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Nortel Multiservice Switch 7400/15000/20000

Operations: Ethernet Services

NN10600-821

Contents

Nortel Multiservice Switch 7400/15000/20000
Operations: Ethernet Services
NN10600-821   7.1S1   Standard
PCR7.1 and up   October 2005

What's new

The following feature was added to this document:

- EVLS port to VLAN (page 4)

Other changes made to this document include the following:

Attention: To ensure that you are using the most current version of an NTP, check the current NTP list in NN10600-000 *Nortel Multiservice Switch 7400/15000/20000 What's New*.

- The following sections were moved to a new NTP, NN10600-822 *Nortel Multiservice Switch 7400/15000/20000 Operations: Ethernet Virtual Line Services*:
  — EVLS deployment and migration from Ethernet over ATM service
  — EVLS configuration
  — Ethernet transport system (ETS) configuration
  — EVLS or ETS removal
- For CR Q01196819, the section Changing an Ethernet interface to VLAN mode (page 10) was updated to include more information about the relationship between the *La* and *Vlan* components.

EVLS port to VLAN

The following section was updated for this feature:

- Changing an Ethernet interface to VLAN mode (page 10)

Ethernet configuration

Configure the Ethernet interface to carry Ethernet traffic to and from one or more Ethernet physical media.
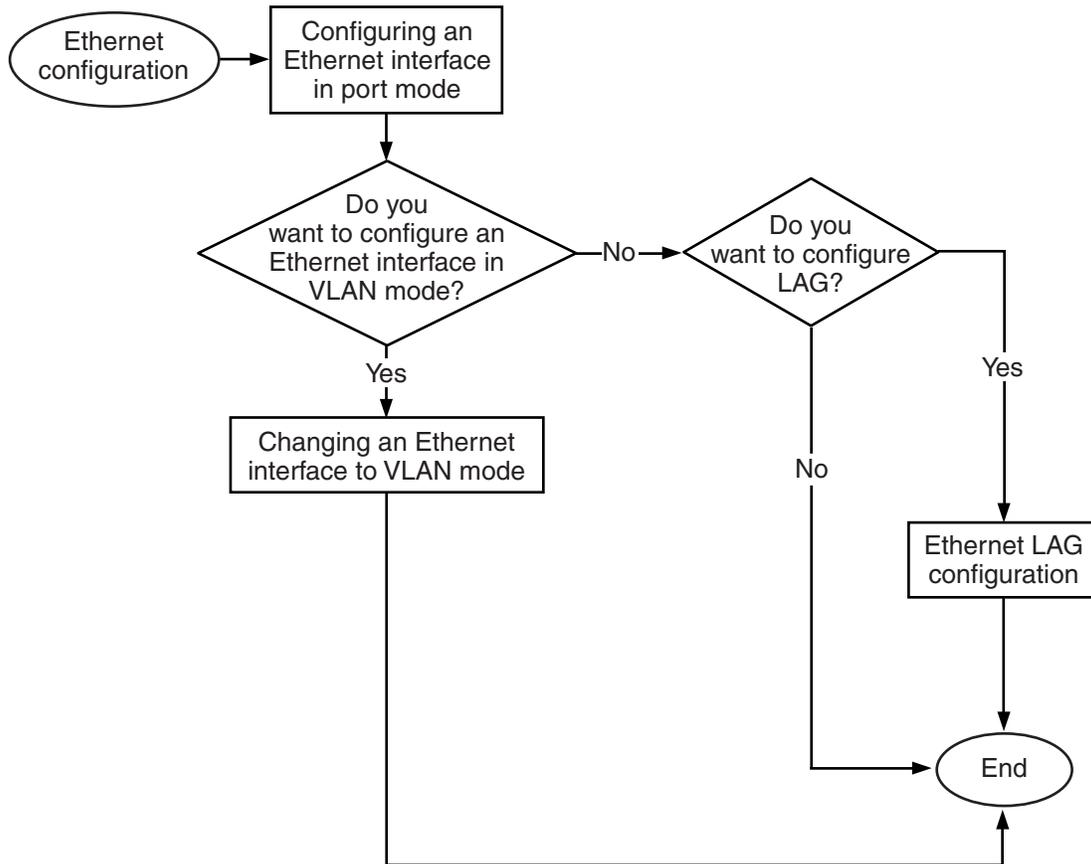
For information about Ethernet virtual line services (EVLS), see NN10600-822 *Nortel Multiservice Switch 7400/15000/20000 Operations: Ethernet Virtual Line Services*.

Ethernet configuration tasks

This work flow shows you the sequence of tasks you perform to configure the Ethernet interface. To link to any procedure, go to .

