ERICSSON

Prepare the Network for NCM Service

Operating Instructions

1/1543-CNA 403 3666 Uen B

Contents

1 Prepare the Network for Network Connectivity Manager (NCM) Service Overview

NCM enables the management of an Ethernet network with a single network view. NCM enhances operations with streamlined packet service provisioning.

Tasks such as planning the network, installing, configuring Network Elements and creating groups of connectivity resources occur before an operator can activate a service.

Network planning is not performed by NCM but is mentioned here to indicate that these activities have taken place before and during the activities performed by NCM.

The sections that follow describe the tasks required for setting up and managing the network.

2 Prerequisites for NCM Service Provisioning

The network administrator is the responsible for planning and setting up the network.

The network operator is the responsible for creating and configuring services in the network.

The following list provides an overview of activities required to setup and provision a network:

— The Network Element are created and synchronized in ENM. For more information, see ENM Operators Guide in CPI, Reference [1].

— Links are automatically discovered by ENM.

— Management of Network Element resources.

— Node discovery of services.

Note: Links involving Router 6000 Network Elements are not supported.

3 Component Domains

NCM uses Components Domains (CDs) to create logical groups of connectivity resources between connected NEs of the same technology type that share the same protocol instance.

A connectivity resource is a switching fabric within an NE. The switching fabric is used to connect traffic between ports. Ports that share a switching fabric can connect traffic between those ports. A port can be associated with only one switching fabric. However, an NE can contain several switching fabrics, in which case traffic is not connectable between all the ports; for example, an NE can support both a point-to-point switching fabric and a bridging fabric, and traffic cannot be connected between a port in one switching fabric and a port in the other.

CDs serve as routing management building blocks, define boundaries, and help identify inter-domain connections within your network topology, assisting in partitioning the network for routing purposes. Ethernet services can then be configured and routed over multiple CDs, traversing links and NEs of different technology types and protocols.

Table 1 Component Domain Types

CD Type	How to populate the CD	Additional Information
Point to Point	On install, NEs with point-to-point connectivity are automatically included in a default Point-to-Point CD. Create additional Point-to-Point CDs and populate them by moving NEs from the default domain.	From a point-to-point component domain, you can browse to associated NEs, Links, Ports, and Connectivity.
Bridged STP	Create a STP CD to contain NEs running a Spanning Tree Protocol (STP). The boundary of the spanning tree region is determined by the inability of the port to pass Bridge Protocol Data Units (BDPUs).	From a Bridged STP CD, you can browse to associated NEs, Spanning Trees, Spanning Tree Bridges, Links, and Ports.

CD Type	How to populate the CD	Additional Information
	Populate a bridged STP CD by seeding it with a single NE participating by the ability of the port to pass Bridge Protocol Data Units (BPDUs). The remaining participating NEs are discovered and automatically added to the CD.	
Bridged Tree	Create this Bridged Tree (BT) CD for NEs participating in bridges with loop-avoidance disabled. Populate a BT CD by seeding it with a single NE participating in a tree bridge. It is the operator's responsibility to ensure that no physical loop exists within the tree bridge network.	From a BT CD, you can browse to associated NEs, Links, Ports, Connectivity, and Bridged Tree Topology.
Bridged ERP	Create an ERP CD to contain NEs participating in an Ethernet ring and that are configured to use Ethernet Ring Protection (ERP) protocol. Populate a bridged ERP CD by seeding it with a single NE participating in the ring. The remaining NEs are discovered and automatically added by following the links around the ring.	From a Bridged ERP CD, you can browse to associated NEs, Links, Ports, Connectivity, ERP Bridges, and ERP State.

3.1 Access the Component Domains View

> The Component Domains View lists existing domains and provides additional data such as CD type, creation and modification dates, and NE membership information.

The Domain Membership Count value is the number of connectivity resources in a CD. A connectivity resource represents the components and the functionality of a bridge within an NE in the NCM client.

To access to the CD view perform the steps as follows:

1. Launch NCM
2. Select a CD, then right-click to launch actions or browse to associated network resources.
3. Select **Resources** and click **Component Domains**.
4. Search for CDs. Filter the table by the search criteria in the **Filter** field group.

Table 2 Actions on the Component Domain Query View

Action	Description
View details	Displays information about the selected CD.
Modify	Allows you to modify the name of a selected CD.
Populate	Allows you to populate a selected CD with NEs.
Remove	Deletes the CD. A confirmation window appears.
Clear	Clears the NE information and data from the selected CD. A confirmation window appears.
Browse	Allows access to CD type resources and services associated with this CD. See

The actions that can be performed on the Component Domain.

