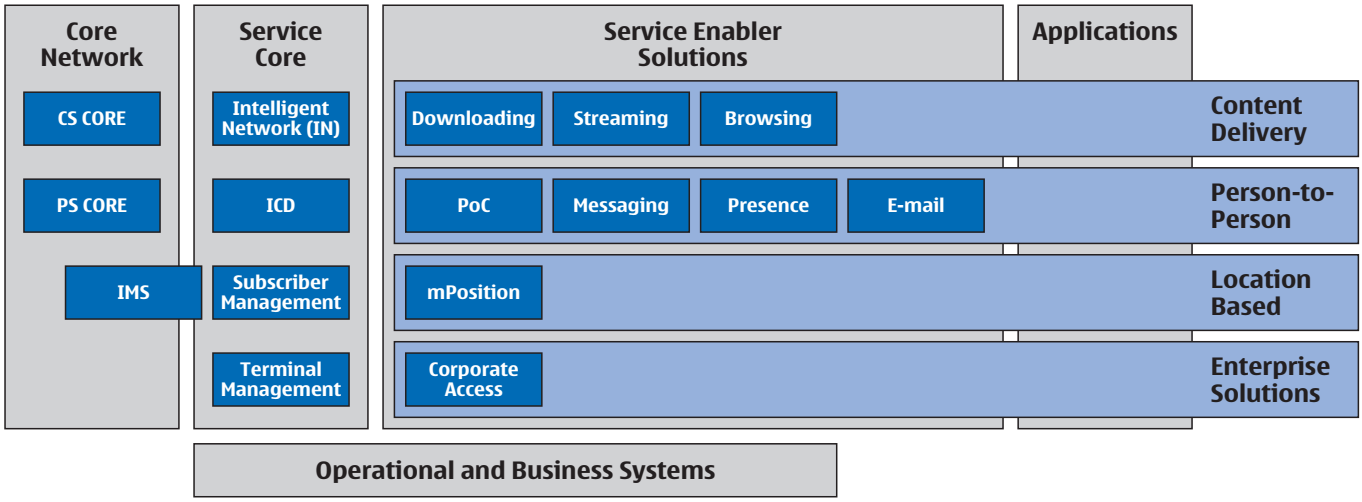
No. of Participants
Max. 12

Modules
- 3G PCNPL introduction to packet core network planning and packet core overview
- 3G PCNPL IP addressing and VLANs in core network
- 3G PCNPL Iu-PS planning
- 3G PCNPL Gn planning
- 3G PCNPL Gi planning
- 3G PCNPL Gp planning
- 3G PCNPL dimensioning of packet core elements
- 3G PCNPL security planning
- 3G PCNPL QoS planning

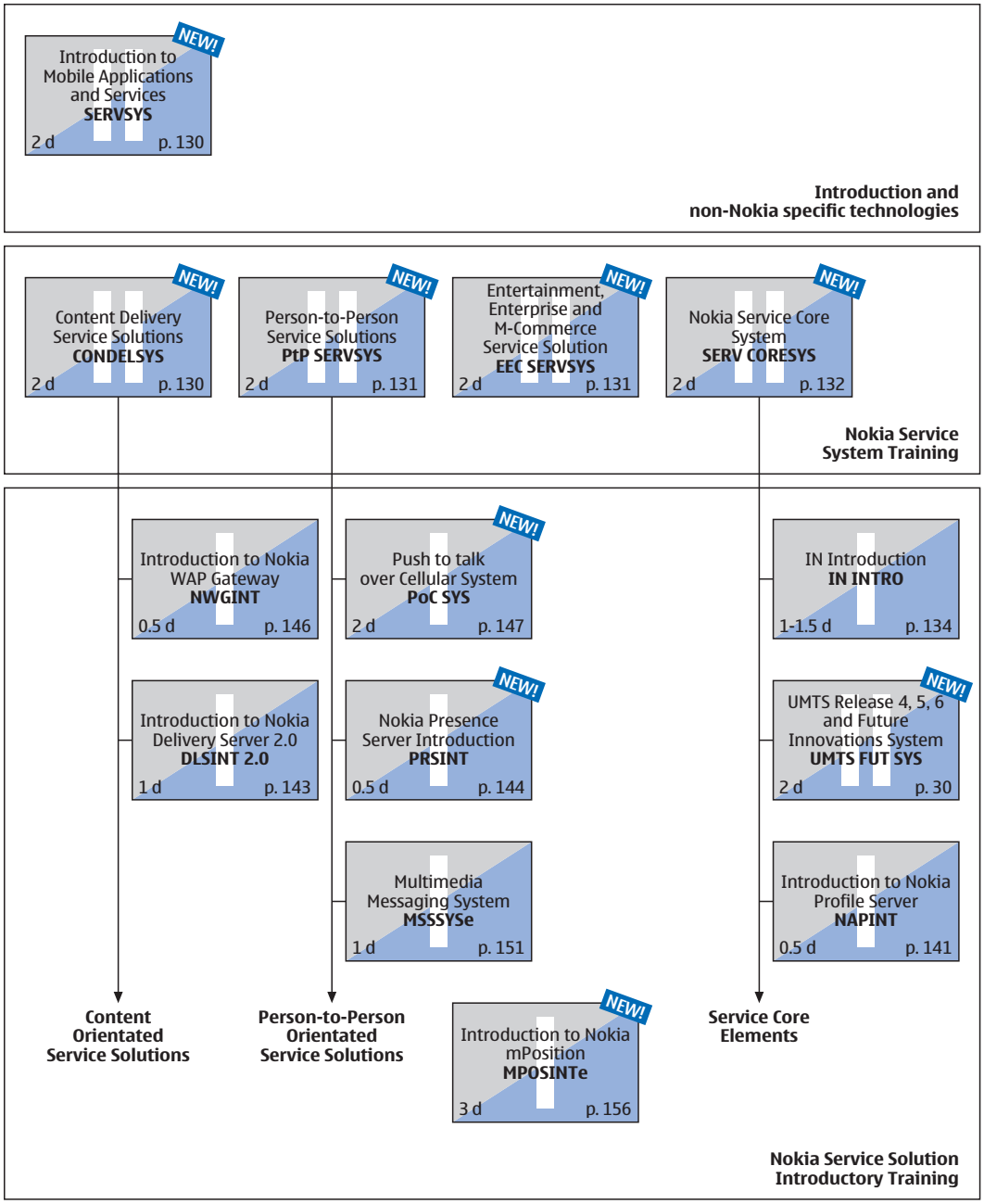
Mobile services

The technical architecture of mobile services is divided into the service core, service enablers and applications. The service core provides functionality such as service control, subscriber management and charging. The service enablers provide the platform to deliver the actual service, such as WAP or MMS to the customer. Finally, applications are the actual content being delivered to the customer, such as a WAP page, game, Java™ application etc.

Nokia provides an extensive portfolio that supports every step of the way to developing an understanding of the services and the technical architecture.



Service system training and specifications



The fastest growing development area in the networks is the service subsystem, with new products constantly coming through. Therefore, to support the under-pinning knowledge required to be effective in this area, we have divided our training solution into three parts. First, general introduction to mobile services (non-Nokia specific). Second, Nokia solution approach – these courses are a unique blend of theory training with interactive simulation to really explore the service opportunities and implementation issues, without going deep into the technical products. The third part is an introduction to the Nokia specific products, such as the service enablers that will be covered in detail later in this section.

Nokia can also provide consultative workshops on the different and future solutions. These workshops are tailored on request and are aimed at high-level marketing and strategy planning personnel.

Introduction to Mobile Applications and Services

NEW!

SERVSYS

Target Group
Personnel requiring an overview knowledge of mobile applications and services in GSM, GPRS and UMTS.

Objectives
After the training, the participant will be able to:
- Have a comprehensive overview of infrastructure and functionality needed for providing value added services to mobile end-users.
- Seek more in-depth knowledge after having all major technologies and standards placed on the mobile applications and services map.

Prerequisites
2G SYSTRA, 3G SYSTRA

Duration
2 days

No. of Participants
Max. 24

Modules
- Application environments
- Billing
- Protocols
- User interaction
- Security
- Programming languages
- JAVAscript
- Bearer services
- Mobile devices
- Messaging services

Notes
- This course is arranged in cooperation with APIS (www.apis.se) and is not Nokia specific.
- Additional material: “Services for UMTS: Creating Killer Applications in 3G” (Ahonen, Barret), page 14.

Content Delivery Service Solutions

NEW!

CONDELSYS

Target Group
Personnel from the technology, service planning and management sector, who are interested in the Nokia content delivery solutions.

Objectives
After the training, the participant will be able to:
- Identify and list current and potential services which are orientated to content delivery.
- Based upon a simulation, identify what are the opportunities and challenges with content delivery services.
- Identify the network requirements to host such services, including the impact on capacity.
- Identify the Nokia Service Enabler solutions for browsing, streaming and downloading.
- Based upon a simulation, demonstrate the ability to correctly plan, develop and deploy new content delivery services AND provide a model for the provision of content. This should include reasoning behind charging.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 12

Modules
- Overview of content delivery services
- Showcase: Content delivery solutions
- Simulation: Identify opportunities and challenges with content delivery services
- Impact and requirements on network of content delivery solutions
- Nokia Service Enabler solutions for browsing
- Nokia Service Enabler solutions for streaming
- Nokia Service Enabler solutions for downloading
- Simulation: Plan, develop and deploy new content delivery services
- Simulation: Develop model for the provision of content for the delivery services

Notes
Available in Q2/04.

Person-to-Person Service Solutions

NEW!

PtP SERVSYS

Target Group
Personnel from the technology, service planning and management sector, who are interested in the Nokia person-to-person service solutions.

Objectives
After the training, the participant will be able to:
- Identify and list current and potential services which are orientated to person-to-person.
- Based upon a simulation, identify what are the opportunities and challenges with person-to-person services.
- Identify the network requirements to host such services, including the impact on capacity.
- Identify the Nokia Service Enabler solutions for Push to talk, Messaging, Presence and e-mail.
- Based upon a simulation, demonstrate the ability to correctly plan, develop and deploy new person-to-person services and provide a model for the provision of content. This should include reasoning behind charging.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 12

Modules
- Overview of person-to-person services
- Showcase: Person-to-person solutions
- Simulation: Identify opportunities and challenges with person-to-person services
- Impact and requirements on network of person-to-person solutions
- Nokia Service Enabler solutions for Push to talk
- Nokia Service Enabler solutions for Messaging
- Nokia Service Enabler solutions for Presence
- Nokia Service Enabler solutions for e-mail
- Simulation: Plan, develop and deploy new person-to-person services
- Simulation: Develop model for the provision of content for the person-to-person services

Notes
Available in Q2/04.

Entertainment, Enterprise and M-Commerce Service Solution

NEW!

EEC SERVSYS

Target Group
Personnel from the technology, service planning and management sector, who are interested in the Nokia entertainment, enterprise and m-commerce solutions.

Objectives
After the training, the participant will be able to:
- Identify and list current and potential services which associated with infotainment and m-commerce.
- Based upon a simulation, identify what are the opportunities and challenges with enterprise and entertainment services.
- Identify the network requirements to host such services, including the impact on capacity.
- Identify the requirements for successfully implementing m-commerce solutions into the network.
- Identify the Nokia service enabler solutions for entertainment, enterprise and m-commerce.
- Based upon a simulation, demonstrate the ability to correctly plan, develop and deploy new enterprise, entertainment and m-commerce services AND provide a model for the provision of content. This should include reasoning behind income models.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 12

Modules
- Overview of content delivery services
- Showcase: Content delivery solutions
- Simulation: Identify opportunities and challenges with content delivery services
- Impact and requirements on network of service solution evolution
- Nokia service enabler solutions for entertainment
- Nokia service enabler solutions for enterprise
- Nokia service enabler solutions for m-commerce
- Simulation: Plan, develop and deploy new entertainment services
- Simulation: Plan, develop and deploy new enterprise services
- Simulation: Develop model for use of m-commerce in everyday use

Notes
Available in Q2/04.

Nokia Service Core System

NEW!

SERV CORESYS

Target Group
Personnel from the technology, service planning and management sector, who are interested in the Nokia service core solution.

Objectives
After the training, the participant will be able to:
- Identify and list the elements (and functions) of the service core.
- At an overview level, describe the role of IN, gateways and ICD in the provision of services.
- Identify and explain the role of the charging, subscriber and terminal management.
- Identify the elements of the future roadmap of the service core in Release 5. Also, list and explain the role of rich call, SIP, CAMEL, OSA and how service provisioning will evolve.
- Identify the core network requirements to host services, including the impact on capacity.
- Identify the Nokia solutions for ICD, IN and IMS service core components.
- Based upon a simulation, identify the opportunities that machine-to-machine solutions bring.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 12

Modules
- Overview of the service core
- Showcase: IN solutions and requirements
- Showcase: ICD
- Subscriber, charging and terminal management in the Nokia service core
- Nokia service solution for IN in Release 3 and 4
- Nokia service solution for ICD
- Nokia service solution and evolution in IMC
- Standard interfaces and protocols and implementation in the Nokia solution
- Simulation: Adding new service enablers into the core
- Nokia service solution for machine-to-machine services

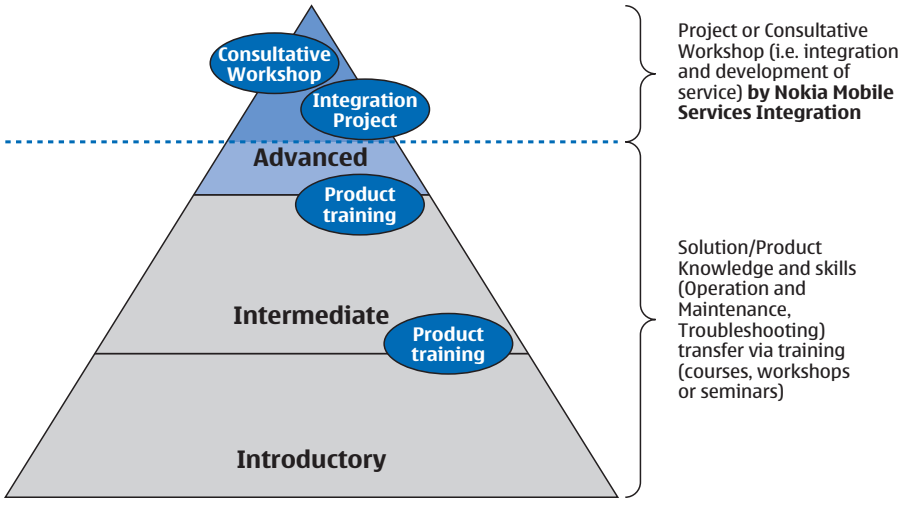
Notes
Available in Q2/04.