Ethernet configuration tasks

```
Ethernet          Configuring an
configuration ──► Ethernet interface
                    in port mode
                         │
                         ▼
            Do you
        want to configure an ──No──►   Do you
        Ethernet interface in        want to configure ──Yes──┐
           VLAN mode?                     LAG?                 │
                │                          │                   │
               Yes                        No          Ethernet LAG
                │                          │          configuration
                ▼                          │                   │
        Changing an Ethernet               │                   ▼
        interface to VLAN mode             └────────►   End ◄──┘
                │                                        ▲
                └────────────────────────────────────────┘
```

MSS 3543 002 AB

Ethernet configuration task navigation

- Configuring an Ethernet interface in port mode (page 7)
- Changing an Ethernet interface to VLAN mode (page 10)
- Ethernet LAG configuration (page 13)

Configuring an Ethernet interface in port mode

Configure an Ethernet interface in port mode to provide an Ethernet connection between a Nortel Multiservice Switch node and the customer edge (CE) device.

Prerequisites

- To download the required Ethernet software applications, refer to the chapter on downloading software from the software distribution site to the node in NN10600-270 *Nortel Multiservice Switch 7400/15000/20000 Software Installation*.

- You must add an Ethernet port to the LogicalProcessor (Lp) component. Refer to the chapter on logical processor, port, and channel configuration in NN10600-550 *Nortel Multiservice Switch 7400/15000/20000 Common Configuration Procedures*.

Procedure steps

Step	Action
1	Add a *LanApplication* component. The *Framer* subcomponent is added automatically. `add La/<la>`

2	Link the *LanApplication* component to a physical port.
	
	If you are configuring the 2-port 100 BaseT Ethernet function processor (FP), complete this step:
	
	`set La/<la> Framer interfaceName Lp/<lp> Eth100/<z>`
	
	If you are configuring the 6-port 10 BaseT Ethernet FP, complete this step:
	
	`set La/<la> Framer interfaceName Lp/<lp> Enet/<z>`
	If you are configuring the 4-port 10/100 BaseT Ethernet FP, 8-port 10/100 BaseT Ethernet FP or the 4-port gigabit Ethernet FP, complete this step:
	
	`set La/<la> Framer interfaceName Lp/<lp> Eth/<z>`

3   Optionally, set the *unknownVlanIdTreatment* attribute for the *EthernetPolicy* component. Setting the *unknownVlanIdTreatment* attribute is dependant upon the solution you are implementing in your network.

- For the Ethernet virtual line service (EVLS) solution, see NN10600-822 *Nortel Multiservice Switch 7400/15000/20000 Operations: Ethernet Virtual Line Services*.

- For the virtual IP router (VIPR) and RFC2547 solutions, default values are used and configuration of the *EthernetPolicy* component is ignored.

4   Optionally, link the Ethernet interface to setup access to an IP service.

If you want to link the Ethernet interface in port mode to setup port access to an IP service for the VIPR solution, see the chapter on VR Ethernet access media configuration in NN10600-801 *Nortel Multiservice Switch 7400/15000/20000 IP Configuration Management*.

If you want to link the Ethernet interface in port mode to setup port access to an IP service for the RFC2547 solution, see the chapter on VRF and access configuration in NN10600-803 *Nortel Multiservice Switch 7400/ 15000/20000 IP VPN Configuration Management*.
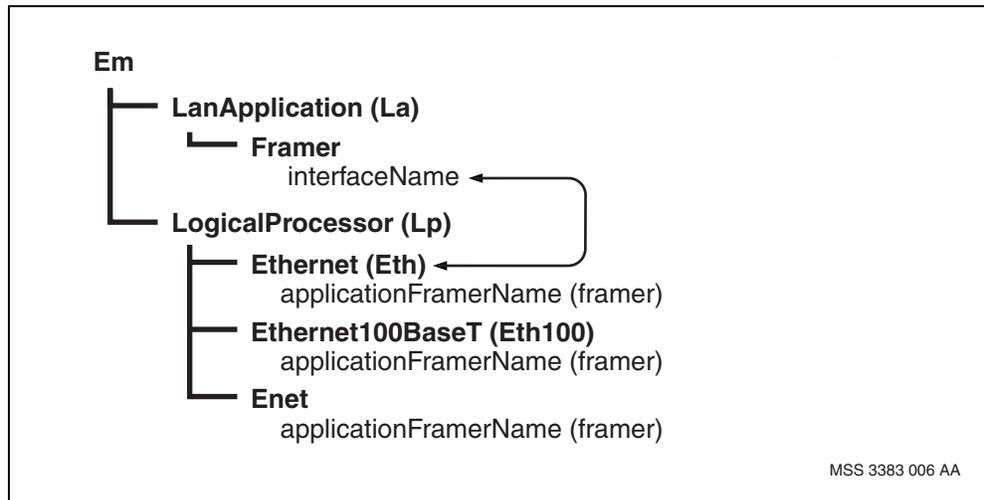
--End--

Variable definitions

Variable	Value
<la>	is the instance value of the *LanApplication* component.
<lp>	is the instance value of the *LogicalProcessor* component.
<z>	is the number of the FP port to which the *LanApplication* attaches.