3.2 Add Component Domains

To add a CD perform the following steps:

Steps

1. Launch NCM
2. Click **Add** from the Component Domain view
3. Enter a **Name**
4. Select the **Type** of CD you want to create
5. Enter customer notes (Optional)
6. Click **OK**

Results

The new CD appears in the list with a domain membership count of zero.

3.3 Populate a New Component Domain

> A CD is populated with a connectivity resource compatible with the CD type from each NE linked to the seed.

You populate a CD with NEs running a matching protocol. For example, you can only populate an STP CD with connectivity resources from NEs running spanning tree protocol. If the selected NE does not have a connectivity resource compatible with the CD, an error appears.

When you add the first NE to a CD, you seed the CD with a connectivity resource in the NE that is compatible with the CD type, except for point-to-point CDs. In all of the CD types that are populated by seeding, links are examined and any linked NE with a compatible connectivity resource is automatically included in the same CD. This allows you to quickly populate a CD.

A connectivity resource can only be used in one CD.

Unlike other CDs populated from a single seed, after all the linked NEs are identified you can reduce the number of NEs in a BT CD by excluding branches of the bridged tree before the CD is created in the NCM database. You can create additional BT CDs and populate them with the excluded branches later. This allows you to create several smaller BT CDs, rather than being restricted to one large BT CD.

Point-to-point CDs are populated by selecting NEs and moving them into the CD.

To populate a CD perform the following steps:

Steps

1. Starting from either the Network Element or Component Domain view:

    a. Navigate to Resources > Network Elements to open the NE list, then right-click an NE from the list view and choose Add to Component Domain.

    b. Navigate to Resources > Component Domains to open the Component Domain list then right-click the newly added CD and click Populate.

    The Populate Component Domain wizard opens.

2. If you started by selecting:

    a. The NE from the Network Elements list, select the newly added CD fromName drop-down list and click Next.

    b. The newly added CD from the Component Domain list, click Next.

    The NE Query panel appears.

3. If you are populating a point-to-point CD, and started from either the Network Elements or Components Domain list, you must select each NE in the CD. Build a query to find NEs to add to the CD. Filter by criteria such as NE name, type, and state. Restrict the search further by selecting the associated Element Manager and subnetwork. When your query is complete, click Apply. Query results are displayed. Select all the NEs to add into the CD, click Nex, then Finish to confirm your selection of NEs

4. If you are populating an STP CD, and started from:

    a. The Network Elements list, and the NE you selected contains a compatible seed, click Next, then Finish to confirm your selection.

    b. The Component Domain list, build a query to find the NE that contains the seed to use. Filter by criteria such as NE name, type, and state. Restrict the search further by selecting the associated subnetwork. When your query is complete, click Apply. Query results are displayed. Select the NE to use as the seed for the CD, click Next, then Finish to confirm your selection of the NE containing the seed connectivity resource.

5. If you are populating an ERP CD, NCM populates all the connected ERP Ring to one ERP CD by default. NCM also supports Multiple ERP Support functionality, the operator can choose which ERP CD (identified by ERP Ring ID) that the ERP Ring wants to populate to. The same one ERP Ring can populate to both ERP CD with Multiple ERP Support and without Multiple ERP Support. And the E-Line/E-LAN service can also be created with or without Multiple ERP Support. There is no impact to the existing services. :

a. To populate an ERP CD, and start from the Network Elements list, and the NE you selected contains a compatible seed,choose **Add to Component Domain**, select the ERP CD. Click **Next**.

b. To populate an ERP CD, and start from the Component Domain list, build a query to find the NE that contains the seed to use. Filter by criteria such as NE name, type, and state. Restrict the search further by selecting the associated Element Manager and subnetwork. When your query is complete, click **Apply**. Query results are displayed. Select the NE to use as the seed for the CD, click **Next**.

In the Review Component Domain step you can view the list of all the potential ERP bridge members, and:

a. Choose to populate the ERP ring to a ERP CD with Multiple ERP Support by selecting Multiple ERP SUpport check-box and specifying the ERP Bridge Ring ID.:

b. Choose to populate all the connected ERP ring to one ERP CD by unchecking **Multiple ERP Support** check-box. It is the default option.

Note: NCM assigns a default Ring ID 0 on each NE which has been configured ERP bridge. By default, NCM populates all the connected ERP Ring to one ERP CD and correlates them to the default Ring ID 0. The 0 Ring ID is visible through Browse To functionality in NCM GUI.

If operator enables Multiple ERP on ERP CD then the ERP CD is populated with selected ERP Ring ID value.

c. Click **Finish** to confirm your selection.

