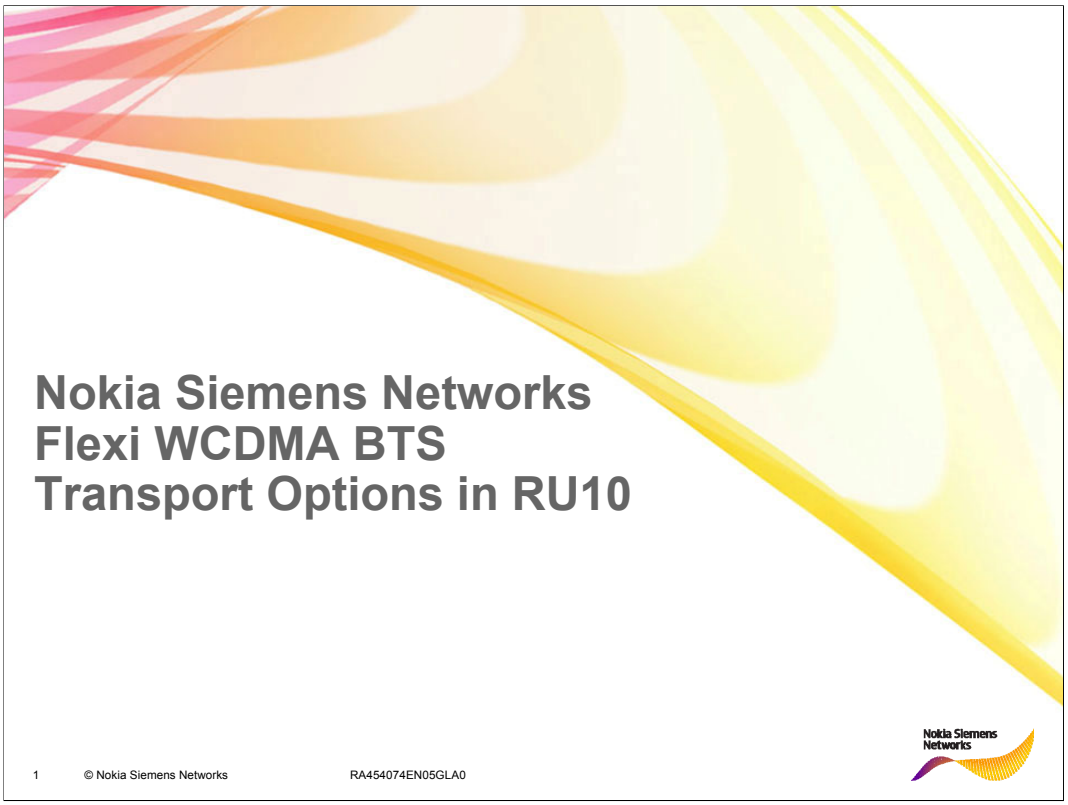
Nokia Siemens Networks
Flexi WCDMA BTS
Transport Options in RU10
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Flexi WCDMA BTS Transport

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Document change history

Date	Version	Name	Change comment

Flexi WCDMA BTS Transport Options in RU10

At the end of this Learning Element the participant will be able to:

- State the Flexi WCDMA BTS transport options available
- State the Flexi WCDMA BTS Synchronization options
- Explain Timing over Packet for Flexi WCDMA BTS

Transport Options

ATM:
C-plane, U-plane and OAM via ATM/E1 or ATM/STM-1

RAS05.1

Hybrid backhaul:

- C-plane, Rel 99, OAM via ATM/E1 or ATM/STM-1
- U-plane HSPA via ATM/Eth with PWE

Ethernet backhaul:

C-plane, U-plane OAM via ATM/Eth with PWE

RAS06

Dual Iub:

- C-plane, OAM and Rel 99 via ATM/nE1 or ATM/STM-1
- U-plane HSPA via IP/Eth

Native Iub/IP/Eth:

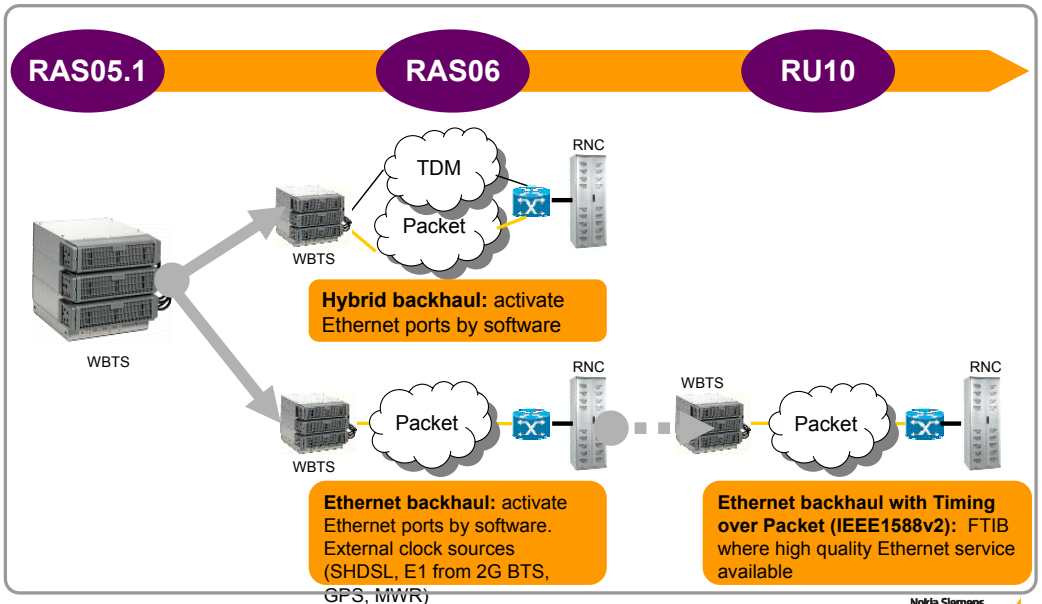
C-plane, U-plane and OAM via Ip/Eth with or without ToP

RU10

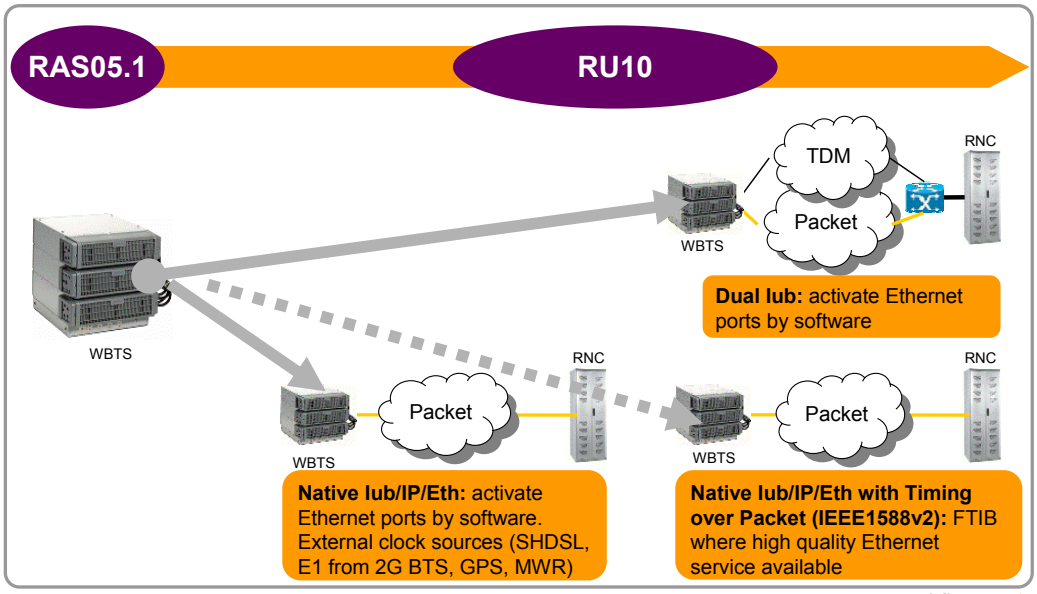
PWE – Pseudo Wire Emulation

ToP – Timing over Packet

Flexi WCDMA BTS evolution 1(2):
ATM over Ethernet (FTIA, FTJA, FTIB)