Service core

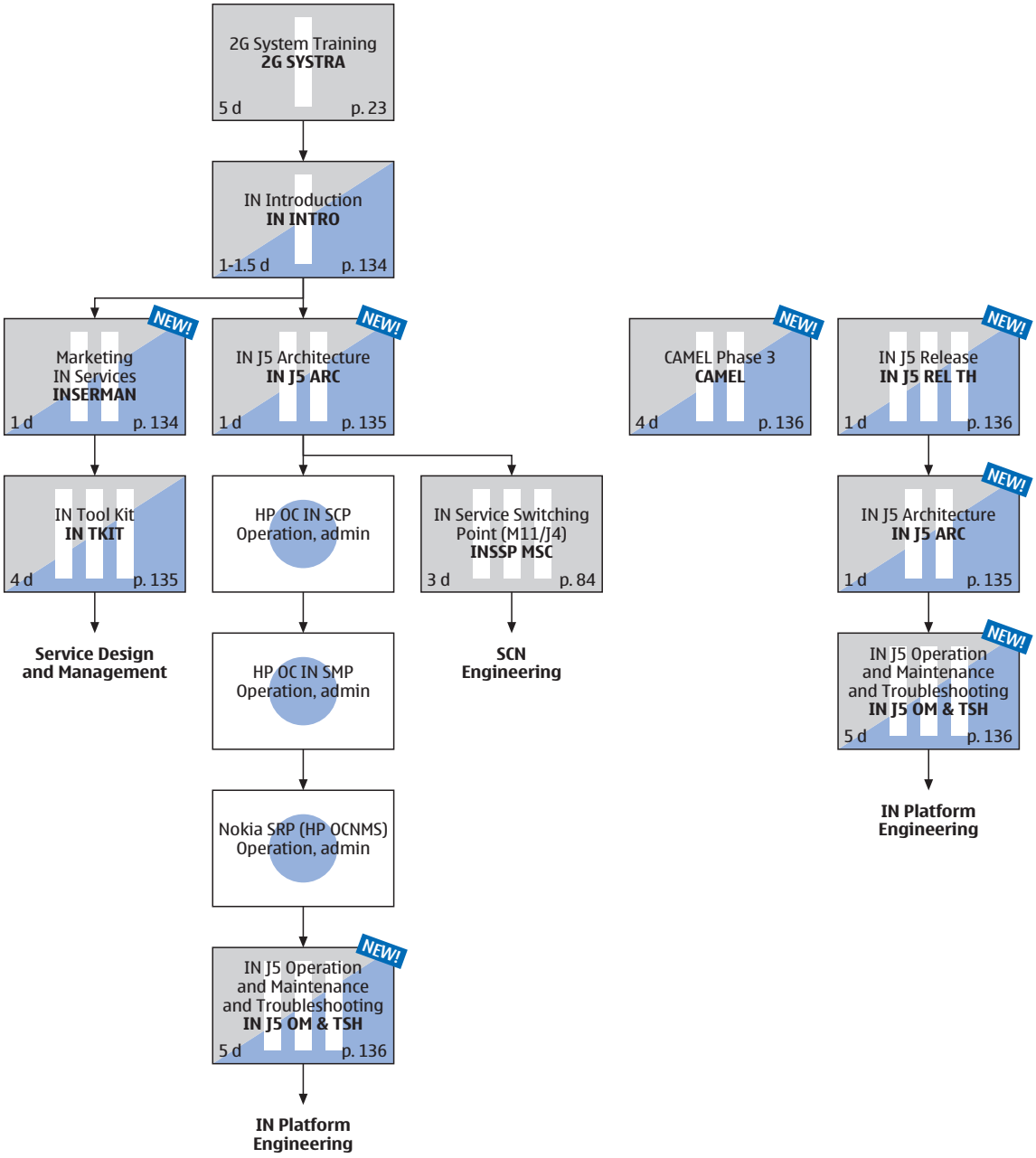
Nokia provides a full range of services to support integration, development and establishment of new service solutions. By nature, these are very specific to your unique implementation and requirements. Nokia training provides a comprehensive portfolio to support the products. We also provide services for the integration and development of services. Consultancy workshops can also be delivered. Rather than training events, these are rather projects and hence the format and price will differ.

For more information contact your local Nokia training contact person.

Personnel who work with the service core are responsible for the integration, operation and maintenance of the network elements that provide the platform for service enablers. They are usually responsible for supporting service creation and deployment and correcting faults raised by NOC or customer care. The specific network elements may vary from operator to operator, depending on the implementation.



Intelligent network



Intelligent network specialists are responsible for the operation and maintenance of the IN solution, integration it into the SCN and MPC and for the creation and deployment of services into the network. We provide a comprehensive solution to develop IN capability, which includes training for marketing people on the potential for IN services. We also provide a solution for the J5 release, which includes troubleshooting training.

For more information please refer to Hewlett-Packard (www.hp.com/communications/opencall/training/index.html) and contact carina.nordling@hp.com

IN Introduction

IN INTRO

Target Group
Technical and non-technical personnel dealing with IN.

Objectives
After the training, the participant will be able to:
- Explain three differences between a non-IN network and an IN network.
- List and describe four Nokia IN services types.
- List and explain the function of SSP, SCP, SRP, SMP, SCE, SMI, SMAP.
- Name the equipment on which SSP, SCP and SMP are implemented in the Nokia implementation.
- List two kinds of propagation.
- Describe the service creation principle of IN tool kit.
- Describe the prepaid concept.
- Describe the VPN concept.
- Describe the localized services concept.

Prerequisites
2G SYSTRA

Duration
1–1.5 days

No. of Participants
Max. 24

Modules
- Introduction to intelligent network
- IN architecture
- Service examples
- IN J5 briefing

Notes
The duration of the course for IN J4 is 1 day and 1.5 days for IN J5. IN J5 includes the module IN J5 briefing.

Marketing IN Services

NEW!

INSERMAN

Target Group
Management and marketing personnel who design the marketing for IN to the end user segments.

Objectives
After the training, the participant will be able to:
- List the marketing steps towards successful launch.
- Describe the price scheme possibilities.
- Explain the concept of PP card and voucher management.
- Understand the bottlenecks between marketing requirements and system capabilities.

Prerequisites
IN INTRO

Duration
1 day

No. of Participants
Max. 24

Modules
- Marketing steps
- Price scheme possibilities
- PP card and voucher management
- Marketing requirements and system possibilities
- Branding

IN Tool Kit

IN TKIT

Target Group
Service design and management personnel using the mobile IN application as a tool.

Objectives
After the training, the participant will be able to:
- Create commercial services with the IN tool kit.
- Use service creation, provision, announcements, charging, default, service administration, groups, global lists, SSA, subscriber administration, tariff management and CDR format definition tools.
- Modify, withdraw and manage the created services.
- Forecast the interaction problems, solve poor FDE combinations.

Prerequisites
IN INTRO

Duration
4 days

No. of Participants
Max. 6

Modules
- IN J5 service introduction
- Service creation with IN tool kit
- Tools IN tool kit
- Functional definition elements
- Overlapping operations
- Service examples INAP
- Service examples CAMEL

Notes
The duration of IN TKIT course for IN J4 is 3 days. It is recommended, however, to attend the 5 day IN practice package IN J4Th and IN J4Pr.
The duration of IN TKIT for J5 is 4 days.

IN J5 Architecture

NEW!

IN J5 ARC

Target Group
Technical and non-technical personnel who need to know and understand IN network elements and their connections to each other.

Objectives
After the training, the participant will be able to:
- List and explain the functionality of all IN network elements of J5 solution.
- Describe the interfaces.
- List the protocols used.
- Describe which hardware and software are used.

Prerequisites
IN INTRO

Duration
1 day

No. of Participants
Max. 24

Modules
- Platform architecture
- Interface overview
- Protocols used
- Triggering
- SRP/SMAP voice

IN J5 Operation and Maintenance and Troubleshooting

NEW!

IN J5 OM & TSH

Target Group
Personnel operating IN platform.

Objectives
After the training, the participant will be able to:
- Operate the IN platform.
- Use all available tools and understand their outputs.
- Collect all information required (alarms, measurements, logs etc.) in order to report efficiently to the help desk.
- Make a change note.
- Troubleshoot the IN network elements.

Prerequisites
IN INTRO, IN J5 ARC

Duration
5 days

No. of Participants
Max. 6

Modules
- SMP and SEP functionality
- Maintenance
- Change notes
- Troubleshooting

IN J5 Release

NEW!

IN J5 REL TH

Target Group
Personnel working with IN J5 solution that know already IN J4 solution.

Objectives
After the training, the participant will be able to:
- Know the changes between IN J4 and IN J5.

Prerequisites
IN INTRO

Duration
1 day

No. of Participants
Max. 8

Modules
- Platform changes
- capacity issues
- Hardware and software changes
- Upgrade procedures
- New features

CAMEL Phase 3

NEW!

CAMEL

Target Group
Personnel working in the field of maintenance, support, solution development and project management for mobile services.

Objectives
The course explains the features and principles of CAMEL phase 3. This includes the circuit switched call control with IN and the packet session handling by IN. Additionally the CAMEL relevant protocols (CAP/MAP) will be analyzed. As last part of the course the implementation of intelligent network using Open Service Access (OSA) is introduced.

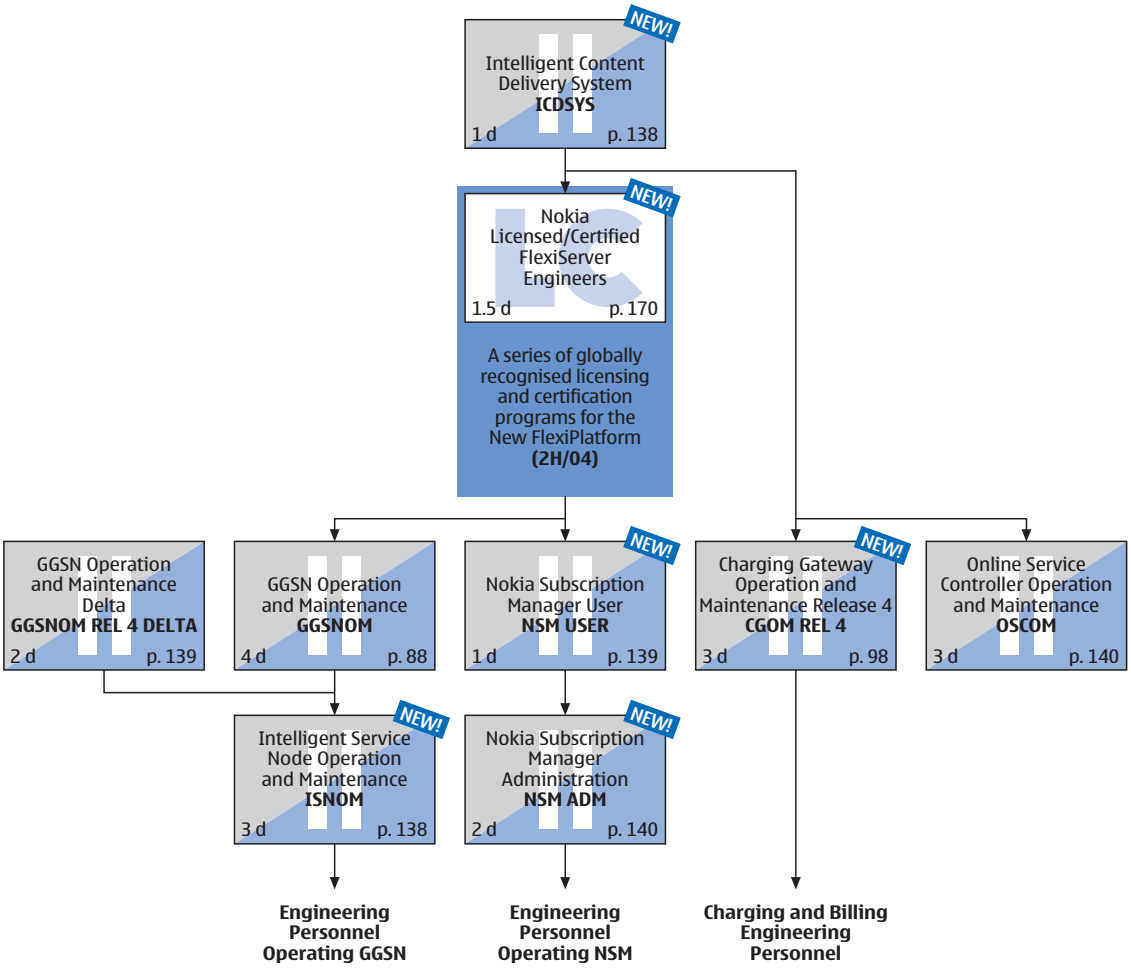
Prerequisites
None

Duration
4 days

No. of Participants
Max. 24

Modules
- CAMEL introduction
- CAMEL service creation
- CAMEL IN network architecture
- CAMEL IN subscriber data
- CAMEL IN calls
- CAMEL special IN topics
- CAMEL IN functions and models
- CAMEL IN protocols
- CAMEL OSA

Intelligent Content Delivery



As the use of packet data starts to increase, a more flexible way to address charging is needed – the Intelligent Content Delivery (ICD) solution provides such a platform. For personnel responsible for charging we provide a comprehensive training solution for all the elements and planning within the concept.

The ICD solution is built upon the Nokia FlexiServer solution, and therefore taking a license program (which includes the training) is necessary. For more information turn to page 170. We provide recommended training for three groups: Personnel responsible for 1) the configuration of the GGSN, 2) subscriber management and 3) charging.

Intelligent Content Delivery System

NEW!

ICDSYS

Target Group
Engineering personnel operating Nokia ICD system.

Objectives
After the training, the participant will be able to:
- List Nokia ICD system network elements.
- State the benefits of ICD solution.
- Explain the main functionalities of Nokia ICD system.
- Describe interfaces between network elements.
- List the protocols used in each network element.
- Briefly explain how to operate and maintain the system.
- Describe the evolution of Nokia ICD system.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
1 day

No. of Participants
Max. 24

Modules
- Introduction to Nokia ICD system
- Architecture of Nokia ICD system
- Functionality of Nokia ICD system
- Operating and maintenance of Nokia ICD system
- Nokia ICD system evolution

Notes
Available as e-Seminar in Q3/04.

Intelligent Service Node Operation and Maintenance

NEW!

ISNOM

Target Group
Engineering support personnel operating Nokia intelligent service node (ISN) as part of intelligent content delivery (ICD) system solution.

Objectives
After the training, the participant will be able to:
- Describe the ISN components, its architecture and functionalities.
- List the main features ISN.
- Describe the hardware and software architecture of ISN.
- Describe and configure the interfaces of ISN components.
- Explain the ISN signaling flow.
- Make ISN specific hardware configuration, software installation and commissioning.
- Perform the ISN specific operation and maintenance procedures.

Prerequisites
ICDSYS, Nokia FlexiServer License, GGSNOM

Duration
3 days

No. of Participants
Max. 8

Modules
- Intelligent service node introduction
- GGSN Release 4 specific features
- Traffic and content analysis (ISN)
- Intelligent service node specific hardware installation
- Intelligent service node software installation and configuration
- Operation and maintenance procedure for Nokia intelligent service node
- Intelligent service node troubleshooting

Notes
- Traffic Analyzer (TA) and Content Analyzer (CA) included.
- This course will be devided into two separate courses; Intelligent Service Node Content Analyser (ISNCA) and Intelligent Service Node Traffic Analyser (ISNTA).
- This course was formerly named Sa GGSN.

GGSN Operation and Maintenance Delta GGSNOM REL 4 DELTA

Target Group
GGSN support engineers who have good knowledge about GGSN Release 2.0 and Release 3.X.

Objectives
After the training, the participant will be able to:
- Understand the influence of the new features to the operating and maintenance tasks.
- Install and configure the GGSN Release 4.0 software.
- Configure context access points, service access points and related services.

Prerequisites
GPRSSYS, IPCORE, IPSOPLAT, GGSNOM, ICDSYS, FlexiServer e-learning

Duration
2 days

No. of Participants
Max. 8

Modules
- Service awareness overview (GGSN Release 4)
- GGSN Release 4 specific features
- Software installation (GGSN Release 4 Delta)
- GGSN Release 4 access points (GGSN Release 4 Delta)

Nokia Subscription Manager User NEW! NSM USER

Target Group
Operations personnel and network engineers taking care of Nokia Subscription Manager.

Objectives
After the training, the participant will be able to:
- Explain the basic idea and purpose of NSM.
- List elements connected to NSM.
- Describe NSM architecture.
- Solve practical use cases related to:
  - End-user subscription
  - Service subscription
  - Service Catalogue management.
  - Content provider management.

Prerequisites
ICDSYS, Nokia FlexiServer License

Duration
1 day

No. of Participants
Max. 8

Modules
- Introduction to Nokia Subscription Manager
- Nokia Subscription Manager architecture
- Nokia Subscription Manager functionality

Nokia Subscription Manager Administration

NEW!

NSM ADM

Target Group
Nokia Subscription Manager (NSM) system administrators.

Objectives
After the training, the participant will be able to:
- Describe the NSM components, its architecture and functionalities.
- List the main features of the NSM.
- Describe the hardware and software architecture of the NSM.
- Describe and configure the interfaces of the NSM components.
- Perform NSM specific hardware configuration, software installation and integration.
- Perform the NSM specific operation and maintenance procedures.

Prerequisites
ICDSYS, Nokia FlexiServer License, NSM USER

Duration
2 days

No. of Participants
Max. 8

Modules
- Introduction to Nokia Subscription Manager
- Nokia Subscription Manager architecture
- Nokia Subscription Manager installation
- Nokia Subscription Manager integration to intelligent content delivery
- Nokia Subscription Manager integration to operator database
- Operation and maintenance procedure for Nokia Subscription Manager
- Nokia Subscription Manager troubleshooting

Online Service Controller Operation and Maintenance

OSCOM

Target Group
Operator support personnel who need to operate Online Service Controller (OSC) as part of intelligent content delivery (ICD) system solution.