Procedure job aid

Ethernet interface component hierarchy

```
Em
    └── LanApplication (La)
            └── Framer
                    interfaceName  ◄─────────────┐
    └── LogicalProcessor (Lp)                    │
            └── Ethernet (Eth)  ◄────────────────┘
                    applicationFramerName (framer)
            └── Ethernet100BaseT (Eth100)
                    applicationFramerName (framer)
            └── Enet
                    applicationFramerName (framer)
```

MSS 3383 006 AA

Changing an Ethernet interface to VLAN mode

Change an Ethernet interface to virtual local area network (VLAN) mode in order to:

- provide a virtual connection to Ethernet virtual line services (EVLS) or to an IP solution.

- enable different virtual LANs (VLANs) on the same physical Ethernet port to be mapped to different network solutions.

- provide customer traffic identification.

Multiple VLANs can be configured within an Ethernet port to optimize port usage and port bandwidth usage.

Ethernet interfaces in VLAN mode are supported on the following function processors (FPs) only: 4-port 10/100 BaseT Ethernet, 8-port 10/100 BaseT Ethernet, and 4-port gigabit Ethernet.

Attention: Unlike other traditional Multiservice Switch services, such as FrameRelay and ATM, which cannot provide a port-based service, Ethernet uses the *La* component to represent the port-VLAN. The port-VLAN can be configured and managed independently of the *Vlan* components configured under it. As such, the *La* component does not represent nor reflect the status of its Vlan. In order to determine the status of a Vlan, the *Vlan* component itself must be displayed.

Performing any operation affecting condition on the *La* component has no effect on the *Vlan* components under *La*. Likewise, an operation affecting condition for one *Vlan* has no effect on any other *Vlan* or the *La* component. For example, locking the *La* component has no effect on the *Vlan* components of that *La*. Similarly, performing critical changes to a *Vlan* has no effect on any other *Vlan* or the *La* component.

Prerequisites

- Ensure that an Ethernet interface has been configured in port mode. For information, see Configuring an Ethernet interface in port mode (page 7).

Procedure steps

Step	Action

1 Add the *VirtualLanIdentifier* component to the *LanApplication* component or set the *vlanAware* attribute to enabled.

Attention: Setting the *vlanAware* attribute is applicable to EVLS only.

```
add La/<la> Vlan/<vlan>
```

or

```
add La/<la> policy
set La/<la> policy vlanAware enabled
```

2 Set the *maxFrameSize* attribute.

```
set Lp/<lp> Eth/<v> maxFrameSize <frame_value>
```

3 Link the Ethernet VirtualLanIdentifier to setup access to an IP solution.

If you want to link the Ethernet interface in VLAN mode to setup VLAN access to an IP service for the VIPR solution, see the chapter on VR Ethernet access media configuration in NN10600-801 *Nortel Multiservice Switch 7400/15000/20000 IP Configuration Management*.

If you want to link the Ethernet interface in VLAN mode to setup VLAN access to an IP service for the RFC2547 solution, see the chapter on VRF and access configuration in NN10600-803 *Nortel Multiservice Switch 7400/15000/20000 IP VPN Configuration Management*.
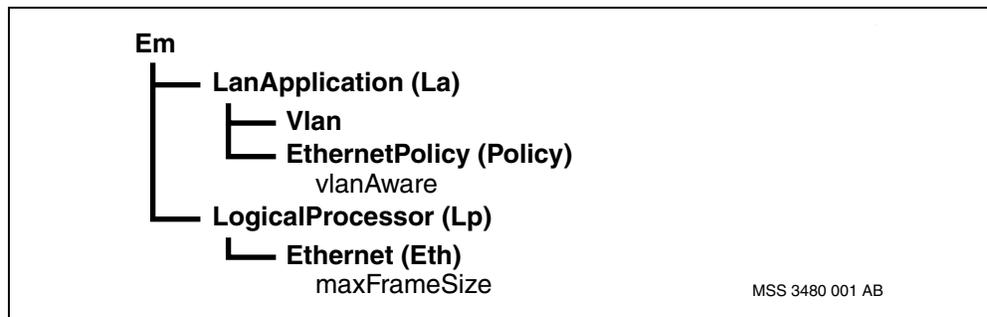
--End--

Variable definitions

Variable	Value
<frame_value>	specifies the maximum frame size.
<la>	is the instance value of the *LanApplication* component.
<lp>	is the instance value of the *LogicalProcessor* component.
<v>	is the number of the Ethernet port on the function processor.
<vlan>	is the instance value of the *Vlan* component.