6. If you are populating a Bridged Tree CD, and started from:

a. The Network Elements list, and the NE you selected contains a compatible seed, click **Next**.

b. The Component Domain list, build a query to find the NE that contains the seed to use. Filter by criteria such as NE name, type, and state. Restrict the search further by selecting the associated subnetwork. When your query is complete, click Apply. Query results are displayed. Select the NE to use as the seed for the CD, click Next.

In the Review Component Domain step you can view the list of all the NEs with compatible connectivity resources linked to the seed and optionally specify NEs to exclude from the CD before it is saved.

In the top list, all the bridges for the NE containing the seed are listed (most NEs support only one bridge).

a. Select the bridge to use (even if only one is listed), and click Find.The Potential Members list is populated with all the NEs linked to the selected seed that contain a compatible connectivity resource

b. Optionally, move one or more NE from the Potential Members list to the Excluded Members list to exclude that NE's connectivity resource and all of its child connectivity resources (if there are any) from this CD:

   i. Select an NE in the Potential Members list. Do not select the NEcontaining the seed; if you do, an error message appears.

   ii. Click Add to Selection to move it to the Excluded Members list. Only the selected NE is moved to the list. The identification of any child connectivity resources does not occur until the CD is populated and saved.

c. Click **Next**, then **Finish** to confirm your final selection.

7. The Populate Component Domain wizard closes and a status message informs you that the CD has been populated.

3.4 Modify the Component Domains

When the physical topology of your managed network changes you must change the logical representation in NCM in any CD that is affected.

For example, if an NE is decommissioned or reconfigured to support a different technology, the service endpoints for any services terminating on that NE must be migrated to another NE and the NE must be removed from the CD with which it is associated.

If an NE is reconfigured to support a different technology, it must be moved to a compatible CD that contains the resources to which it is connected.

If an NE is added to the network, it must be installed in NCM and added to a compatible CD that contains the resources to which it is connected.

If you are expanding your network, the NE must already be connected in the physical network and installed in NCM before you can add the NE to a CD or create service endpoints on the NE.

If you are migrating service endpoints, or decommissioning or reconfiguring NEs, make the changes to services and CDs before the physical changes are implemented in the network.

3.4.1 Add a Network Element to a Component Domains

You can expand an ERP, an STP and BT CDs by replacing the link between two adjacent NEs in the CD with two links, one from each NE to the new NE, which inserts an NE between the two NEs already in the CD. You can also expand a BT CD by adding a link from an existing NE in the CD to a new NE, which appends the new NE (and any other NEs with an available compatible connectivity

resource physically linked to that NE) to a branch of the BT CD. There must be a connectivity resource compatible with the CD available in new NE.

If you are adding a new NE to your physical network, it must already be connected in the physical network and installed in NCM before you can add the links in NCM. If you are reconfiguring or relocating an existing NE in your physical network, it must be synchronized before you can add the links in NCM.

Before you can expand an ERP, an STP, or BT CD by replacing an existing link with new links to insert connections to a new NE, you must detach all the services that use the existing link before you add the new links.

Steps

1. To add an NE that is not in a CD and is configured with:

   — An STP connectivity resource to an STP CD, add a link between a PnP port on each NE. When a link is added between nodes in two STP CDs, the smaller STP CD is folded into the larger one, with the assumption that STP extends to the other CD.

   — An ERP connectivity resource to an ERP CD, insert a new NE between two NEs already in the ERP CD. New NEs can only be inserted between two NEs already in the ERP CD. To enlarge the ring, disconnect the link between the two NEs in the ERP CD, then add two links to PnP ports on the new NE, one from each NE in the ERP CD.

   — A Bridged Tree connectivity resource to a BT CD, add a link between a PnP port on each NE. A link can be added to any NE in the BT CD. When the NE added to the BT CD is the head of a branch of bridged NEs that also are not in any BT CD, those NEs are also added into the CD.

   The connectivity resource on the new link is examined to ensure compatibility and that it is not associated with any other CD before the link is added. Any NEs linked to the new NE with compatible connectivity resources that are not associated with another CD are also added to the CD.

2. If you inserted an NE between the two NEs already in the CD:

   a. Open each service that you detached and click Attach Route to attach the service. The service is automatically rerouted and reactivated.

   b. Open each service that you unrouted and click Route. The service returns to the Routed state.

3.4.2 Prepare to Remove a Network Element from a Component Domain

Before you can remove an NE from a CD, or expand an ERP, an STP or BT CD by replacing an existing link with new links, you must detach or unroute all the services that use the NE you want to remove or the link you want to replace.