Objectives
After the training, the participant will be able to:
- Have a thorough understanding of the architecture, concepts and features of the OSC, as well as appreciate it's important position within the intelligent content delivery (ICD) system.
- Describe and configure the interfaces of OSC.
- Make the OSC specific hardware configuration, software installation and commissioning.
- Perform the OSC specific operation and maintenance procedures.

Prerequisites
ICDSYS

Duration
3 days

No. of Participants
Max. 8

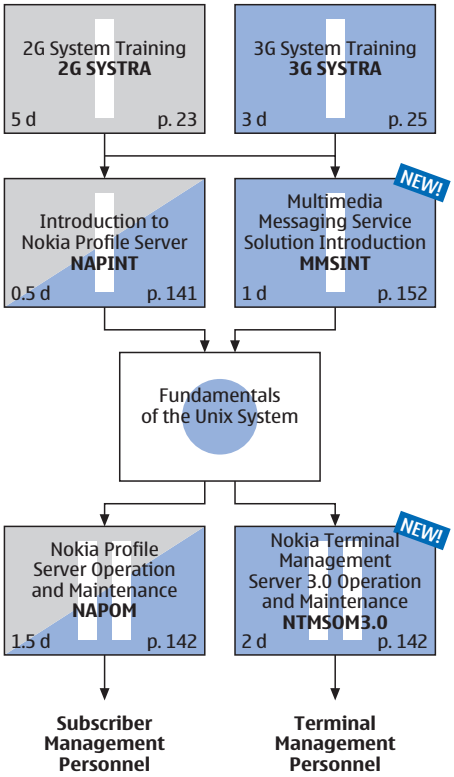
Modules
- Online Service Controller overview
- Online Service Controller architecture
- Online Service Controller interfaces
- Online Service Controller functionality and features
- Online Service Controller specific hardware installation
- Online Service Controller software installation and basic configuration
- Online Service Controller integration towards other ICD elements
- Online Service Controller balance interface integration
- Operations and maintenance procedure for Nokia Online Service Controller

Subscriber and terminal management

Nokia Profile Server enables operators and subscribers to manage as well as personalize mobile services such as multimedia messaging and download. Operators can easily manage service packaging and access control of their ever-growing non-voice mobile service offering all from a single place.

As multimedia messaging is entering the market, Nokia Profile Server gives mobile terminal users greater control and flexibility in deciding how they want to send and receive MMS (Multimedia Messaging Services) messages through modification of their MMS profile and how they want to maintain the Delivery Service (DLS) profile.

Our training solution comprises the following:
- System training gives a general overview of the structure of the messaging service and specifications. These trainings are theory courses.
- Operation and maintenance training is targeted for personnel actually operating and maintaining the Nokia products. The trainings include practical exercises.



Introduction to Nokia Profile Server NAPINT

Target Group
Personnel requiring an overview about NAP.

Objectives
After the training, the participant will be able to:
- Explain how NAP works.
- List the NAP features.
- List the NAP supports services.
- Explain how subscribers use profiles.

Prerequisites
2G SYSTRA, TCP/IP knowledge, basic knowledge on Value Added Services like WAP, DLS and NMS

Duration
0.5 day

No. of Participants
Max. 24

Modules
- Introduction to Profile Server
- NAP Fundamentals
- NAP Functionality 2.0
- NAP Documentation

Notes
For Profile Server release 3.0 the contents of this course is also offered in the NMSINT course, for MMS customers.

Nokia Profile Server Operation and Maintenance

NAPOM

Target Group
Operations and maintenance personnel.

Objectives
After the training, the participant will be able to:
- Operate and maintain NAP.

Prerequisites
2G SYSTRA, NAPINT, Oracle DPA, Solaris Admin, Unix fundamentals

Duration
1.5 days

No. of Participants
Max. 8

Modules
- Introduction NAPOM
- NAP architecture
- NAP operating profile server
- NAP profiling and grouping subscribers
- NAP creating MMS profiles
- NAP data provisioning
- NAP self administering interface
- NAP alarms
- NAP maintenance and troubleshooting

Nokia Terminal Management Server 3.0 Operation and Maintenance

NEW!

NTMSOM3.0

Target Group
Operation and maintenance personnel, installation personnel, integration personnel.

Objectives
After the training, the participant will be able to:
- Install, integrate, maintain and administer the Nokia Terminal Management Server (NTMS).

Prerequisites
2G SYSTRA or 3G SYSTRA, Unix fundamentals

Duration
2 days

No. of Participants
Max. 8

Modules
- NTMSOM architecture
- NTMSOM configuration
- NTMSOM installation
- NTMSOM integration
- NTMSOM operation
- NTMSOM troubleshooting

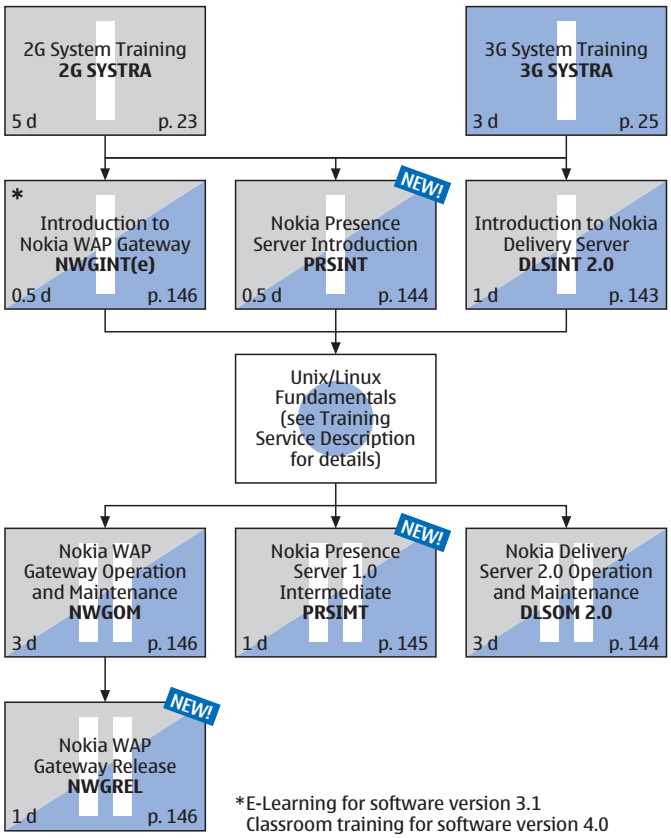
Service enabler solutions

The service enabler solutions are the elements that allow for innovative services to work in a network, such as MMS, SMS and location services. These solutions are connected into the service core and the platforms vary in implementation. Generally, the operation and maintenance of these computing boxes is done by specialized engineers who are responsible for the integration, management, upgrade and fault handling.

Nokia Delivery Server manages the business rules for content download, fetches content from a storage server and delivers it reliably to a phone, whereas, the presence service allows users to publish their information and share it with others.

We provide system training to all target groups on content services and operation and maintenance training for those engineers responsible for the implementation and maintenance of the services.

Content services



*E-Learning for software version 3.1
Classroom training for software version 4.0

Introduction to Nokia Delivery Server 2.0 DLSINT 2.0

Target Group
Personnel needing basic information about Nokia Delivery Server (DLS).

Objectives
After the training, the participant will be able to:
- Define the download business aspects.
- Explain the basic functionality of DLS.
- Draw the connections that DLS has in the network.
- Explain the main duties of DLS administrator.
- Explain concepts related to DRM.
- Describe the CMM workflow.
- Describe the CSM process.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
1 day

No. of Participants
Max. 24

Modules
- Overview
- Basic functionality
- Options available

Nokia Delivery Server 2.0 Operation and Maintenance

DLSOM 2.0

Target Group
Technical personnel operating Nokia Delivery Server.

Objectives
After the training, the participant will be able to:
- Operate DLS in normal working conditions.
- Read and react to the logs and alarms of DLS.
- Define the usage of digital rights management in DLS.
- Create and manage a ticket.
- View statistical information.
- Make queries.
- Describe the concept of subscriber identification.
- Explain how billing is managed.
- Manage content through the content management using the CMM user interfaces (optional).
- Configure parameters related to the content security module (optional).

Prerequisites
2G SYSTRA or 3G SYSTRA, DLSINT 2.0

Duration
3 days

No. of Participants
Max. 8

Modules
- Request handling
- Tools
- Operating Nokia Delivery Server
- Digital rights management
- Tickets
- Content provider administration
- Alarms, logs and statistics
- Charging
- Subscriber authorization
- Content management module (optional)
- Content security module (optional)

Nokia Presence Server Introduction

NEW!

PRSINT

Target Group
Operation and maintenance personnel.

Objectives
After the training, the participant will be able to:
- Explain the basic concepts of presence services.
- Draw a model of Wireless Village server and explain the functionality of different service elements.
- Describe use cases of presence applications and ideally, invent new ones.
- Determine the suitability of a specific hardware configuration for use with Nokia Presence Server.
- Explain the key features of Nokia Presence Server.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
0.5 day

No. of Participants
Max. 15

Modules
- Presence, basics and standards
- Wireless Village basics
- Wireless Village message flow examples
- Presence usage scenarios and application examples
- Nokia Presence Server platform
- Nokia Presence Server, overview and features

Notes
- This learning program is the basis for intermediate course and it can be given separately to anyone working with the product as well.
- This module is not a prerequisite for application development module.

Nokia Presence Server 1.0 Intermediate

NEW!

PRSIMT

Target Group
Operation and maintenance personnel.

Objectives
After the training, the participant will be able to:
- Describe Presence Server administrator tasks.
- Use Presence Server web user interface and command line tool.
- Control and monitor Presence Server components.
- Change Presence Server configuration.
- Install applications on Presence Server.
- Modify legacy terminal gateway properties.
- Integrate Presence Server into network management system.
- Configure and monitor logs and alarms.
- Describe high availability (HA) environment.
- Configure Presence Server for high availability installation.
- Control and monitor Presence Server in high availability installation.
- Describe basic troubleshooting methods.
- Perform database switch in high availability installation.

Prerequisites
PRSINT

Duration
1 day

No. of Participants
Max. 8

Modules
- Nokia Presence Server administration 1 – Administration overview
- Nokia Presence Server administration 2 – Web UI
- Nokia Presence Server administration 3 – Configuration files
- Nokia Presence Server administration 4 – SNMP interface
- Nokia Presence Server administration 5 – Logs and alarms
- Nokia Presence Server administration 6 – Troubleshooting
- Nokia Presence Server administration 7 – Web service applications and legacy terminal gateway
- Nokia Presence Server high availability 1 – HA basics and environment
- Nokia Presence Server high availability 2 – Setting up Nokia Presence Server and database for HA configuration
- Nokia Presence Server high availability 3 – Managing error situations

Introduction to Nokia WAP Gateway

NWGINTe

Target Group
Personnel requiring knowledge on the Nokia WAP Gateway.

Objectives
After the training, the participant will be able to:
- Explain the basic functionality of Nokia WAP Gateway.
- List the basic and optional features of Nokia WAP Gateway.
- Explain the difference between push and pull services.

Prerequisites
2G SYSTRA or 3G SYSTRA and basic knowledge of WAP Gateway

Duration
0.5 day

No. of Participants
N/A

Modules
- NWGINT 3.1 introduction to NWG
- NWGINT 3.1 basic features
- NWGINT 3.1 optional features

Introduction to Nokia WAP Gateway NWGINT

Target Group
Personnel requiring knowledge on the Nokia WAP Gateway.

Objectives
After the training, the participant will be able to:
- Explain the basic functionality of Nokia WAP Gateway.
- List the basic and optional features of Nokia WAP Gateway.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
0.5 day

No. of Participants
Max. 24

Modules
- Introduction to Nokia WAP Gateway
- Basic features
- Optional features

Nokia WAP Gateway Operation and Maintenance NWGOM

Target Group
Operation and maintenance personnel.

Objectives
After the training, the participant will be able to:
- Perform daily routines related to Nokia WAP Gateway maintenance.
- Use the different tools available for Nokia WAP Gateway maintenance.
- Configure parameter values for the features available.
- Check the overall status of the system.

Prerequisites
NWGINT, MMSSYS, Unix Fundamentals

Duration
3 days

No. of Participants
Max. 8

Modules
- Overview
- Request handling
- Operating Nokia WAP Gateway
- Logging and statistics
- Handling alarms
- WAP push
- Subscriber identification
- Barring and delivery rules
- Security
- Billing

Notes
E-learning available in version 3.1 for theory part (6–7 hours).

Nokia WAP Gateway Release NWGREL

Target Group
Operation and maintenance personnel.

Objectives
After the training, the participant will be able to:
- List the relevant changes for this release.
- Configure parameter values for the features available.
- Check the overall status of the system.

Prerequisites
NWGINT, NWGOM

Duration
1 day

No. of Participants
Max. 8

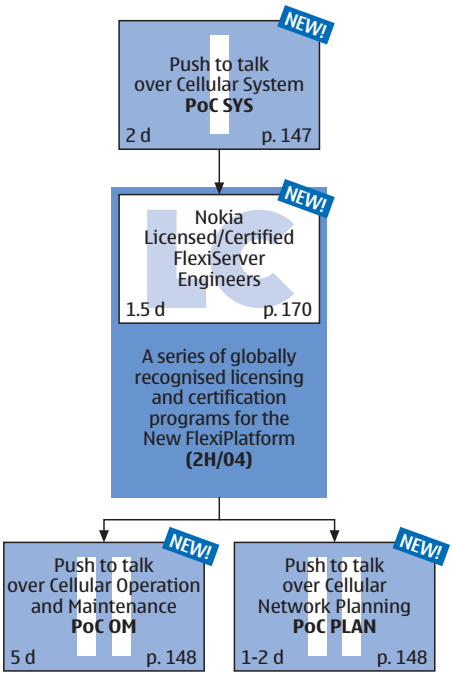
Modules
- WAP overview
- New features and functionality in:
  - WAP 2.0 support
  - New content transformation
  - User agent profiling (UAProf)
  - TLS tunneling
  - Push cancellation, replacement, status query

Notes
For more information on the availability of the course please contact your local Nokia training contact person.

Push to talk solution

Push to talk (PoC) is an innovative new service capability where a community can send messages to a group of subscribers, such as in an office or to a group of friends. We provide system training on the solution (PoC SYS), which is built upon the Nokia FlexiServer. This means that a license is required before proceeding to the OM (PoC OM) solution.

PoC PLAN (Push to talk over Cellular Planning) is still in the early development phase and will be available late 2004.



Push to talk over Cellular System

NEW!

PoC SYS

Target Group
Personnel requiring technical understanding of the PoC System.

Objectives
After the training, the participant will be able to:
- List the main network elements of PoC system.
- Describe the interfaces of PoC to GPRS networks.
- Describe the functionality of the call processor server.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 24

Modules
- Push to talk over Cellular service introduction
- Push to talk over Cellular architecture
- Push to talk over Cellular network elements
- Push to talk over Cellular over GPRS networks
- Push to talk over Cellular enabled terminals
- Basic principles of network dimensioning for Push to talk over Cellular

Notes
Available as e-seminar in Q4/04.

Push to talk over Cellular Operation and Maintenance

NEW!

PoC OM

Target Group
Operation and maintenance personnel who need to integrate, operate and maintain the PoC network elements.

Objectives
After the training, the participant will be able to:
- Execute a back-up of the Nokia FlexiServer configuration.
- Interpret the Nokia FlexiServer alarms.
- List the main parameters for PoC traffic over IP.
- Understand the PoC CDRs format.
- List 3 external interfaces to PoC system.

Prerequisites
PoC SYS, Nokia FlexiServer License

Duration
5 days

No. of Participants
Max. 8

Modules
- Nokia FlexiServer configuration
- Push to talk over Cellular Server and Register
- Push to talk over Cellular parameters
- Push to talk over Cellular network interfaces
- Push to talk over Cellular traffic measurements
- Push to talk over Cellular charging
- Push to talk over Cellular subscriber provisioning
- Push to talk over Cellular network management

Push to talk over Cellular Network Planning

NEW!

PoC PLAN

Target Group
Personnel responsible for network planning when using PoC.

Objectives
After the training, the participant will be able to:
- Describe general theory of PoC IP network applications, PoC core network integration, and PoC related GPRS quality of services to AW.