Procedure job aid

Ethernet interface in VLAN mode component hierarchy

```
Em
     ── LanApplication (La)
              ── Vlan
              ── EthernetPolicy (Policy)
                    vlanAware
     ── LogicalProcessor (Lp)
              ── Ethernet (Eth)
                    maxFrameSize                MSS 3480 001 AB
```

Ethernet LAG configuration

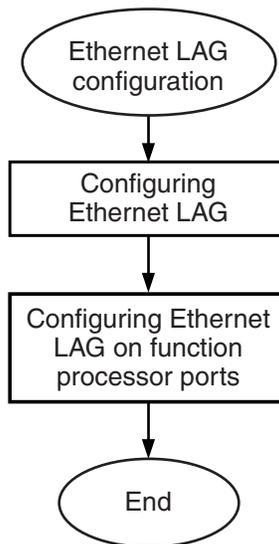Configure Ethernet link aggregation (LAG) to allow grouping of several Ethernet ports to be handled as a single port.

Prerequisites to configuring Ethernet LAG

- For LAG conceptual information, see Understanding link aggregation (LAG) (page 18).

Ethernet LAG configuration procedures

This task flow shows you the sequence of procedures you perform to configure Ethernet LAG. To link to any procedure, go to Ethernet LAG configuration procedure navigation (page 14).

Ethernet LAG configuration procedures

```
        ┌─────────────────────┐
        │   Ethernet LAG      │
        │   configuration     │
        └─────────────────────┘
                  │
                  ▼
        ┌─────────────────────┐
        │    Configuring      │
        │   Ethernet LAG      │
        └─────────────────────┘
                  │
                  ▼
        ┌─────────────────────┐
        │ Configuring Ethernet│
        │   LAG on function   │
        │   processor ports   │
        └─────────────────────┘
                  │
                  ▼
        ┌─────────────────────┐
        │        End          │
        └─────────────────────┘
```

MSS 3532 002 AA

Ethernet LAG configuration procedure navigation

Configuring Ethernet LAG

Configure the Ethernet over link aggregation (LAG) software that is required for the LAG Ethernet service on the 4-port Gigabit Ethernet FP.

Procedure steps

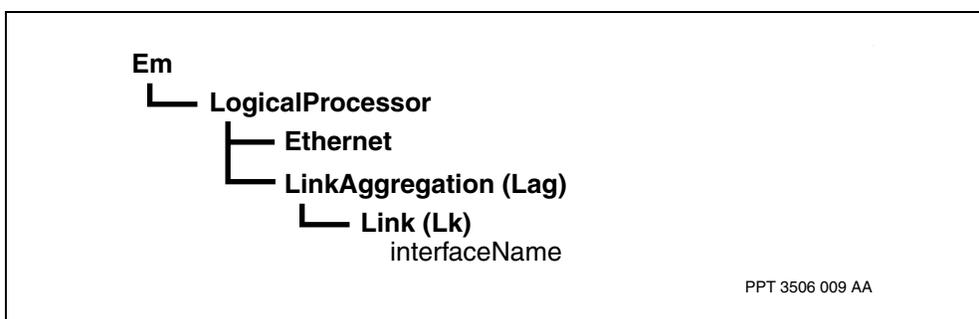| Step	Action
1	Set the software logical processor type (*lpt*) feature list.
	`set sw lpt/LAG featureList lag`
2	Set the logical processor (*lp*) to the software logical processor type (*lpt*).
	`set lp/<lp> lpt sw lpt/LAG`
3	Add the Ethernet port.
	`add lp/<lp> ethernet/<ethernet_port_number>`
4	Add the *LAG* component.
	`add lp/<lp> lag/<lag_number>`
5	Add the LAG logical links.
	`add lp/<lp> lag/<lag_number> link/<link_number>`
6	Set the *LAG Link interfaceName* to the Ethernet ports.
	`set lp/<lp> lag/<lag_number> link/<link_number> interfaceName lp/<lp> ethernet/<ethernet_port_number>`

--End--

Variable definitions

Variable	Value
<ethernet_port_number>	is the instance value of the Ethernet port.
<lag_number>	is the instance value of the *LAG* component.
<link_number>	is the instance value of the logical link.
<lp>	is the instance value of the *LogicalProcessor* component.