Flexi WCDMA BTS evolution 2(2):
Native Iub/IP & Dual Iub (FTIA, FTJA, FTIB)



Hybrid Backhaul with Pseudo Wires

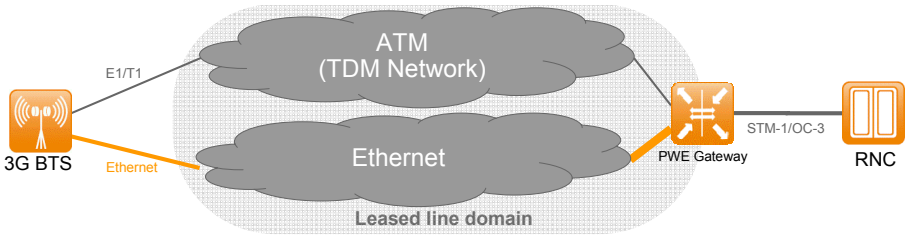
End-to-End solution for decoupling cost from capacity
Enabling cost-efficient backhaul of HSDPA peak rates

Solution consists of

- UltraSite and Flexi BTS using Ethernet interfaces with ATM over Ethernet feature
- Transport gateway at RNC for providing connectivity to TDM and packet network
- Feature Traffic Separation or Path Selection

Operator benefits

- HSDPA offload to cost-efficient Ethernet backhaul, e.g. ADSL2+, via Pseudo wire technology
- Number of E1 leased line can be reduced up to one, used for real-time traffic, signalling and synchronization.
- Protects previous ATM investments



Packet Backhaul with Pseudo Wires

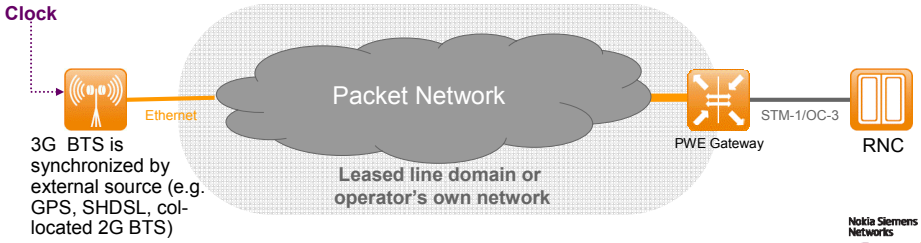
Enables convergence to one single transport network
Obsoletes ATM/TDM network for BTS Backhaul

Solution consists of

- For UltraSite and Flexi BTS using Ethernet interfaces with ATM over Ethernet feature
- Transport gateway at RNC for providing connectivity to TDM and packet network

Operator benefits

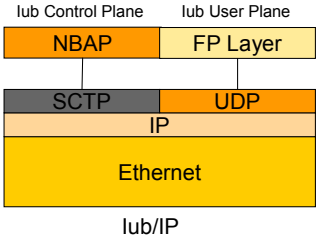
- Complete cell site traffic is transported over high-quality Ethernet services (e.g. "Metro Ethernet")
- Usage of ATM pseudo wires allows to benefit from high ATM efficiency and QoS features

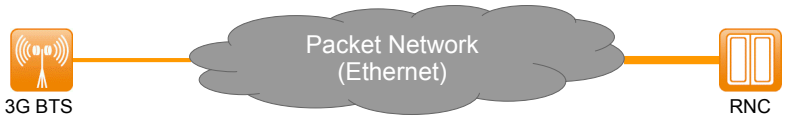


IP based Iub for Flexi WCDMA BTS

OPEX/CAPEX reduction by using cost efficient packet transport with 3GPP compliant IP/Ethernet Iub stack