Prerequisites
PoC SYS, FlexiServer e-learning recommended

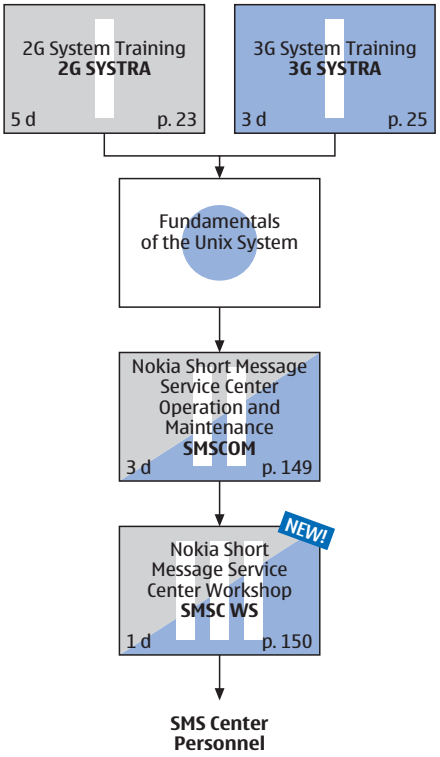
Duration
1–2 days

No. of participants
Max. 8

Modules
- Introductions
- PoC IP network application
- Network requirements
- PoC site connectivity solutions
- PoC IP architecture
- PoC system DNS architecture
- Network time protocol services
- Operability of PoC from the IP perspective

Short messaging

The short messaging group comprises network service engineers, who are responsible for the administration and operation of the Nokia SMSC product solutions.



Nokia Short Message Service Center Operation and Maintenance SMSCOM

Target Group
Operations and maintenance personnel responsible for the SMSC.

Objectives
After the training, the participant will be able to:
- Name the elements of Nokia SMS Center from memory.
- Explain the message processing within Nokia SMS Center from memory.
- Perform given operating tasks in a given way with reference to training material.
- Perform given configuration tasks in a given way with reference to training material.
- Perform given maintenance tasks in a given way with reference to training material.

Prerequisites
2G SYSTRA or 3G SYSTRA, Unix Fundamentals

Duration
3 days

No. of Participants
Max. 8

Modules
- SMS Center architecture (SMS Center SC5BCD2)
- SMS Center message handling (SMS Center SC5BCD2)
- SMS Center documentation (SMS Center SC5BCD2)
- Operating SMS Center (SMS Center SC5BCD2)
- SMS Center management (SMS Center SC5BCD2)
- Configuring SMS Center (SMS Center SC5BCD2)
- SMS Center maintenance (SMS Center SC5BCD2)

Nokia Short Message Service Center Workshop

NEW!

SMSC WS

Target Group
Technical specialists supporting the SMSC.

Objectives
After the training, the participant will be able to:
- Use the discussed information in daily tasks.

Prerequisites
2G SYSTRA or 3G SYSTRA, Unix Fundamentals, SMSCOM

Duration
1 day

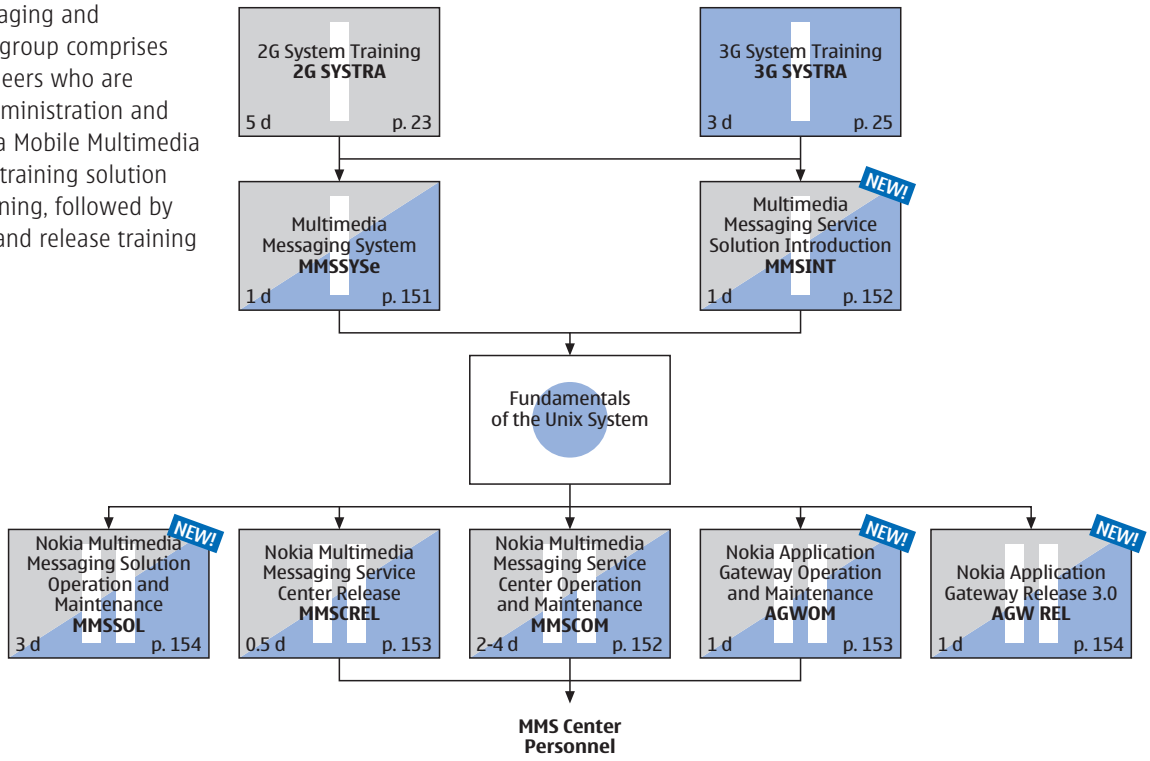
No. of Participants
8

Modules
- Defined per delivery

Notes
The content of the workshop is defined separately session by session, according to the subjects defined together with the customer. The same applies for location, environment and other arrangements. These workshops are always operator specific.

Multimedia messaging and application gateways

The multimedia messaging and application gateways group comprises network service engineers who are responsible for the administration and operation of the Nokia Mobile Multimedia product solution. Our training solution comprises system training, followed by practical OM training and release training for new versions.



Multimedia Messaging System — MMSSYSe

Target Group
Personnel requiring an overview of Nokia Multimedia Messaging Service Center including the network element architecture and implementation in Nokia GSM and GPRS networks.

Objectives
After the training, the participant will be able to:
- List and briefly describe the four main multimedia messaging services.
- List the network elements and their functions from the multimedia messaging services point of view.
- List and briefly describe the MMS Center elements and their functions.
- List the specific features of the Nokia MMS Center.
- Name the three elements that form the MMS Center platform from memory.
- List the three responsibilities of the MMS Center Kernel.
- State the difference between an application interface acting as a client or as a server.
- Explain the main functions of the WAP network interface.
- List the three elements of the MMS Center platform.
- List four key features of the MMS Center.
- List four internal and external protocols used with the MMS Center.
- Name the different network elements and their roles in a GSM and GPRS networks from the MSS Center point of view.
- Name the basic functions of the different network elements in the GSM and GPRS networks from the MMS Center point of view.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
1 day

No. of Participants
N/A

Modules
- Introduction to multimedia services
- MMS Center architecture
- MMS Center implementation
- MMS GPRS network architecture and functionality
- MMS GSM network architecture and functionality

Multimedia Messaging Service Solution Introduction

NEW!

MMSINT

Target Group
Non-technical personnel.

Objectives
After the training, the participant will be able to:
- Name the basic multimedia messaging services and characteristics.
- Name the message routing points of the cellular network.
- Name items that are part of Nokia MMS solution.

Prerequisites
2G SYSTRA, 3G SYSTRA

Duration
1 day

No. of Participants
Max. 24

Modules
- Introduction to MMS
- Nokia MMS solution 3.0 message handling
- Nokia MMS solution 3.0 MMS Center
- Nokia MMS solution 3.0 Multimedia Application Gateway
- Nokia MMS solution 3.0 Profile Server
- Nokia MMS solution 3.0 Terminal Management Server

Notes
Training for optional features is available upon request.

Nokia Multimedia Messaging Service Center Operation and Maintenance

MMSCOM

Target Group
Operation and maintenance personnel.

Objectives
After the training, the participant will be able to:
- Perform given operating tasks in a given way with reference to training material.
- Perform given maintenance tasks in a given way with reference to training material.
- Perform given configuration tasks in a given way with reference to training material.
- Be aware of 3GPP and OMA specifications about multimedia messaging service (MMS).

Prerequisites
2G SYSTRA, 3G SYSTRA, MMSSYS(e), Unix fundamentals

Duration
2–4 days

No. of Participants
Max. 8

Modules
- MMS Center architecture
- MMS Center message handling
- MMS Center documentation
- Operating and administrating MMS Center
- Reporting and statistics
- Configuring MMS Center
- Interworking MMS functionality
- External application interface
- Billing
- Exercises

Optional features training modules
- Content adaptation
- E-mail gateway
- Clustered solution
- Subscriber database interface
- Legal interception interface
- In advance credit check interface
- Mobile number portability with MAP interface
- Secured IP interfaces

Notes
Duration from two to four days, depending on the release or, if training for any of the optional features is ordered.

Nokia Multimedia Messaging Service Center Release

MMSCREL

Target Group
Personnel who need knowledge of a certain MMS Center Release.

Objectives
After the training, the participant will be able to:
- Maintain and administer the latest release of Nokia MMS Center.
- Maintain and administer the features of Nokia MMS Center 2.1.

Prerequisites
2G SYSTRA, 3G SYSTRA, MMSCOM, Unix fundamentals

Duration
0.5 day

No. of Participants
Max. 8

Modules
- Nokia MMS Center 2.0
- Nokia MMS Center 2.1
- Nokia MMS Center 3.0

Nokia Application Gateway Operation and Maintenance

NEW!

AGWOM

Target Group
Operating and maintenance personnel with less than six months experience with AGW.

Objectives
After the training, the participant will be able to:
- Name the four MMS services that make up AGW.
- Name the third party programs that make up AGW and state their function.
- Perform given operating tasks in a given way.
- Perform given maintenance tasks in a given way.
- Perform given configuration tasks in a given way.

Prerequisites
2G SYSTRA, 3G SYSTRA, MMSSYS(e), Unix fundamentals

Duration
1 day

No. of Participants
Max. 8

Modules
- AGW basics
- Legacy support (MMS service)
- Multimedia Message Storage (MMS service)
- Email smart push (MMS service)
- Multimedia voice messaging (MMS service)

Notes
This course was formerly named EGWOM and TGWOM.

Nokia Application Gateway Release 3.0

NEW!

AGW REL

Target Group
Operating personnel.

Objectives
To provide knowledge about Application Gateway 3.0 changes and new features, as well as some operating and configuring practice.

Prerequisites
2G SYSTRA, MMSCOM, HP Unix Fundamentals (or equivalent)

Duration
1 day

No. of Participants
Max. 8

Modules
- AGW Release 3.0 course module
- Exercises

Nokia Multimedia Messaging Solution Operation and Maintenance

NEW!

MMSSOL

Target Group
Operation and maintenance personnel.

Objectives
After the training, the participant will be able to:
- Provide knowledge and develop skills to operate and maintain the Nokia MMS solution.

Prerequisites
3G SYSTRA, MMSINT, Unix fundamentals

Duration
3 days

No. of Participants
Max. 8

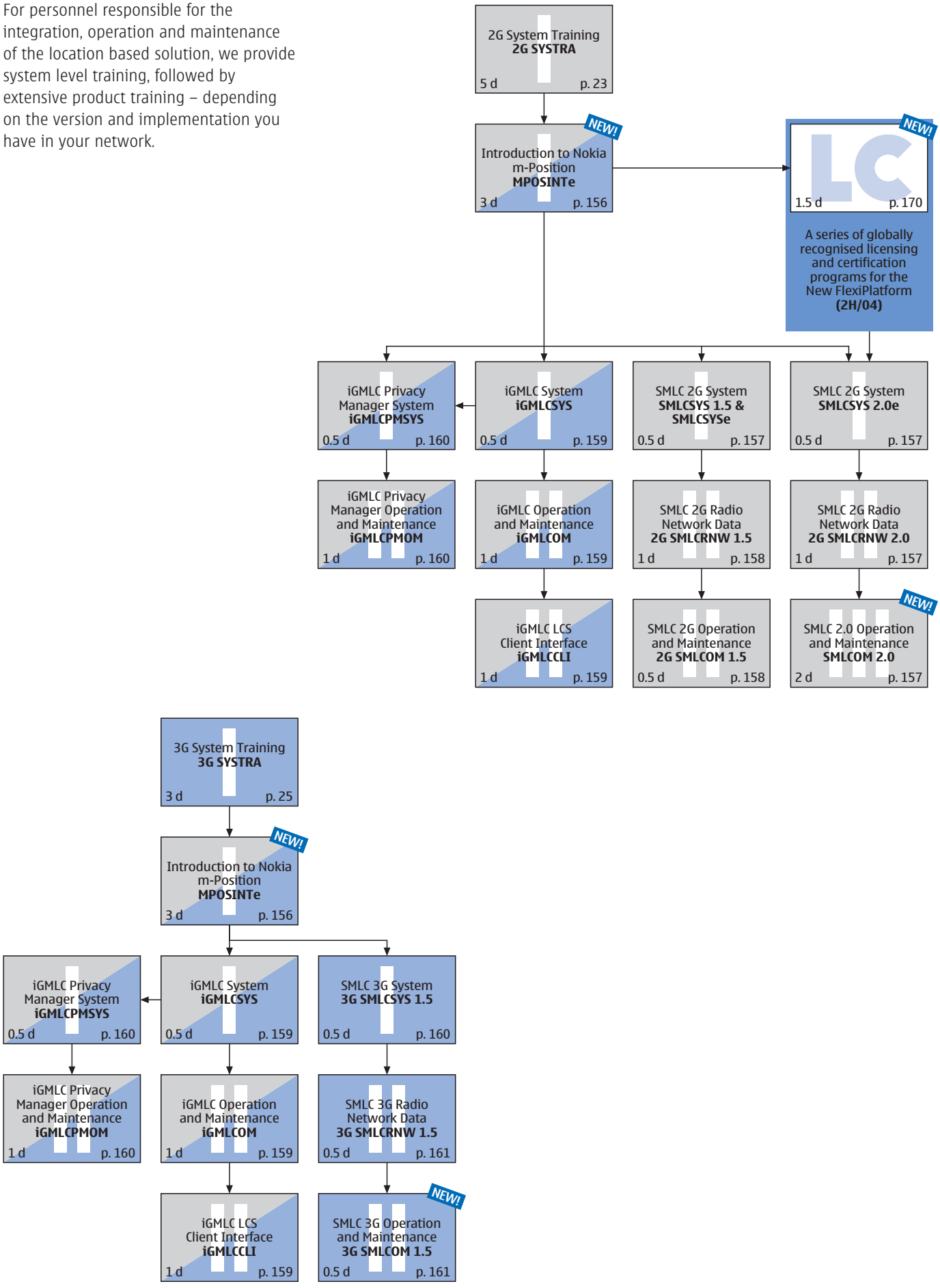
Modules
- To be defined

Notes
MMS solution level courses are designed to cover various operator processes across multiple platforms and interfaces within Nokia MMS solution.

Nokia Multimedia Messaging solution
Nokia MMS solution provides a service platform to put operators on the fast track to revenue by enabling "Ready to go" services, through instant service provisioning and activation. Nokia MMS solution core elements are Nokia Multimedia Messaging Service Center and Nokia Multimedia Application Gateway. Nokia MMS solution can also include the following elements: Nokia WAP Gateway, Nokia Messaging Gateway, Nokia Profile Server, Nokia Terminal Management Server and Nokia Charging Center.

Location based services

For personnel responsible for the integration, operation and maintenance of the location based solution, we provide system level training, followed by extensive product training – depending on the version and implementation you have in your network.



Introduction to Nokia mPosition

NEW!

MPOSINTe

Target Group
Personnel involved with Nokia mPosition location based services: service creation and management, service platform administration, marketing, customer care.

Objectives
After the training, the participant will be able to:
- Describe the Nokia mPosition network solutions for Global System for Mobile Communications (GSM) and wideband code division multiple access (WCDMA) networks.

Prerequisites
UndGSMe, 3G INTe

Duration
3 days

No. of Participants
N/A

Modules
- Introduction to Nokia mPosition
- Nokia mPosition for GSM/EDGE
- Nokia mPosition for WCDMA

Mobile Positioning in Cellular Networks

NEW!

MPOSITION

Target Group
Telecommunications professionals who need an in-depth understanding of mobile positioning technology as descried by the 3GPP standards.