Procedure job aid

Ethernet LAG software component hierarchy

```
Em
  └── LogicalProcessor
        ├── Ethernet
        └── LinkAggregation (Lag)
              └── Link (Lk)
                    interfaceName
                                              PPT 3506 009 AA
```

Configuring Ethernet LAG on function processor ports

Configure the Ethernet link aggregation (LAG) on function processor ports to link the service to the physical ports.
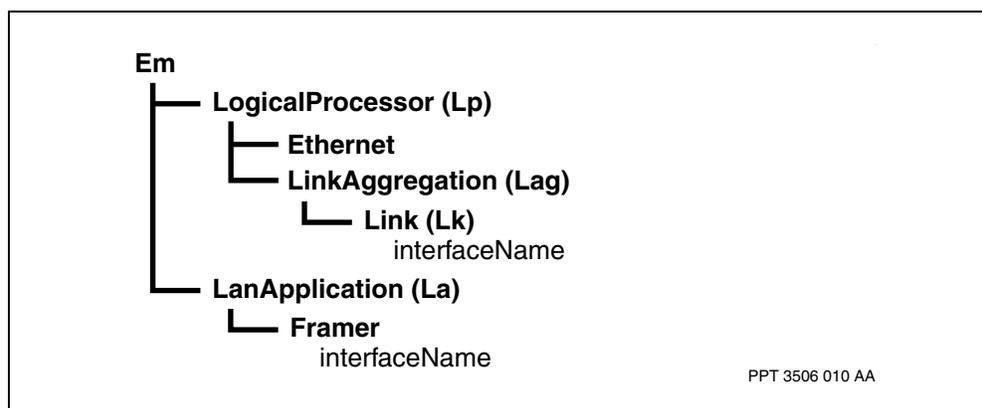
Procedure steps

Step	Action
1	Add a LAN application.
	add La/<la>
2	Link the LAN application to the LAG group.
	set La/<la> framer interfaceName ! lp/<lp> lag/<lag_number>

--End--

Variable definitions

Variable	Value
<la>	is the instance value of the *LanApplication* component.
<lag_number>	is the instance value of the *LAG* component.
<lp>	is the instance value of the *LogicalProcessor* component.

Procedure job aid

Ethernet LAG on function processor ports component hierarchy

```
Em
└── LogicalProcessor (Lp)
    │   ┌── Ethernet
    │   └── LinkAggregation (Lag)
    │           └── Link (Lk)
    │                   interfaceName
    └── LanApplication (La)
            └── Framer
                    interfaceName
```

PPT 3506 010 AA

Understanding link aggregation (LAG)

Link aggregation (LAG) is a protocol that facilitates the grouping of several Ethernet ports, allowing a media access control (MAC) client to treat a set of ports as a single port. Link aggregation is an optional sublayer between a MAC client (application) and the MAC (physical interface or media). LAG is specified by IEEE Std 802.3-2002 Section 3 (Chapter 43). See figure Link aggregation protocol (page 18) for more information.

Attention: The 4-port Gigabit Ethernet functional processor (FP) supports LAG.

Link aggregation protocol

PPT 3506 011 AA
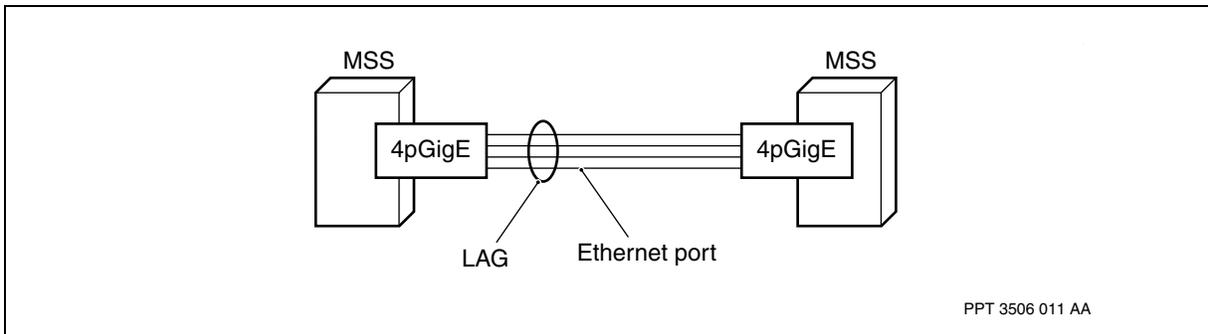
Benefits of LAG include the following:

- Provides a mechanism to aggregate bandwidth across multiple Gigabit Ethernet (GigE) links without increasing LAN topology complexity.

- Offers dynamic bandwidth allocation by adding or removing links from LAG

- Facilitates link protection with quicker recovery from local link failure as compared with Layer 3 methodologies.

- Allows distribution of traffic across multiple links through load spreading.

- Assumes a low risk of duplication or mis-ordering of frames.

- Supports existing IEEE 802.3 MAC Clients.

Traffic load balancing is accomplished by distributing conversations or flows (for example IP flows) across the physical links comprising LAG. All packets within each individual conversation are always transmitted on the same physical link, eliminating the need for buffering and re-ordering at the receiving end.

LAG architecture functions

The *Lag* and *Link* components are responsible for configuration, control and operation of LAG on the Nortel Multiservice Switch 15000. The LAG group is configured by following provisioning procedures.