- Flexi WCDMA BTS, Ultrasite WCDMA BTS and RNC support 3GPP Rel-5/Rel- 6 compliant Iub/IP protocol stack via integrated Ethernet interfaces
- Based on IPv4
- Reduced planning and configuration effort due to complete absence of ATM layer
- Reduced maintenance costs, e.g. BTS rehosting is basically just a change of an IP address
- Priority marking on IP (ToS/DSCP) and Ethernet (VLAN priority bits) layer





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Dual Iub for Flexi WCDMA BTS

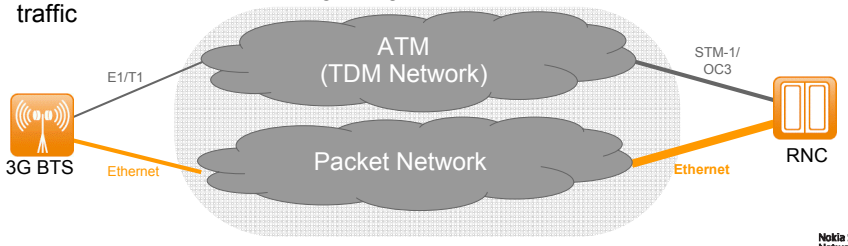
Allowing data traffic offload using Ethernet interfaces at RNC and Flexi BTSs

Dual Iub allows

- offloading data traffic to alternative Ethernet path using 3GPP Rel-5/Rel-6 compliant Iub/IP protocol stack
- any Ethernet physical layer (e.g. DSL, ng-SDH, adaptive modulation microwave..) may be used
- ATM/TDM for delay critical R'99 voice and data traffic as well as signaling traffic

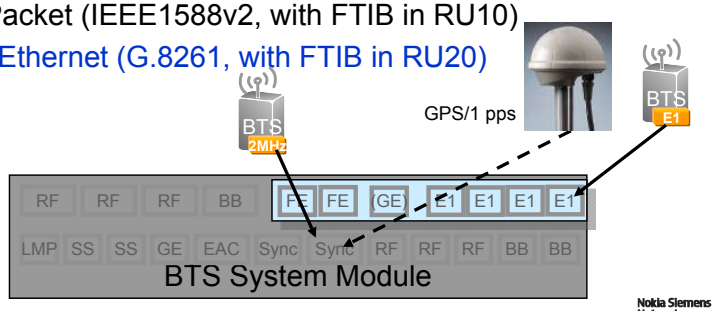
Operator benefits

- significant cost savings in backhaul, like with solution *Hybrid Backhaul with Pseudo Wires*
- no external pseudo wire gateway required at RNC site
- higher peak rates possible as with n*E1s



Synchronization Options

- From GPS
  - Using Synchronization Input at FlexiBTS System Module
- From PDH interface
  - Using FlexiTransport sub-module for E1/T1/JT1
- From 2.048 MHz signal
  - Using Synchronization Input at FlexiBTS System Module
- From Ethernet interface
  - Timing-over-Packet (IEEE1588v2, with FTIB in RU10)
  - Synchronous Ethernet (G.8261, with FTIB in RU20)



Timing over Packet

Taking full advantages of packet transport for BTS backhaul

- Synchronization information, needed for running air interface with required frequency accuracy, can be provided to BTSs over high quality packet network (e.g. Metro Ethernet)
- Allows to keep costs low by obsolescing use of GPS or Hybrid Backhaul (simultaneous usage of TDM and packet backhaul) for synchronization

Solution includes:

- Timing over Packet (ToP) Master Clock at RNC sending synchronization information to BTSs. RNC site node can be used to connect ToP Master
- FTIB in Flexi BTS (ToP Slave) for recovering clock signal from Timing over Packet data