Objectives
After the training, the participant will be able to:
- Have a comprehensive system-wide knowledge of LCS (location services) technology in GSM and UMTS networks.
- Have an awareness of the existing and future location based services and applications.
- Understand relevant information in the LCS/3GPP specifications and similar documents, regarding the LCS functions, procedures and positioning methods.
- Have received a unified account of the state of the positioning technology through a systematic and detailed description of all the standardized positioning methods and procedures.
- Be aware of important issues such as system-impact, privacy and lack of interoperability that exist today as challenges for the implementation of positioning technology in mobile telephony networks.

Prerequisites
2G SYSTRA, 3G SYSTRA

Duration
2 days

No. of Participants
24

Modules
- Introduction to mobile positioning
- LCS architecture
- Positioning methods overview
- Security and privacy
- Location procedures
- Cell ID
- E-OTD/OTDOA
- A-GPS
- Le, LIF, LBS examples

Notes
This course is arranged in cooperation with APIS and is not Nokia specific.

SMLC 2.0 Operation and Maintenance

SMLCOM 2.0

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Integrate, operate, maintain, and troubleshoot SMLC 2.0 in 2G network.

Prerequisites
2G SYSTRA, 2G SMLCRNW

Duration
2 days

No. of Participants
Max. 8

Modules
- Installation of SMLC application packages
- Integration of SIGTRAN interfaces
- Integrating other SMLC interfaces
- SMLC configuration management
- SMLC system maintenance
- SMLC troubleshooting

SMLC 2G Radio Network Data

2G SMLCRNW 2.0

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Create 2G radio network data file and timing advance statistical data files and update the SMLC database.

Prerequisites
2G SYSTRA, SMLCSYS

Duration
1 day

No. of Participants
Max. 8

Modules
- SMLC 2G radio network data
- SMLC 2G statistical data
- SMLC 2G algorithms
- SMLC 2G data update
- SMLC 2G manual data update
- SMLC 2G NetImport data update
- SMLC 2G automatic data update
- SMLC 2G database

SMLC 2G System

NEW!

SMLCSYS 1.5 & SMLCSYSe

Target Group
Generic.

Objectives
Basic understanding of SMLC 2G.

Prerequisites
2G SYSTRA, iGMLCSYS, MPOSITION, MPOSINTe

Duration
0.5 day

No. of Participants
Max. 24

Modules
- SMLC 2G introduction
- SMLC 2G architecture
- SMLC 2G graphical user interface

Notes
E-learning solution is available for software version 1.5.

SMLC 2G Radio Network Data

2G SMLCRNW 1.5

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Create 2G radio network data file and timing advance statistical data files and update the SMLC database.

Prerequisites
2G SYSTRA, SMLCSYS

Duration
1 day

No. of Participants
Max. 8

Modules
- SMLC 2G radio network data
- SMLC 2G statistical data
- SMLC 2G algorithms
- SMLC 2G data update
- SMLC 2G manual data update
- SMLC 2G NetImport data update
- SMLC 2G automatic data update
- SMLC 2G database

SMLC 2G Operation and Maintenance

2G SMLCOM 1.5

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Operate, maintain and troubleshoot 2G SMLC.

Prerequisites
2G SYSTRA, SMLCSYS, 2G SMLCRNW

Duration
0.5 day

No. of Participants
Max. 8

Modules
- SMLC 2G getting started
- SMLC 2G configuration files
- SMLC 2G logging management
- SMLC 2G fault management
- SMLC 2G general operations
- SMLC 2G troubleshooting

iGMLC System

iGMLCSYSe

Target Group
Personnel working with location based services.

Objectives
After the training, the participant will be able to:
- Describe the role of the Nokia iGMLC in both the mPosition for legacy phones and mPosition for E_OTD solutions.

Prerequisites
2G SYSTRA or 3G SYSTRA

Duration
0.5 day

No. of Participants
N/A

Modules
- Nokia iGMLCSYSe solution

iGMLC System

iGMLCSYS

Target Group
Personnel working with location based services.

Objectives
Basic understanding of iGMLC.

Prerequisites
2G SYSTRA, 3G SYSTRA, MPOSITION, MPOSINTe

Duration
0.5 day

No. of Participants
Max. 24

Modules
- iGMLC introduction
- iGMLC architecture
- iGMLC processing
- iGMLC graphical user interface

Notes
E-learning solution is also available for this course.

iGMLC Operation and Maintenance

iGMLCOM

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Operate, maintain and troubleshoot iGMLC.

Prerequisites
2G SYSTRA, 3G SYSTRA, iGMLCSYS, iGMLCSYS

Duration
1 day

No. of Participants
Max. 8

Modules
- iGMLC getting started
- iGMLC configuration management
- iGMLC LCS client management
- iGMLC system maintenance
- iGMLC troubleshooting

iGMLC LCS Client Interface

iGMLCCLI

Target Group
Field engineers or application developers working with location based services.

Objectives
After the training, the participant will be able to:
- Discuss and understand the interface between iGMLC and LCS clients.

Prerequisites
2G SYSTRA, 3G SYSTRA, iGMLCSYS, iGMLCOM

Duration
1 day

No. of Participants
Max. 8

Modules
- iGMLC LCS client interface introduction
- Understanding document type definitions in iGMLC
- Understanding iGMLC LCS client interface – LIF MLP 1.1
- Understanding iGMLC LCS client interface – Privacy manager
- Understanding iGMLC LCS client interface – LIF MLP 3.0
- Working with a sample client for iGMLC
- iGMLC secure sockets layer connection

iGMLC Privacy Manager System

iGMLCPMSYS

Target Group
Personnel working with location based services.

Objectives
Provide a basic understanding of iGMLC Privacy Manager.

Prerequisites
2G SYSTRA, 3G SYSTRA

Duration
0.5 day

No. of Participants
Max. 8

Modules
- iGMLC Privacy Manager architecture
- iGMLC Privacy Manager processing
- iGMLC Privacy Manager graphical user interface

iGMLC Privacy Manager Operation and Maintenance

iGMLCPMOM

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Operate, maintain and troubleshoot iGMLC Privacy Manager.

Prerequisites
2G SYSTRA, 3G SYSTRA, iGMLCPMSYS, iGMLCPMSYS

Duration
1 day

No. of Participants
Max. 8

Modules
- iGMLC Privacy Manager configuration management
- iGMLC Privacy Manager operator provisioning
- iGMLC Privacy Manager subscriber provisioning
- iGMLC Privacy Manager fault management
- iGMLC Privacy Manager logging and billing management
- iGMLC Privacy Manager database management
- iGMLC Privacy Manager troubleshooting

SMLC 3G System

NEW!

3G SMLCSYS 1.5

Target Group
Personnel working with location based services.

Objectives
Basic understanding of SMLC 3G.

Prerequisites
3G SYSTRA, iGMLCSYS, MPOSITION, MPOSINTe

Duration
0.5 day

No. of Participants
Max. 24

Modules
- SMLC 3G introduction
- SMLC 3G architecture
- SMLC 3G graphical user interface

SMLC 3G Radio Network Data — 3G SMLCRNW 1.5

Target Group
Field engineers working with location based services.

Objectives
After the training, the participant will be able to:
- Create a 3G radio network data file and update the SMLC database.

Prerequisites
3G SYSTRA, SMLCSYS

Duration
0.5 day

No. of Participants
Max. 8

Modules
- SMLC 3G radio network data
- SMLC 3G algorithms
- SMLC 3G manual data update
- SMLC 3G NetImport data update
- SMLC 3G database tables

SMLC 3G Operation and Maintenance — NEW! — 3G SMLCOM 1.5

Target Group
Field engineers working location based services.

Objectives
After the training, the participant will be able to:
- Operate, maintain and troubleshoot SMLC 3G.

Prerequisites
3G SYSTRA, SMLCSYS

Duration
0.5 day

No. of Participants
Max. 8

Modules
- SMLC 3G getting started
- SMLC 3G configuration files
- SMLC 3G logging management
- SMLC 3G general operations
- SMLC 3G troubleshooting

Application development resources

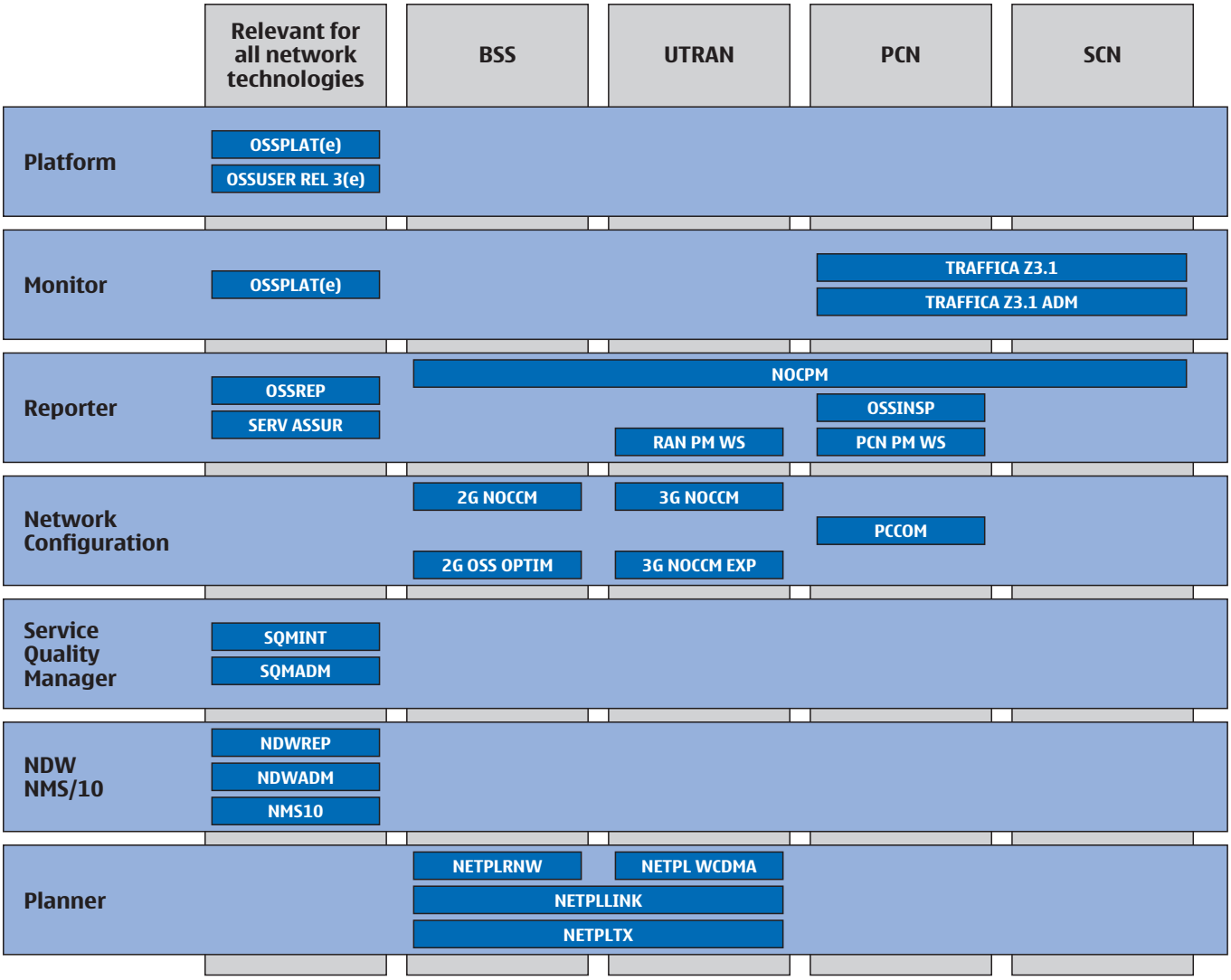
The service core and enablers provide the platform to implement new service capabilities into the network. Some services are already included, in other cases the services can be developed by you or a diverse range of companies. To support the explosive and innovative development of services, Nokia provides a comprehensive online resource (www.forum.nokia.com) that provides tools, documents, articles and support for developers. It is free to join and already has over 1 million registered users.

You can also find information about training on certain areas, such as Symbian as well information on the latest events. During 2004 Nokia will introduce developer certification programs to better identify competence in this fast growing field.

Value added operations support systems

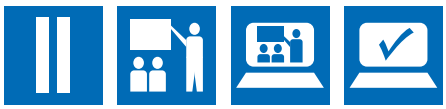
The Nokia OSS supports a multitude of functionality that supports specific aspects of network operation. This includes a number of optional features that support tasks such as service quality monitoring, data-mining and performance measurements. These tools are designed for use by several target groups as shown in the picture.

Find your Nokia NetAct Feature Training.



Nokia Traffica Z3.1

TRAFFICA Z3.1



Target Group
Second line OM personnel; personnel working with Nokia Traffica.

Objectives
After the training, the participant will be able to:
- Explain the purpose and usage of Nokia Traffica.
- Describe the Nokia Traffica architecture and elements connected to it.
- Handle the basic Nokia Traffica user's tasks and solve practical use cases related to them.
- Explain the Traffic News and solve practical use cases related to it.

Prerequisites
DXSOM, 2G SYSTRA, 3G SYSTRA

Duration
2 days

No. of Participants
Max. 8

Modules
- General introduction to Nokia Traffica
- Nokia Traffica architecture
- Nokia Traffica functionalities
- Reporting and offline troubleshooting

Notes
The virtual classroom version is spread over more days, but with shorter sessions.

Nokia Traffica Z3.1 System Administration

TRAFFICA Z3.1 ADM

Target Group
Second line OM personnel; personnel working with Nokia Traffica.

Objectives
After the training, the participant will be able to:
- Explain the purpose of Nokia Traffica.
- Manage users with user manager and Nokia Traffica, know the tools for administering the Nokia Traffica and in practical part to build up Nokia Traffica topology, create own definitions and transfer these remotely to other Nokia Trafficas.

Prerequisites
2G SYSTRA, 3G SYSTRA, TRAFFICA Z3.1

Duration
1 day

No. of Participants
Max. 8

Modules
- General introduction to Nokia Traffica
- Nokia Traffica system administration

Nokia NetAct Inspector – Active QoS Measurement

NEW!

OSSINSP

Target Group
Service management and network performance personnel.

Objectives
After the training, the participant will be able to:
- Explain purpose and scope of Nokia NetAct Inspector. Discuss the application and the accordant user groups within the operators organization.
- Develop a strategy in the operator's network to setup measurement stations and stethoscopes in online and offline modus.
- Describe the overall Inspector using process and define measurement stations and stethoscopes in practical examples.
- Demonstrate usage of Inspector in teamwork with suited other Nokia NetAct functionalities like Monitor and Reporter. Generate example reports showing QoS indicators of existing services.

Prerequisites
OSSPLAT, OSSREP

Duration
2 days

No. of Participants
Max. 6

Modules
- Nokia NetAct Inspector introduction
- Inspector using strategy process
- Inspector environment setup process
- QoS monitoring and reporting process

Packet Core Configurator Operation and Maintenance

NEW!

PCCOM

Target Group
Personnel taking care of operation and configuration of the Nokia NetAct Packet Core Configurator.

Objectives
After the training, the participant will be able to:
- Explain the functionality of the Nokia NetAct Packet Core Configurator as a tool for service access provisioning as well as for network development and optimization.
- Configure access point creation, modification, termination and re-hosting with the Nokia NetAct Packet Core Configurator.
- Create and analyze PCC reports.
- Perform consistency checks and uploads.

Prerequisites
None

Duration
2 days

No. of Participants
Max. 4

Modules
- GPRS / Core network IP overview
- GGSN features
- Basic configuration in GGSN
- GGSN access point configuration
- Basic GGSN debugging
- GPRS and 3G roaming
- Nokia NetAct Packet Core Configurator

Notes
This course can be conducted in Training Center Dusseldorf (Germany) or in operator's environment.

Introduction to Nokia Service Quality Manager SQMINT

Target Group
Personnel who want an overview of service management as a concept and an overview of Nokia Service Quality Manager (SQM).

Objectives
After the training, the participant will be able to:
- Understand TMF and TMN (TOM).
- Define problem classes, service classes, rules, and services.
- Navigate through SQM monitoring tools.
- Navigate through SQM map tools.

Prerequisites
2G SYSTRA, knowledge of a Nokia NMS and its applications

Duration
1 day

No. of Participants
Max. 8

Modules
- Overview of service management
- Rule package structure
- Applications and functionalities
- Map and map applications

Administrating Nokia Service Quality Manager SQMADM

Target Group
Personnel who want to administrate the Nokia Service Quality Manager product.