- For control - it incorporates Link Aggregation Control Protocol (LACP), that can be used for configuration and agreement on aggregation capabilities between systems.

- For operation - these components are responsible for distributing and collecting frames.

- On transmit - the *Link* components will pass LACP frame transmission requests for control of the LAG group.

- On receive - the *Link* components will distinguish LACP frames from user traffic. User traffic will be passed onto LanMedia, which is the application.

The functions described for the *Lag* and *Link* components are equivalent to the Aggregation Control, Aggregation and Control Processor functions described in IEEE Std 802.3-2002 Section 3 (Chapter 43)

LAG uses two protocols: Link Aggregation Control Protocol (LACP) to exchange LAG group and aggregated port information, and Marker Protocol to facilitate moving traffic (flow of conversations) to other links in the LAG without the need to buffer or resequence frames in a traffic flow.

For information about configuring Ethernet LAG, see Ethernet LAG configuration (page 13).

Understanding Ethernet services

Ethernet is the predominantly deployed local area network (LAN) technology and is becoming more widely deployed as a metropolitan area network (MAN) and a wide area network (WAN) technology. The standard IEEE 802.3 defines the three basic building blocks of Ethernet:

- the physical media, such as twisted pair, optical fiber cable, or coaxial cable

- the rules governing access to the shared physical medium, such as carrier sense multiple access with collision detection (CSMA/CD) access method

- the format of the information that is carried on the physical medium

For more information about the physical media and rules governing access to the shared physical medium, see the IEEE 802.3 and NN10600-551 *Nortel Multiservice Switch 7400/15000/20000 FP Configuration Reference*.

Local area network (LAN)

A local area network (LAN) is a private data communications system that interconnects in-room and in-building computing devices for the purpose of exchanging or sharing information. The interconnection of LANs within a city-wide reach is referred to as a campus or metropolitan area network (MAN). Interconnection of geographically distant LANs is referred to as a wide area network (WAN).
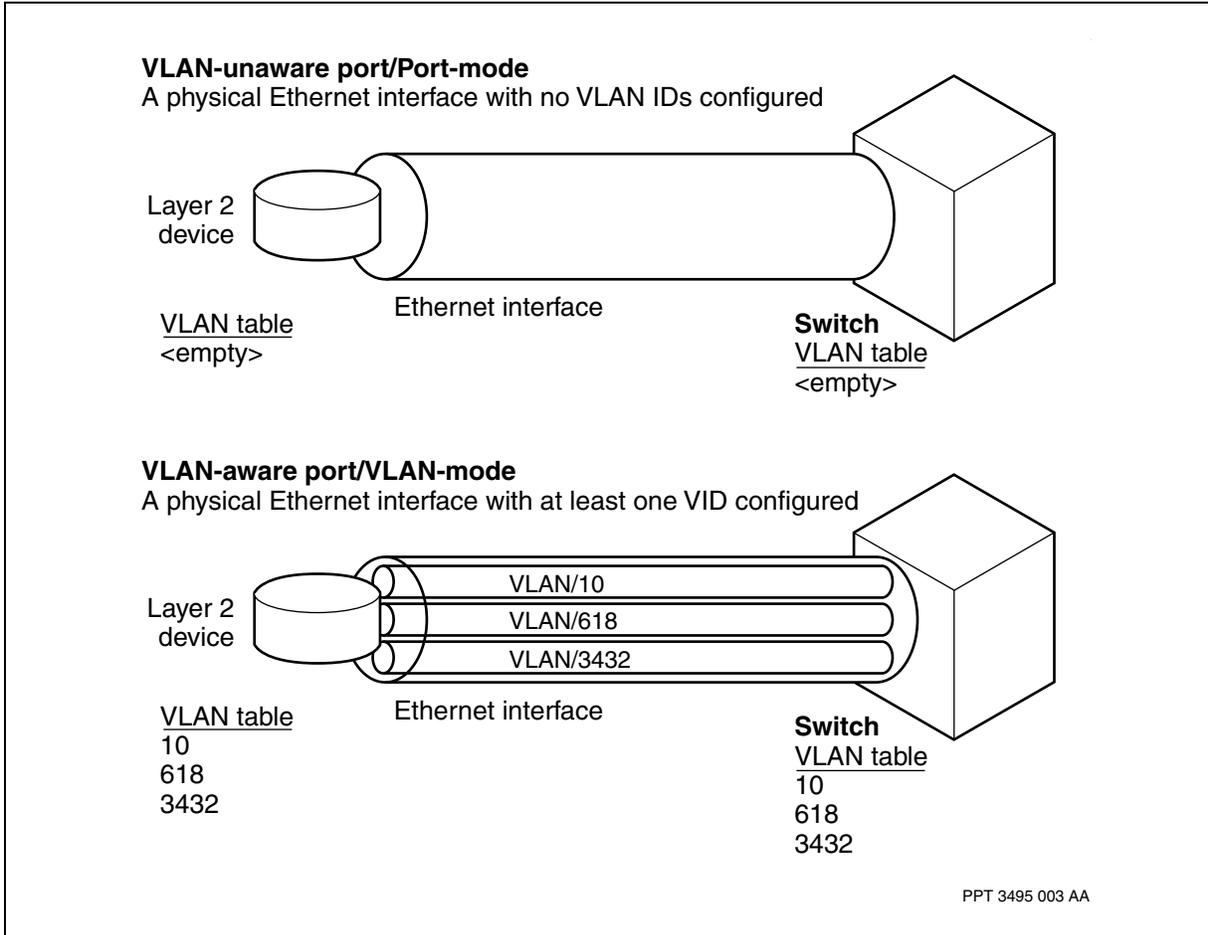
In the context of Ethernet services, a LAN is the physical interconnection of end stations that belong to the same broadcast domain. A broadcast domain is a logical association of end stations that are able to directly communicate with each other over a shared physical connection, referred to as the Ethernet medium. An Ethernet LAN has a single broadcast domain. All end stations connected to an Ethernet LAN are said to participate in the same broadcast domain.