Steps

1. Identify all the services that use the NE or link:

    a. In the navigation bar, click Resources > Network Elements to open the NE list or Resources > Links to open the links list.

    b. Right-click the NE or link and select:

    — Browse... > E-LANs and record the E-LAN services.

    — Browse... > E-Lines and record the E-Line services.

    You need to keep these listings of affected services to so you can detach or unroute the services before modifying the CD and attach the services after modifying the CD.

2. In the navigation bar, click Services and for each service identified in Step 1

    a. Determine if it has a service endpoint on that NE. Either remove the endpoint if it is no longer needed, or migrate the service endpoint to another NE if the service is to be preserved.

    b. For services in either Active, Partially Active, or Degraded state:

    i. Select the service from the Services list and right-click View Edit to open the Service Design view.

    ii. Click Detach Route.

    c. For services in a Routed state:

    i. Select the service from the Services list and right-click View Edit to open the Service Design view.

    ii. Click Unroute.

    Services must be detached one at a time. Detaching services does not affect the actual services in the physical network; it only means that the services are not being monitored while you modify the CD.

3.4.3 Remove a Network Element from a Component Domain

An NE removed from a CD is no longer associated with any CD. The NE can then be reassigned to another compatible CD or used to seed another CD of the same type, or it can reconfigured, or removed from the network.

Before you can remove an NE from a CD you must detach all the services that use the NE.

Steps

1. To remove an NE from:
   - An STP CD, remove the links on both sides of an NE. If this severs the topology, the group with the most NEs remains in the CD and the other NEs are removed from the CD.
   - An ERP CD, remove the links on both sides of an NE (or linked sequence of NEs) to remove the NE (or NEs) from the ERP CD.
   - A BT CD, remove the link between two NEs. All the NEs no longer connected to the root NE are removed from the CD.
2. Open each service that you detached from the NE and click **Attach Route** to attach the service.

3.5 Clear and Remove a Component Domain

Before you can completely remove a CD, you must detach all the services that use that CD. Then select the CD from the component query view. Use the clear command to delete all the connectivity resources from the domain. Use the remove command to delete the empty CD.

3.6 View the Topology of a Bridged STP Component Domain

The STP Topology view in NCM displays the static configuration of the bridged spanning tree and the constituent links between the connectivity resources in the NEs (both managed and unmanaged) in the STP CD, and the operational status of those links.

When you open the Spanning Tree Topology you must wait for the spanning tree to converge before the topology is displayed.

- When more than one instance of a spanning tree appears in the Spanning Trees list, which indicates a Multi-Spanning Tree Instance (MSTI), you can select only one at a time to display in the Spanning Tree Topology view.
- The Spanning Tree Topology view does not appear if an NE in the STP CD cannot be reached because of a communications failure.
- If the STP functionality is disabled on an NE that appears in the Spanning Tree Topology view, that NE is not displayed after the view is refreshed.
- The Spanning Tree Topology view does not show the shelf, slot, or port information, or may display -1 , if a STP neighbor NE is not managed by NCM.
- An error message is displayed when there are multiple CST roots.

— The STP port states are reported when the Spanning Tree Topology is opened but are not updated in real-time.

— No alarms or traps are displayed for a Spanning Tree Topology view.

To refresh the Spanning Tree Topology view to reflect changes since the view was opened, you must close and reopen the view. Each time you open the view there is a delay before the topology view appears while NCM communicates with the parent NEs to retrieve the topology information.

To view a Spanning Tree Topology:

Steps

1. Navigate to a Spanning Trees list:
   — From the navigation bar:
      a. Select Resources > Component Domains
      b. Right-click an STP CD in the Component Domains list.
      c. Select Browse... > Spanning Tree Bridges.
   — Alternatively, Browse... Spanning Tree Bridges from:
      — E-Lines list
      — E-LANs list
      — NE list
      — Component Domain List
      — Connectivity list
      — Link list
      — Spanning Tree Bridge Ports list

      The Spanning Tree Bridges list contains one or more Spanning Tree instances.
2. Right-click the Spanning Tree for which you want to see the topology, then Browse... > Spanning Tree Topology:
3. Click:
   — An NE to open the details pop-up dialog, which shows information about the NE and its role in the STP CD. In the pop-up dialog, click the Bridge Details link to view more information on the spanning tree bridge on the NE and the Port Details link to view more information about the ports on the NE.

— A link to open the details pop-up dialog, which shows high-level information about the link. In the pop-up dialog, click the Link Details link to view more information about the link.

Reference List

[1] *ENM Operators Guide*, 1/1553-aom 901 151 Uen