Objectives
After the training, the participant will be able to:
- Draw the system architecture of Nokia Service Quality Manager.
- Name and identify the Nokia SQM processes and configuration files.
- Administrate the collectors.
- Define permissions for users.
- Start up and shut down processes.

Prerequisites
SQMINT, 2G SYSTRA, 3G SYSTRA

Duration
1.5 days

No. of Participants
Max. 4

Modules
- SQM hardware and software
- SQM software and environment
- System maintenance/handling (SQMADM)
- Installing PC clients

Nokia NetAct Reporter – Network Data Warehouse Reporting

NEW! NDWREP

Target Group
Personnel in the customer interface and all those who want to understand the basic functionality of the Nokia Network Data Warehouse (NDW) and who need PM reporting as a tool in their daily work.

Objectives
After the training, the participant will be able to:
- Explain the concept and architecture of Nokia NetAct Reporter.
- View Nokia NDW default reports.
- Create reports with Report Builder.
- View KPIs and reports using Report Browser and KPI Browser.
- Create Reports using ODR/ODB.

Prerequisites
2G SYSTRA, 3G SYSTRA

Duration
4 days

No. of Participants
Max. 8

Modules
- Introduction to Nokia NetAct Reporter
- NDW default reports
- Report creation and viewing using Report Builder, KPI Browser and Report Browser
- Report creation using ODR/ODB

Nokia NetAct Reporter – Network Data Warehouse Administration

NEW! NDWADM

Target Group
NDW administrators and other people with ND4 system administration in their responsibilities.

Objectives
After the training, the participant will be able to:
- Administer the NDW UNIX part.
- Administer the NDW Windows part.

Prerequisites
2G SYSTRA or 3G SYSTRA, HP-UX Admin1, OSSADM1 useful

Duration
2 days

No. of Participants
Max. 8

Modules
- System administration for NDW Unix part
- System administration for NDW Windows part 2

Service Assurance – Models, Process and Nokia NetAct Applications

SERV ASSUR

Target Group
Service management and network performance personnel.

Objectives
After the training, the participant will be able to:
- Describe important models for operator processes in an overview level.
- Explain service management and operation processes for the vertical assurance level 1 process within the eTOM model of the TMForum.
- Explain resource management and operations processes for the vertical assurance level 1 process within the eTOM model of the TMForum.
- Recall the Nokia NetAct applications supporting the service assurance process.
- Explain how they can be used to fulfil sub processes within the service assurance area.

Prerequisites
OSSPLAT

Duration
1 day

No. of Participants
Max. 12

Modules
- Operator process modelling
- Nokia NetAct applications supporting service assurance process

Network Management System 10

NMS10

Target Group
NMS/10 installation, operation, maintenance and network monitoring personnel.

Objectives
After the training, the participant will be able to:
- Explain the use of NMS/10 in the network control system.
- Explain the principles of HP open view.
- Configure NMS/10 SF.
- Configure the NMS10MF.
- Supervise the network with the NMS10MF.
- Use the MF manager.
- Configure Q3 agent.
- Supervise the network with Q3 agent.

Prerequisites
None

Duration
3 days

No. of Participants
Max. 6

Modules
- NMS/10 SR C6.0
- Configuration of equipment
- MF Overview/Introduction
- Q3 agent

Assessment services

Ensuring that you get the most from your investments and maximizing the potential of your people are both issues we all face. Networks continue to increase in complexity and the business environment remains challenging.
To meet this demand, Nokia is introducing a range of assessment, licensing and certification services to help ensure you have the right level of competence, in the right place, for optimal investment.

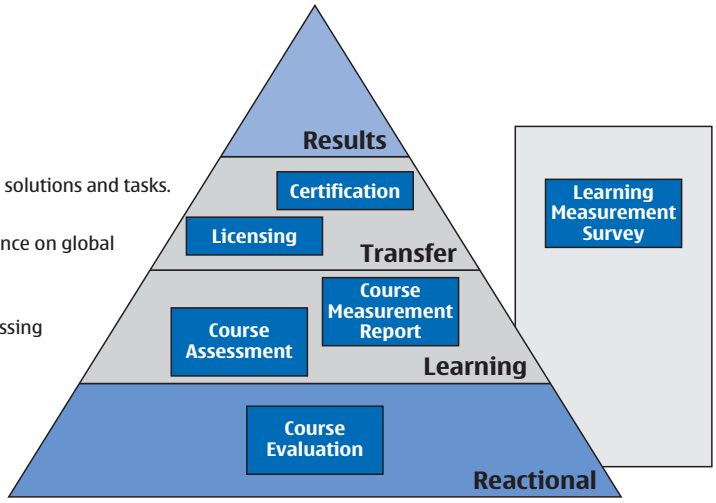
Our services are based on the established Kirkpatrick model, which is used to determine the impact and benefit of learning on your organization and people.

"Is internationally recognised as an expert in their field"
Issues based on meeting strict requirements in completing defined licenses, solutions and tasks.

"Is proven to be capable of performing their task"
Based on successfully passing theory/practical assessment and have experience on global defined standards.

"Proven to have met the course objectives"
The post-assessment is optional and the diploma is given on successfully passing the assessment.

"Has taken a Nokia course"
Every participant receives recognition of participation at the end of a course/workshop.



Reaction – For every course and workshop we provide, we always collect an evaluation from the participants to assess their feelings about the training. Each participant receives our "Recognition of Participation".

Learning – The efficiency of learning is measured on a course level through an assessment that tests the knowledge the participants have gained. Most of our intermediate courses offer this for free.

Results on an individual level are available for additional price (page 20). On successfully completing the assessment, the individual will receive a Nokia Diploma.

Transfer – The third level of the model is the measured transfer – in other words, what the person can and cannot do – assessed through our globally recognized license and certification program to customers. The license will verify an individual's ability to perform a set of skills required to perform a job.
The certification verifies an acknowledged expert in their selected field.

Results – The highest level is the effect of learning on the financial bottom line of your organization. To support and measure your investment decisions, we also provide a training measurement service that provides clear reports on the progress of training.

Training measurement service

Nokia Training Measurement Services provides raw data and analysis of the effectiveness of transfer and a capability assessment (with individual results) of each participant. The results can be used to assess the impact on business performance and identify capability development actions.

This service is available for network operations, BSS, RAN, NSS, MPC and field engineering personnel.

On completing the service you will receive:
- Report on the effectiveness of transfer per course.
- Report on the effectiveness of transfer and capability assessment per individual.
- Diploma for each individual with complete skills assessment.
- Recommended actions for capability development.
- Workshop to review the results.

Please ask for a presentation from your local training contact person.

This service is subject to our assessment ethics – which include that full-disclosure is made to the participants and they are aware of the project. Local data-protection laws may also affect the amount of information collected.

Nokia Licensing and Certification Service

Licensing and certification have been an integral part of Nokia's assessment services for Nokia employees and Nokia's subcontractors for over a year. Based on requests, we are now offering these services to our customers during 2004.

A Nokia License tests practical skills in a testbed, a live network or in a classroom whereas a Nokia Certificates are created by Nokia experts, and delivered as a closed book exam in a controlled environment.

Nokia Licensing and Certification Services will be launched for customers in three different components:
- FlexiServer Licensing and Certification package
- Nokia Certification for operators will be launched during 2004
- Nokia Licensing for operators will be based on the customer's demand and operating model.

The Nokia FlexiServer Licensing and Certification package will encompass prerequisite knowledge, i.e. all of the training required to perform certain tasks and verification of ability to perform those tasks in a testbed.

Nokia Certification can be used to verify the level of expertise within the organization. The individuals will be asked to complete a Nokia exam, which has been stringently created, following psychometric methods.

Nokia Licensing for customers will need to be examined in the light of the unique network operations model used by the operator. It will also encompass some assessment of present skills or analysis of training attended and verification of ability to perform the tasks in a Test Bed or in the live network. For more information please contact your local training contact person.

Nokia Certification
An expert must pass a closed book examination, which is created by Nokia experts for one or more Nokia network elements

Nokia License
An individual is assessed in a testbed or live network to prove they can implement, operate and maintain functions of one or more Nokia network elements

Nokia Trainer License
An individual is assessed to prove they can train a specific product course which can then be delivered within your own organization

Benefits and awards of Nokia Licensing and Certification

Nokia Certification is an important tool for identifying, benchmarking and managing the overall competence of your organization. Once the standard has been set, this can facilitate a number of competence development options within your organization.

Benefits for the organization
- Enables you to identify, benchmark and manage the overall competence level of your organization
- Links your competence/career ladder to licensing and certification
- Provides a method to identify competence across international affiliates
- Provides a requirement standard when recruiting engineers

Benefits for the individual
- Licensing offers the opportunity to prove your skills to your employer
- Certification offers the opportunity to prove your skills and expert knowledge to your employer

Awards for Nokia Licensing
- Nokia Licensing card

Awards for Nokia Certification
- Access to online learning support for day-to-day work
- A technical book
- Nokia Certification card

Nokia offers specially designed Nokia cards for successful Nokia Licensing and Nokia Certification candidates. Nokia Certification candidates additionally receive a technical book and access to day to day online learning support.

Nokia License and Certification renewal

Nokia License renewal comes in two categories:
- A license is only valid for a software / hardware release, which means that the participant is notified of when their license will expire and when they can attend the release training
- A license is valid for a certain period of time, for example, 1 year

Nokia Certification is valid for 18 months.

Nokia FlexiServer platform Licensing and Certification

Nokia License – FlexiServer Hardware Installation

NEW!

NLEFLEXHW

Target personnel
Engineers who are responsible for the installation of Nokia FlexiServer blade hardware.

Requirements
- Knowledge of antistatic policy requirements
- Knowledge of antishock safety instructions

Training and assessment plan
- Technology specific competence (1d)
  - Self-paced e-learning modules (1d)
  - Introduction to Flexiplatforms (NOLS)
  - Flexiserver hardware and scaling (NOLS)
  - Nokia FS blade hardware installation (CD-ROM)
- Knowledge assessment (2h)
- Practical assessment (4h)

Validity and renewal
Valid until the next release. Renewal is made through taking release training + assessment.

Notes
Available in Q3/04.

Nokia License – FlexiServer Software Installation

NEW!

NLEFLEXSW

Target personnel
Engineers who are responsible for the software installation of FlexiServer and basic configuration.

Requirements
- Ability to work with telecommunication servers
- Basic Linux/Unix knowledge
  - Linux Command Line Interface
  - Linux Test Editor
- Understanding of IP networks and related protocols
- Addressing in IPv4 and IPv6
- Cisco LAN switch configuration

Training and assessment plan
- Self-paced e-learning (1d)
  - Introduction to Flexi platforms
  - FlexiServer hardware and scaling
  - FlexiServer functionality
  - Operating FlexiServer
- Knowledge assessment (2h)
- Classroom session (3.5d)
  - Introduction to the Nokia FlexiServer hardware
  - FlexiServer software installation
  - Software management in the FlexiServer
  - Basic IP configuration of the FlexiServer
  - System management in the FlexiServer
  - Backup management in the FlexiServer
  - Alarms and logs in the FlexiServer
- Practical assessment (3h)

Validity and renewal
Valid until next release. Renewal is made through taking release training + assessment.

Notes
- Available in Q4/04.
- Nokia schedules open sessions of the classroom sessions in many locations globally. Please refer to NOLS or your contact person for a list of available dates.

Nokia License – FlexiServer Software Maintenance

NEW!

NLEFLEXSWUP

Target personnel
Engineers who are responsible for the software updates and upgrades on FlexiServer software.

Requirements
- Ability to work with telecommunication servers
- Basic Linux/Unix knowledge
  - Linux Command Line Interface
  - Linux Test Editor
- Understanding of IP networks and related protocols
- Addressing in IPv4 and IPv6

Training and assessment plan
- Self-paced e-learning modules (3h)
  - Software updates in FlexiServer
  - Software upgrades in FlexiServer
- Knowledge assessment (2h)
- Classroom/simulation (tbc)
- Practical assessment (4h)

Validity and renewal
Valid until the next release. Renewal is made through taking release training + assessment.

Notes
Available in Q4/04.

Nokia License – FlexiServer Routine Maintenance

NEW!

NLEFLEXRM

Target personnel
Engineers who are responsible for the routine maintenance of the FlexiServer.

Requirements
- Ability to work with telecommunication servers
- Basic Linux/Unix knowledge
  - Linux Command Line Interface
  - Linux Test Editor
- Understanding of IP networks and related protocols
- Addressing in IPv4 and IPv6

Training and assessment plan
- Technology specific competence (1d)
- Self-paced e-learning modules (1d)
  - Backup and recovery process
  - Alarms handling and basic troubleshooting
  - Routine procedures in FlexiServer
- Knowledge assessment (2h)
- Practical assessment (4h)

Validity and renewal
Valid until the next release. Renewal is made through taking release training + assessment.

Notes
Available in Q4/04.

Nokia Certified FlexiServer Engineer

NEW!

NCEFLEX

Target personnel
System administrators with proven capability and skills in installing, upgrading and configuring the Nokia FlexiServer.

Training/license requirements
- FlexiServer hardware installation license (NLEFLEXHW)
- FlexiServer software installation and configuration license (NLEFLEXSW)
- FlexiServer software maintenance license (NLEFLEXSWUP)
- FlexiServer routine maintenance license (NLEFLEXRM)

Assessment (Format/duration)
Knowledge (Prometric/0.5d)

Validity and renewal
The certificate is valid for 18 months.

Notes
Available in Q3/05.

FlexiServer is still in the development phase and therefore during the piloting and early implementation stage an alternative training solution is available. Later in 2004, we will provide a special opportunity for those persons who have attended this classroom training to take a separate assessment, in order to receive a license.

Licensing and certification programs for 2004

In the second half of 2004, Nokia will introduce a range of operator available licenses and certificates. This compliments the comprehensive recommended learning solutions and provides you with a basis to assess competence in your own operations.

In the radio access engineering area
- BSS licensed operations engineer
- BSS certified engineer
- RNC licensed operations engineer
- RNC certified engineer

In the SCN core area
- NSS licensed operations engineer
- NSS certified engineer
- 3G SCN licensed operations engineer
- 3G SCN certified engineer

In the PCN core area
- 2G SGSN licensed operations engineer
- 3G SGSN licensed operations engineer
- GGSN licensed operations engineer
- 2G PCN certified engineer
- 3G PCN certified engineer

Future programs
During 2004 we intend to further develop our range of licenses and certification programs to include OSS operations, system administration, mobile service solutions, specialist in core network tasks and 3G release 4 and 5 solutions. All up-to-date information on our licensing and certification services can be found from NOLS or ask your local training contact person.

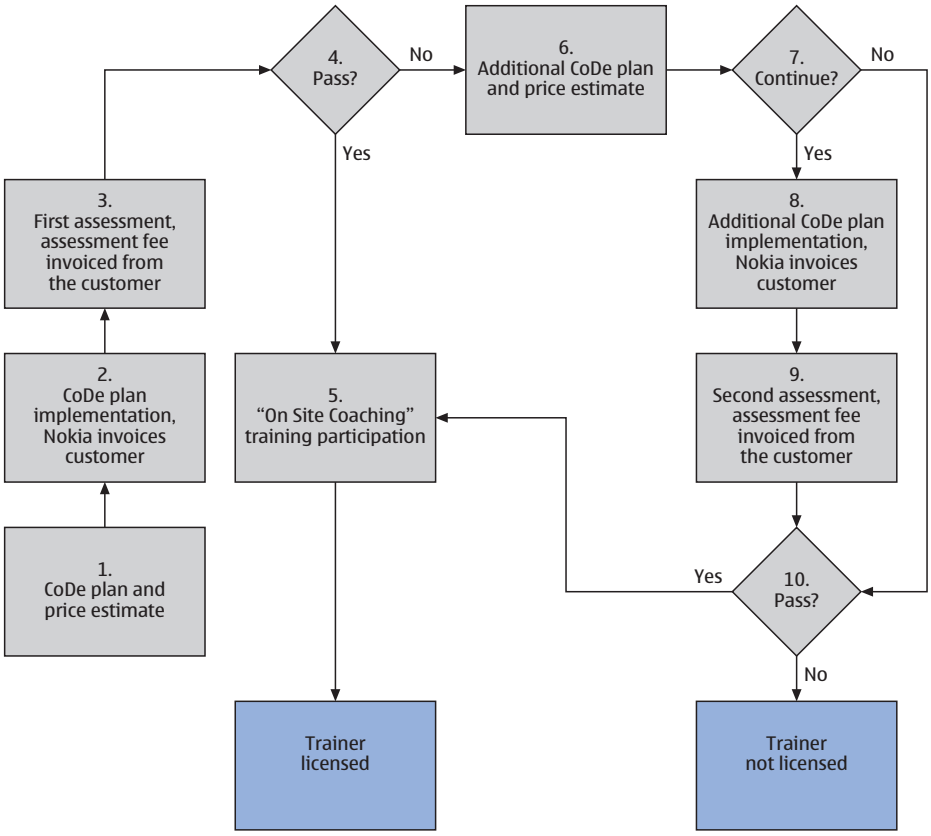
Nokia Trainer Licensing

Nokia provides five trainer licensing programs that allow customers to develop the capability to provide in-house training. These programs are designed to allow the fast and effective transfer of competence to customers who quickly need to ramp-up basic GSM networks with minimal features.