On the Multiservice Switch, an Ethernet interface is represented by the *LanApplication* component. When you configure a *LanApplication* component in port mode, it represents a Multiservice Switch Ethernet interface to an

Ethernet LAN. When an Ethernet interface is configured to operate in port mode, the interface is said to be VLAN unaware. For more information, see Ethernet services operating modes (page 21).

Ethernet services operating modes

VLAN-unaware port/Port-mode
A physical Ethernet interface with no VLAN IDs configured

Layer 2 device

VLAN table
<empty>

Ethernet interface

Switch
VLAN table
<empty>

VLAN-aware port/VLAN-mode
A physical Ethernet interface with at least one VID configured

Layer 2 device

VLAN/10
VLAN/618
VLAN/3432

VLAN table
10
618
3432

Ethernet interface

Switch
VLAN table
10
618
3432

PPT 3495 003 AA

Virtual local area network (VLAN)

There is a limit to the number of end stations that can participate in a single broadcast domain. As the number of end stations participating in a single broadcast domain increases, the performance of the LAN decreases. To mitigate this performance degradation or to allow for more end stations in the same physical network, the concept of logical channelization of the physical LAN to define virtual local area networks (VLANs) is introduced. The standard IEEE 802.1Q defines the rules governing access to VLANs and the format of the information that is carried on the physical medium.

An Ethernet interface is logically channelized into separate VLANs by VLAN identifiers (VIDs). Each VID can identify a different service on a Multiservice Switch Ethernet interface. A Multiservice Switch Ethernet interface operates

in VLAN mode when either at least one VID is configured on that interface or the Ethernet policy for that interface is explicitly configured to be VLAN aware. When an Ethernet interface is configured to operate in VLAN mode, the interface is said to be VLAN aware. For more information, see Ethernet services operating modes (page 21).

Traffic types

Ethernet can support three traffic types: untagged, priority-tagged and VLAN-tagged. The latter two types use the IEEE 802.1Q tag header. An Ethernet LAN can carry all three traffic types. An Ethernet VLAN can carry VLAN-tagged traffic only, with one exception.

This exception is the case of a VLAN aware Ethernet interface that is connected to a network that supports a combination of all three traffic types, a designated VLAN is used to classify the untagged and priority-tagged traffic. This VLAN is referred to as the port VLAN. For example, if VLAN 1 is the designated port VLAN, then all untagged, priority-tagged and VLAN 1 tagged traffic received by the VLAN aware Ethernet interface are classified as belonging to the VLAN 1.

Frame size and formats

This section describes the frame size and formats of the three traffic types (untagged, priority-tagged and VLAN-tagged) used for transmission in an Ethernet network.