Depending on the skills of the individual, both technical and training, a competence development plan is developed, agreed and executed. The individual need to pass an assessment. If the assessment is successful, on-site coaching training will be provided and the individual will be licensed.

Should the assessment fail, an additional plan is made followed by training and a re-assessment.

Once the person is a licensed trainer, they will receive regular information relevant to providing the training.
NOTE: Unless otherwise agreed, Nokia does not license the company to sell training, nor does it supply training material (with direct updates) or support to the trainer.

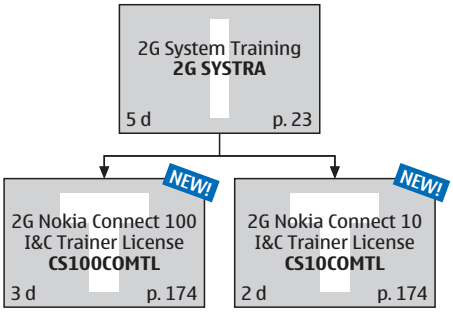


Trainer licensing process.

Can these programs be extended to other areas?
The success of trainer licensing programs is related to the complexity of the technology. Generally, the more complex the product, the more time and energy is needed to maintain both the technical competence and trainer capability. At the moment we don't provide standard programs beyond the connect family.

However, if you have special circumstances where you need to provide training in-house, we can discuss the possibilities, opportunities and risks of developing training capability in your organization. Please contact your training contact person for more information.

Nokia Connect BTS Trainer Licensing programs



2G Nokia Connect 100 I&C Trainer License NEW! CS100COMTL

Target group
Personnel who will conduct the Nokia ConnectSite 100 installation and commissioning training.

Description
Introduces the Nokia ConnectSite 100 Base Station, and its units, and teaches how to install and commission it.

Duration
3 days

Prerequisites
2G SYSTRA or equivalent

Training modules
- Nokia ConnectSite 100 BTS site solution overview
- Nokia ConnectSite 100 BTS product overview
- Nokia ConnectSite 100 BTS antenna system
- Nokia ConnectSite 100 BTS units description
- Nokia ConnectSite 100 BTS installation
- Nokia ConnectSite 100 BTS commissioning

Assessment
- Knowledge assessment
- Trainer evaluation

Validity and renewal
The license is valid for the current release. When training is made on a new release, the trainer's competence is re-evaluated.

Notes
Nokia Service Excellence training is included in the package.

2G Nokia Connect 10 I&C Trainer License NEW! CS10COMTL

Target group
Personnel who will conduct the Nokia ConnectSite 100 installation and commissioning training.

Description
Introduces the Nokia ConnectSite 10 Base Station, and its units, and teaches how to install and commission it.

Duration
2 days

Prerequisites
2G SYSTRA or equivalent

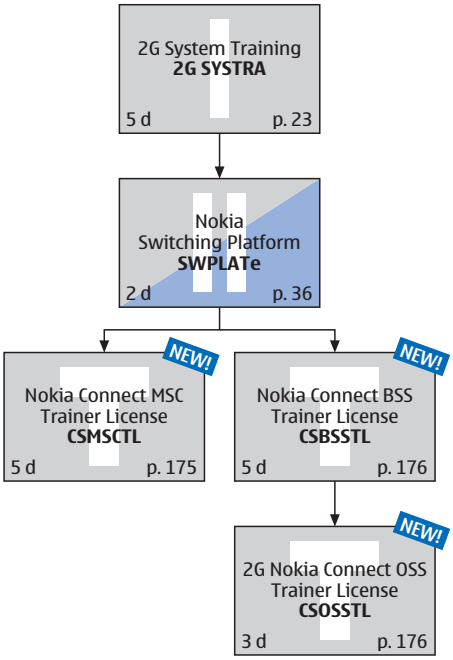
Training modules
- Nokia ConnectSite 10 site solution overview
- Nokia ConnectSite 10 BTS product overview
- ITN and PDH-SDH transmission unit overview
- Nokia ConnectSite 10 BTS installation
- Nokia ConnectSite 10 BTS commissioning
- Nokia ConnectSite 10 BTS maintenance

Assessment
- Knowledge assessment
- Trainer evaluation

Validity and renewal
The license is valid for the current release. When training is made on a new release, the trainer's competence is re-evaluated.

Notes
Nokia Service Excellence training is included in the package.

Nokia Connect network element Trainer Licensing programs



Nokia Connect MSC Trainer License

NEW!

CSMSCTL

Target group
Personnel who will conduct the Nokia Connect MSC operation and maintenance training.

Description
Introduces the Nokia Connect MSC switch, and its units and architecture including HLR and VLR, and teaches how to define the signaling, routing and charging operation.

Duration
5 days

Prerequisites
2G SYSTRA or equivalent and DX platform knowledge

Training modules
- Nokia Connect NSS architecture and functions
- Subscriber administration
- Cellular radio network administration
- Common channel signaling
- Routing administration
- Charging administration

Assessment
- Knowledge assessment
- Trainer evaluation

Validity and renewal
The license is valid for the current release. When training is made on a new release, the trainer's competence is re-evaluated.

Notes
Nokia Service Excellence training is included in the package.

Nokia Connect BSS Trainer License

NEW!

CSBSSTL

Target group
Personnel who will conduct the Nokia ConnectSite BSC essentials and integration training.

Description
Introduces the Nokia Connect BSC solution, including its architecture, radio network parameters and explains the A and Abis interface integration.

Duration
5 days

Prerequisites
2G SYSTRA or equivalent and DX platform knowledge

Training modules
- Nokia Connect BSS solution overview
- Nokia Connect BSC architecture and function
- TCSM2E basic operation
- TCSM2E configuration
- TCSM2E integration in the BSC
- Traffic channels
- A interface integration with MML
- Abis interface integration with MML
- Introduction to radio network administration
- Adjacent cell handling
- Radio network parameters
- RNW configuration management 2G – principles and concepts

Assessment
- Knowledge assessment
- Trainer evaluation

Validity and renewal
The license is valid for the current release. When training is made on a new release, the trainer's competence is re-evaluated.

Notes
Nokia Service Excellence training is included in the package.

2G Nokia Connect OSS Trainer License

NEW!

CSOSSTL

Target group
Personnel who will deliver the Nokia Connect OSS – use of OSS applications training course.

Description
Explains the functionality of the Nokia Connect OSS, the applications and how those applications are used to monitor, manage and configure the Nokia Connect GSM network.

Duration
3 days

Prerequisites
2G SYSTRA or equivalent, Nokia Connect NSS and BSS essentials

Training modules
- Introduction to Nokia NetAct
- Nokia NetAct basic architecture
- Using Nokia NetAct
- Nokia NetAct documentation
- Nokia NetAct Monitor: introduction concepts and data flow
- Nokia NetAct Monitor: use of fault management tools
- Alarm monitoring – process
- 2G RNW configuration tasks – method OSS – view management and software configuration management
- Performance management principles in network operation and control – process
- Administration of performance data – process
- Nokia NetAct – centralized administration of performance data
- Nokia NetAct Reporter functionality areas
- Using Nokia NetAct Reporter

Assessment
- Knowledge assessment
- Trainer evaluation

Validity and renewal
The license is valid for the current release. When training is made on a new release, the trainer's competence is re-evaluated.

Notes
Nokia Service Excellence training is included in the package.

On-the-job Training and Facilitated Learning Programs

On-the-job/facilitated training is a continuation or alternative to the learning process provided by classroom courses in Nokia Training Center. The training is always defined to meet your demands – to ensure a structured program where the trainer and your people work together on practical tasks, transferring knowledge and skills in a natural way.

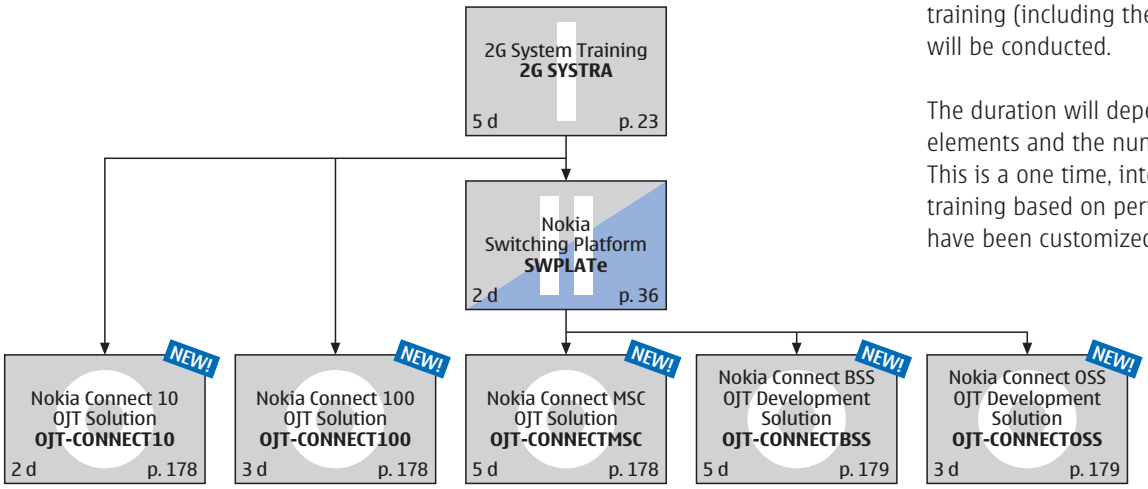
On-the-job training is structured around a set of tasks that should be completed as part of the program. In many cases, these are usually for certain specific target groups and are usually customized. We provide a standard delivery of the Nokia Connect solution through this method – however, because of the nature of on-the-job training being customized to suit the needs of the participants, it is best to define one according to the need, as opposed to having a standard set. Thus if you have a need for on-the-job training as part of your learning solution, then please contact us about our tailored solutions.

Nokia training is also introducing a new service for 2004, the Facilitated Learning Programs. These are 100% tailored to meet your needs. These are highly customized workshops, where we provide a fully dedicated Test Bed and our most competent trainers on specific topics, to go through an unstructured event of investigating, testing and examining certain topics. These could cover a wide range of topics including signaling cases, troubleshooting/recovery situations and features.

The on-the-job training service consists of the following features:

- On-the-job training is ideal to learn tasks needed for everyday operation and telecom implementation in the environment where the participants will be working regularly.
- In on-the-job training, a site or local test bed is used for executing the tasks. This provides an excellent opportunity for the subcontractor telecom implementation and care personnel to get to know their own area of the network with the guidance of a network specialist from Nokia.
- On-the-job training is given only for one or a maximum of three of your people at a time, providing the most efficient way of learning.
- It is always customized to the needs of the participants.

Nokia Connect GSM OJT solutions



To support the fast deployment of the Nokia Connect Solution, a team of on-site trainers (limited to a maximum of three) will visit your site, where all the necessary training (including theory and hands on) will be conducted.

The duration will depend on network elements and the number of participants. This is a one time, intensive on-site training based on performing tasks that have been customized for your needs.

Nokia Connect 10 OJT Solution

NEW!

OJT-CONNECT10

Target Group
Personnel who will install and commission the Nokia ConnectSite 100 BTS.

Description
Introduces the Nokia ConnectSite 10 Base Station, and teaches how to install and commission it.

Duration
2 days

Prerequisites
2G SYSTRA or equivalent

Environment
The trainer will be available for 8 hours / 5 participants.

OJT Tasks
- Nokia ConnectSite 10 Site Solution Overview
- Nokia ConnectSite 10 BTS Product Overview
- ITN and PDH-SDH Transmission Unit Overview
- Nokia ConnectSite 10 BTS Installation
- Nokia ConnectSite 10 BTS Commissioning
- Nokia ConnectSite 10 BTS Maintenance

Assessment
Skills Assessment

Nokia Connect 100 OJT Solution

NEW!

OJT-CONNECT100

Target Group
Personnel who will install and commission Nokia ConnectSite 100 BTS.

Description
Introduces the Nokia ConnectSite 100 Base Station, and teaches how to install and commission it.

Duration
3 days

Prerequisites
2G SYSTRA or equivalent

Environment
The trainer will be available for 8 hours / 5 participants.

OJT Tasks
- Nokia ConnectSite 100 BTS Site Solution Overview
- Nokia ConnectSite 100 BTS Product Overview
- Nokia ConnectSite 100 BTS Antenna System
- Nokia ConnectSite 100 BTS Units Description
- Nokia ConnectSite 100 BTS Installation
- Nokia ConnectSite 100 BTS commissioning

Assessment
Skills Assessment

Nokia Connect MSC OJT Solution

NEW!

OJT-CONNECTMSC

Target Group
Personnel who will operate and maintain the Nokia Connect MSC.

Description
Introduces the Nokia Connect MSC switch, and its units and architecture including HLR and VLR, and teaches how to define the signaling, routing and charging operation.

Duration
5 days

Prerequisites
2G SYSTRA or equivalent and DX platform knowledge

Environment
The trainer will be available for 8 hours / 5 participants.

OJT Tasks
- Nokia Connect NSS Architecture and Functions
- Subscriber Administration
- Cellular Radio Network Administration
- Common Channel Signaling
- Routing Administration
- Charging Administration

Assessment
Skills Assessment

Nokia Connect BSS OJT Development Solution

NEW!

OJT-CONNECTBSS

Target Group
Personnel who will need to operate and integrate Nokia ConnectSite BSC.

Description
Introduces the Nokia Connect BSC solution, including its architecture, radio network parameters and explains the A and Abis interface integration.

Duration
5 days

Prerequisites
2G SYSTRA or equivalent and DX platform knowledge

Environment
The trainer will be available for 8 hours / 5 participants.

OJT Tasks
- Nokia Connect BSS Solution Overview
- Nokia Connect BSC Architecture and Function
- TCSM2E Basic Operation
- TCSM2E Configuration
- TCSM2E Integration in the BSC
- Traffic Channels
- A Interface Integration with MML
- Abis Interface Integration with MML
- Introduction to Radio Network Administration
- Adjacent cell handling
- Radio Network parameters
- RNW configuration management 2G – principles and concepts

Assessment
Skills Assessment

Nokia Connect OSS OJT Development Solution

NEW!

OJT-CONNECTOSS

Target Group
Personnel who will deliver the Nokia Connect OSS – Use of OSS applications training course.

Description
Explains the functionality of the Nokia Connect OSS, the applications and how those applications are used to monitor manage and configure the Nokia Connect GSM network.

Duration
3 days

Prerequisites
2G SYSTRA or equivalent, Nokia Connect NSS and BSS essentials

Environment
The trainer will be available for 8 hours / 5 participants.

OJT Tasks
- Introduction to Nokia NetAct
- Nokia NetAct Basic Architecture
- Using Nokia NetAct
- Nokia NetAct Documentation
- Nokia NetAct Monitor: Introduction Concepts and Data Flow
- Nokia NetAct Monitor: Use of Fault Management tools
- Alarm Monitoring – process
- 2G RNW configuration tasks – method OSS – view management and software configuration management
- Performance Management Principles in Network Operation and Control (Process)
- Administration of Performance data – process
- Nokia NetAct – centralized administration of performance data
- Nokia NetAct Reporter Functionality areas
- Using Nokia NetAct Reporter

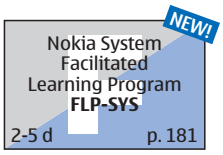
Assessment
Skills Assessment

Facilitated Learning Programs

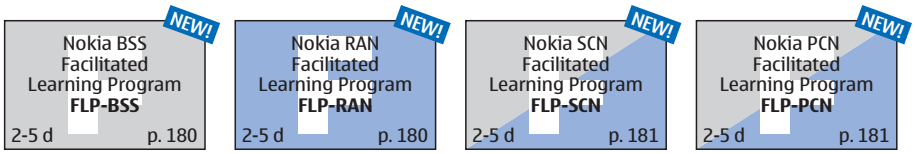
The three characteristics of a Facilitated Learning Programs are:

- The persons attending the program agree on the topics/scenarios/simulations that they require the instructor(s) to focus on.
- The instructor is there to provide a structured way to lead the program, using training methods to reflect on learning, answer questions and provide the facilities (Test Bed, tools, support material and room).
- The program objectives are loosely defined between the instructor and the participant as the program develops.

To help support the understanding of this new service, we provide five basic "frameworks"- one for each subsystem – and an additional one to look at end-to-end scenarios.



End-to-end



Subsystem

Nokia BSS Facilitated Learning Program NEW! FLP-BSS

F

Target Group
The most senior system specialist in the BSS, responsible for system verification, feature and functionality testing, troubleshooting and end-to-end functionality.

Prerequisites/Requirements
Dependent on learning programs topics – but must have proven knowledge of the Nokia BSS and practical experience of feature testing, signaling and troubleshooting. Ideally the person has over 4 years of experience and can learn in a practical manner.

Max Group Size
4

Duration
2–5 days

FLP Options
- BSS system verification
- Feature/functionality testing
- Signaling case studies (e.g. impact of features)
- Extreme recovery situations in the Nokia BSS
- Message analysis

Notes
Available in Q2/04.

Nokia RAN Facilitated Learning Program NEW! FLP-RAN

F

Target Group
The most senior system specialist in the RAN, responsible for system verification, feature and functionality testing, troubleshooting and end-to-end functionality.

Prerequisites/Requirements
Dependent on learning programs topics – but must have proven knowledge of the Nokia RAN and practical experience of feature testing, signaling and troubleshooting. Ideally the person has over 2 years of experience and can learn in a practical manner.

Max Group Size
4

Duration
2–5 days

FLP Options
- Feature/functionality testing
- Signaling case studies (e.g. impact of features)
- Extreme recovery situations in the Nokia RAN
- Message analysis

Notes
- Available in Q4/04.
- We provide workshops on Signaling, Troubleshooting Interworking 2G/3G, Handovers, System Verification and features – please refer to page 54.

Nokia SCN Facilitated Learning Program

NEW!

FLP-SCN

Target Group
The most senior system specialist in the NSS, responsible for system verification, feature and functionality testing, troubleshooting and end-to-end functionality.

Prerequisites/Requirements
Dependent on learning programs topics – but must have proven knowledge of the Nokia NSS and practical experience of feature testing, signaling and troubleshooting. Ideally the person has over 4 years of experience and can learn in a practical manner.

Max Group Size
4

Duration
2–5 days

FLP Options
- NSS system verification
- Feature/functionality testing
- Signaling case studies (e.g. impact of features)
- Message analysis
- Extended call control cases
- Extended routing cases

Notes
- Available in Q2/04.
- We provide workshops on Signaling, Troubleshooting Call Control, Routing, Charging and features – please refer to page 67.

Nokia PCN Facilitated Learning Program

NEW!

FLP-PCN

Target Group
The most senior system specialist in the PCN, responsible for system verification, feature and functionality testing, troubleshooting and end-to-end functionality.

Prerequisites/Requirements
Dependent on learning programs topics – but must have proven knowledge of the Nokia PCN and practical experience of feature testing, signaling and troubleshooting. Ideally the person has over 3 years of experience and can learn in a practical manner.

Max Group Size
4

Duration
2–5 days

FLP Options
- PCN system verification
- Feature/functionality testing
- Signaling case studies (e.g. impact of features)
- Extended QoS measurements and performance analysis

Notes
Available in Q3/04.

Nokia System Facilitated Learning Program

NEW!

FLP-SYS

Target Group
The most senior system specialist in the network subsystems, responsible for system verification, feature and functionality testing, troubleshooting and end-to-end functionality.

Prerequisites/Requirements
Dependent on learning programs topics – but must have proven knowledge of the Nokia solutions and practical experience of feature testing, signaling and troubleshooting. Ideally the person has over 3 years of experience in a specific technology area and learns in a practical manner.

Max Group Size
4

Duration
2–5 days

FLP Options
- End-to-end signaling
- End-to-end feature/functionality testing
- End-to-end troubleshooting
- End-to-end integration and verification

Notes
Available in Q3/04.

Nokia seminars

As the technology is continually developing, so does the need to ensure that your key people know what will happen tomorrow. When a solution or topic area is still very much in its early phase, we can't provide structured courses or workshops. Instead, we identify areas of potential interest to you and bring together the leading experts in Nokia (and sometimes outside) to a seminar environment. These people are the established leaders and experts in their field, and many have published papers or have unique competence and insight.

The seminar is by nature a theoretical learning environment and we try to arrange such events globally in comfortable settings. Where possible, we combine the events with practical elements – such as demonstrations or discussions.

We are always keen to hear of the subject areas of your interest. We have six seminars for 2004 and Nokia is continuing to add new events. For more information, please contact your Nokia training contact person.

Mobile Web Services and Standardisation Seminar

NEW!

SERSTANSEM

Description
Web services are getting popular in mobile world, new services take place and the development of standardisation efforts continue. This seminar introduces the standardization world and definition of web services by giving examples.

Topics
- Introduction – to give the participants a detailed understanding of mobile standardization world and mapping the key organization like OMA, Liberty, OASIS, WS-I, and JCP
- Web services evangelism – to introduce web services by clear definitions and inform participants about ongoing efforts in web services area
- Open Mobile Alliance (OMA) – the key organization for mobile service enablers. Detailed demonstrations by OMA are included
- Liberty Alliance – fewer clicks to access services

Recommended for
Technical personnel that need competence about web services, standardizations and mobile service enablers.

Duration
2–3 days

Dates and Venue
Please check NOLS or contact your Nokia training contact person.

Notes
Available in Q3/04.

Radio Network Planning and Optimization for UMTS Seminar

NEW! UMTSRNWOPSEM

Description
This seminar explains comprehensively how to dimension, plan and optimize UMTS (Universal Mobile Telecommunications System) networks.

The seminar examines current and future radio network management issues and their impact on network performance as well as the relevant capacity and coverage enhancement methods.

Topics
- Includes automation examples of radio resource management
- Focuses on UTRA FDD and introduces UTRA TDD, GPRS and EDGE and examines their interaction and synergy
- Provides an excellent source of information for those considering future cellular networks where Quality of Service (QoS) is of paramount importance
- Analyses the radio network planning challenges and opportunities for both greenfield and existing operators
- Includes an accompanying CD-ROM featuring a static radio network simulator implemented in MATLAB

Recommended for
Wireless operators, network and terminal manufacturers, frequency regulation bodies and everyone interested in radio network planning and optimization, especially RF network systems engineering professionals.

Duration
3–4 days

Dates and Venue
Please check NOLS or contact your Nokia training contact person.

Notes
The material used in this seminar is the Nokia authored and Wiley published "Radio Network Planning and Optimization for UMTS" book – more information available on page 15.

Successfully Implementing EDGE in Your Business Seminar

NEW! EDGEDEPLOYSEM

Description
This seminar presents the general EDGE technology and how Nokia implements the solution.

Topics

1) EDGE Technology Seminar
The goal of this seminar is to give the participants a detailed understanding of how the EDGE technology will enhance and improve the throughput for data services.
- Contents
- GPRS Refresh
- EDGE Basics
- Channel Coding
- RLC/MAC Protocol
- Link Adaptation

2) Nokia EDGE Solution presentation
The goal of the presentation is to give the participants a detailed understanding of Nokia EDGE solution from required equipment to EDGE terminals.
- Contents
- Nokia GSM/EDGE solution
- Measured EGPRS performance
- EGPRS dimensioning
- EDGE Market update

3) Nokia EDGE Solution Discussion Forum
The aim of this interactive part is to share experiences, ideas and ask questions about Nokia EDGE solution.

Recommended for
This event is targeted for anyone needing in-depth knowledge of the GPRS radio interface enhanced with EDGE.

Duration
2 days

Dates and Venue
Please check NOLS or contact your Nokia training contact person.

GSM, GPRS, EDGE and UMTS Performance Evolution Seminar

NEW!

AIRPERFSEM

Description
Operators will be implementing other performance solutions, such as adaptive multi-rate and dynamic channel allocation in the near future. This seminar is discussing the latest performance results.

Topics
- Explains the key parts of both ETSI GSM and 3GPP/GERAN standards
- Introduces 3GPP ALL IP architecture for future GSM (Global System for Mobile Communication)
- Examines the coverage and capacity of GSM/EDGE and AMR (Adaptive Multi Rate)
- Introduces a totally new approach for Radio Access Network automated optimization
- Discusses positioning of GERAN and UTRAN (UMTS Terrestrial Radio Access Network)
- Highlights 3GPP Release 4 and Release 5 architecture and also illustrates ideas for future All IP architectures

Recommended for
This seminar is targeted everyone interested in GSM, GPRS and EDGE performance, especially RF network systems engineering professionals.

Duration
3–4 days

Dates and Venue
Please check NOLS or contact your Nokia training contact person.

Notes
- Available in Q3/04.
- The material used in this seminar is the Nokia authored and Wiley published "GSM, GPRS and EDGE Performance: Evolution Towards 3G/UMTS", more information available on page 15.

Multi-antenna Transceiver Techniques for 3G and Beyond Seminar

NEW!

ANTMULSEM

Description
Multi-antenna techniques are widely considered to be the most promising avenue for significantly increasing the bandwidth efficiency of wireless data transmission systems. In so-called MIMO (multiple input multiple output) systems, multiple antennas are deployed both at the transmitter and the receiver.
In particular, the seminar covers linear processing transmit diversity methods with and without side information at the transmitter (feedback), including the current transmit diversity concepts in the WCDMA standards, as well as promising MIMO concepts, crucial for future high data rate systems.

Topics
- Provides a concise and up-to-date description of perhaps the most active area of research in wireless communications
- Unique in presenting recent developments in both WCDMA and MIMO
- MIMO and MISO techniques are explained in a common setting
- Special emphasis is placed on combining theoretical understanding with engineering applicability

Recommended for
Research engineers in academia and industry, and development engineers in 3G system design as well as research students.

Duration
2–3 days

Dates and Venue
Please check NOLS or contact your Nokia training contact person.

Notes
- Available in Q3/04.
- The material used in this seminar is based upon the book of the same name, page 15.

Understanding Nokia RAN Performance Indicators Seminar

NEW!

RANPERSEM

Description
As 3G networks start to become operational then understanding what are the key indicators in the RAN, and what affects their results becomes more important. The aim of this seminar is to discuss what is behind the key indicators.

Topics
- Performance data collection in the RAN and what influences the triggering of counters
- Counters used in the key performance indicators and how they are interpreted

Recommended for
Technical personnel that need competence about RAN performance data.

Duration
2–3 days

Dates and Venue
Please check NOLS or contact your Nokia training contact person.

Notes
Available in Q4/04.

2004 events and new services in development

Nokia training is always looking at ways to improve and develop new services for you. As the current operating conditions have made traditional competence development solutions expensive and with the increasing complexity of networks, we believe there is a greater pressure to focus on a holistic approach to learning and to develop learning communities for experts that extend beyond a single organization.

We are always keen to explore the potential of new services and a peek into the future is provided here. If you have any suggestions on how we could improve or would like to be involved in the development process then please pass your comments to your local Nokia training contact person.

Solutions to develop new people quickly in-house

The following are some of our further plans to implement e-training services:

Newcomers' e-communities

Who does not know the inhibitions of newcomers returning from their first practice courses, and having to apply their learning outcomes in a live network? Our communities will help to overcome this: Learners and trainer follow-up the practical implementation of learning outcomes by means of online communication.

Customer-specific learning portal

Learning does not end when the classroom door closes. The learning process continues with self-study, practice experience, communication among colleagues. This part of the learning process is typically very individual, and thus strongly dependent on self-motivation and organizational circumstances. Our learning portal will help to institutionalize life-long learning. Personnel may exchange their own 'learning nuggets', chat and fora allow discussion of actual topics, and our experienced trainers will facilitate and contribute to the learning experience – confidentiality granted! Naturally, the learning portal will be especially beneficial for our large and/or multi-national customers.

Practical self-study opportunities

Although the classroom environment gives the opportunity to learn how to perform a task, unfortunately there is usually little time to practice. Therefore, before you are expected to work on a live network, we can provide a self-study environment where you can practice what you have learnt in a safe and secure Test Bed environment.

M-learning – access to the learning community

As the mobile phone has become an integral part of our lives and we see improvements in screen size, usability and speed, new opportunities for self-development start to open up. For example, being able to access small information sessions whilst traveling to work or waiting at the airport or the ability to access question and answer or reference material whilst working in the field. Even small and simple improvements in learning can be influenced, such as receiving the latest news by SMS. In 2004, we will be looking at the possibilities and how you can use them.

Nokia joint academic programs

The academic programs service is designed to link Nokia Customer and Partner Training's advanced courses to academic programs of selected respectable education institutes. The main idea is to incorporate our advanced courses into the offered course list of selected university's Masters' programs. A Masters' program accreditation is a certain amount of credit point qualification, depending on the choice of the student. The trainees registered with "Nokia academic programs" would receive credit points for registered Masters' programs after they attend a Nokia advanced course and pass the post-assessment test of the course. This way the trainees can link our courses to their career. We plan to offer this starting in the second half of 2004.

Developing the holistic model

The holistic approach breaks learning into more manageable chunks – where the more formal training programs act like "scaffolds" and the cognitive knowledge is achieved through the retrieval of specific information. Although knowledge management principles are established, implementation into an organization takes place through gradual evolution. In Nokia we are following the philosophy that all our training content can be broken down into the smallest module and delivered in alternative ways.

Nokia expert forums

Our environment is continually changing. Having many years of experience in mobile network solutions does not end the need of experts to develop their competence. Highly competent experts are the driving forces for effectiveness and very important to the reliability and cost-effectiveness of operations for any technical organization.

We are now working on a concept to make sure that experts in our customers' organisation will have special handling for their competence development needs. Using all possible learning channels, we will keep the key experts in our customers' organization at the highest level of competence for their area. Exclusive workshops, seminars and other learning methods will be arranged for experts to deepen their expertise further and we will also help the experts to develop coaching skills to optimize their impact in the organization.

Practical training arrangements

Global expertise combined with local resources

Nokia provides competence development solutions through a global network of Training Centers. Training is held in modern classrooms that are fully equipped to offer high-quality instruction and practical hands-on exercises.

The training equipment covers the entire Nokia product range, from individual terminals to complete networks. Training can also be arranged in the customer premises as long as appropriate equipment is available.

By combining local expertise with global Nokia resources, our local Training Centers are committed to meeting your competence development needs. In addition, we also work with relevant third parties such as Hewlett-Packard and Oracle to offer a complete training solution in a single package.

Help with practical arrangements and registration

Nokia has dedicated personnel to handle your needs and requests from the moment you order the service. Travel information will be provided, as well as help with practical arrangements, and special requests are always taken into account. If you need help with travel arrangements, please contact your local Nokia representative.

To schedule a Nokia Training Center program or register for a specific course, please contact your local Nokia representative who will assist you with your request. Many of our programs are extremely popular, so we advise you to make your reservation well in advance. To ensure that you have a place, plan to register at least 30 days before the start of the course.

Cancellation policy

If you cannot participate in a course you are already registered for, please inform us as soon as possible. If a course seat is cancelled within the contractual days prior to its start, a full training fee will be charged.

Nokia reserves the right to cancel an Open Course if the minimum number of participants is not registered. A written announcement of the cancellation will be sent to you at least 21 days before the course begins. Nokia will make every effort to place you in another course at your convenience.

Nokia Training Centers

Nokia Training Centers – to provide local competence development services

Along with its solutions for competence development, Nokia Customer Training offers a comprehensive range of support services to help network providers differentiate in their business environment. This support covers the entire process of planning, building and deploying a network. From site assessment and network planning to rollout services and operations support, our complete portfolio covers everything needed to get networks up and running. Once the network is deployed, Nokia Customer Training offers advanced care services and management solutions to keep it operating.

Nokia Training Centers are located throughout the world. For more information on how to get to your Training Center, please visit NOLS (www.online.nokia.com – Training, Info Point).

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