Maximum frame size

The maximum frame size of an Ethernet frame is dependent on the frame format. For an Ethernet network supporting untagged traffic, the maximum frame size is 1518 bytes. For an Ethernet network supporting priority-tagged or VLAN-tagged traffic, the maximum frame size is 1522 bytes. Some Ethernet networks can be configured to use larger than standard specified frame sizes. Frames that are in excess of the standard specified maximum frame size are referred to as jumbo frames. The maximum frame size of a jumbo frame is vendor dependent and has no industry agreement.
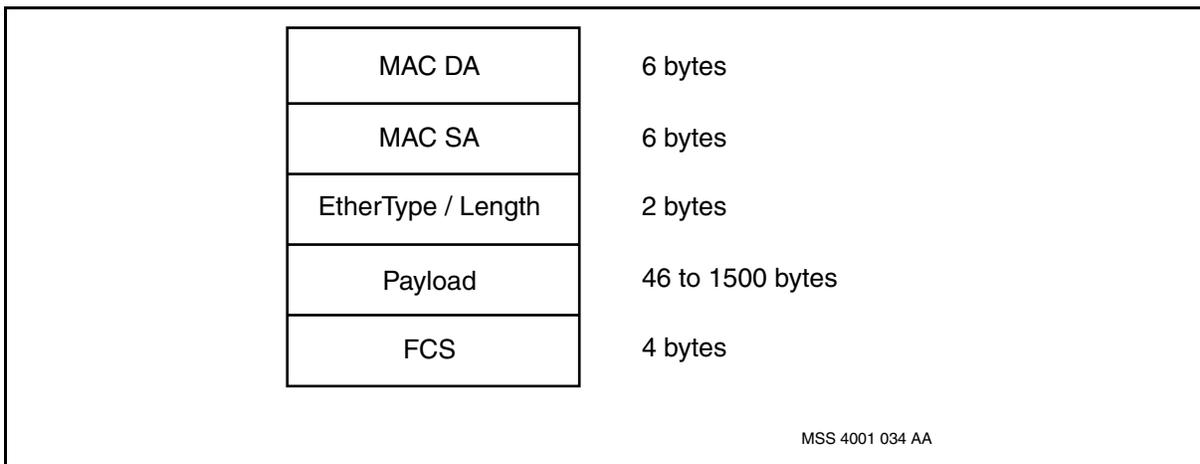
Each Multiservice Switch solution (for example, VIPR or EVLS), that is supported on an Ethernet interface, defines its own level of support for the maximum frame size. For information about the VIPR solution, refer to NN10600-800 *Nortel Multiservice Switch 7400/15000/20000 IP Technology Fundamentals*. For information about the EVLS solution, refer to NN10600-822 *Nortel Multiservice Switch 7400/15000/20000 Operations: Ethernet Virtual Line Services*.

Untagged Ethernet frame format

An untagged Ethernet frame consists of a MAC destination address (DA), MAC source address (SA), ethertype or length field, payload and frame check sequence (FCS). Refer to figure, Untagged Ethernet frame (page 23).
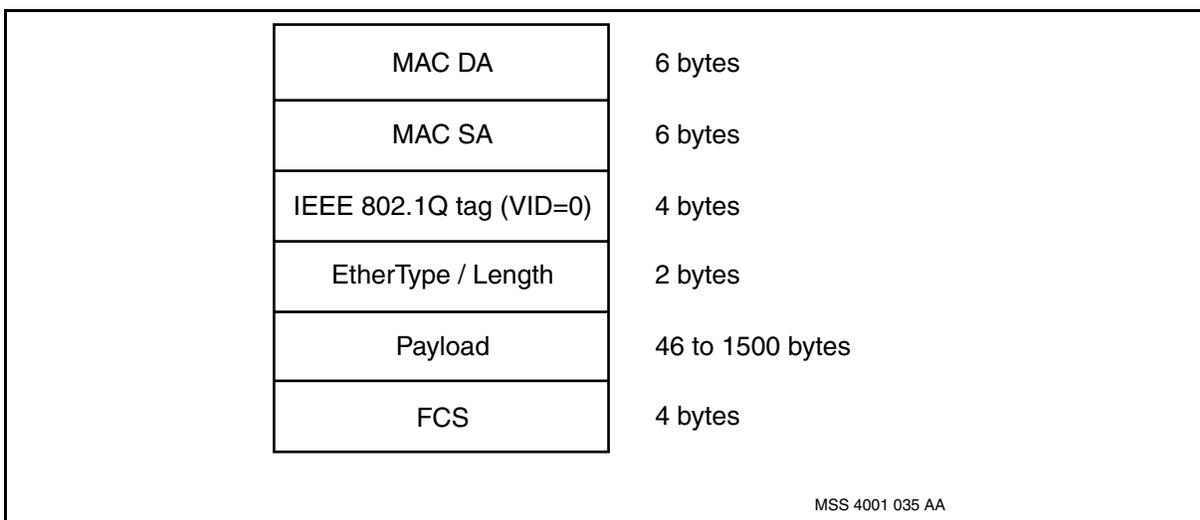
Untagged Ethernet frame

MAC DA	6 bytes
MAC SA	6 bytes
EtherType / Length	2 bytes
Payload	46 to 1500 bytes
FCS	4 bytes

MSS 4001 034 AA

Priority-tagged Ethernet frame format

A priority-tagged Ethernet frame consists of a MAC destination address (DA), MAC source address (SA), IEEE 802.1Q tag header with a VID equal to zero, ethertype or length field, payload and frame check sequence (FCS). Refer to figure, Priority-tagged Ethernet frame (page 23).

Priority-tagged Ethernet frame

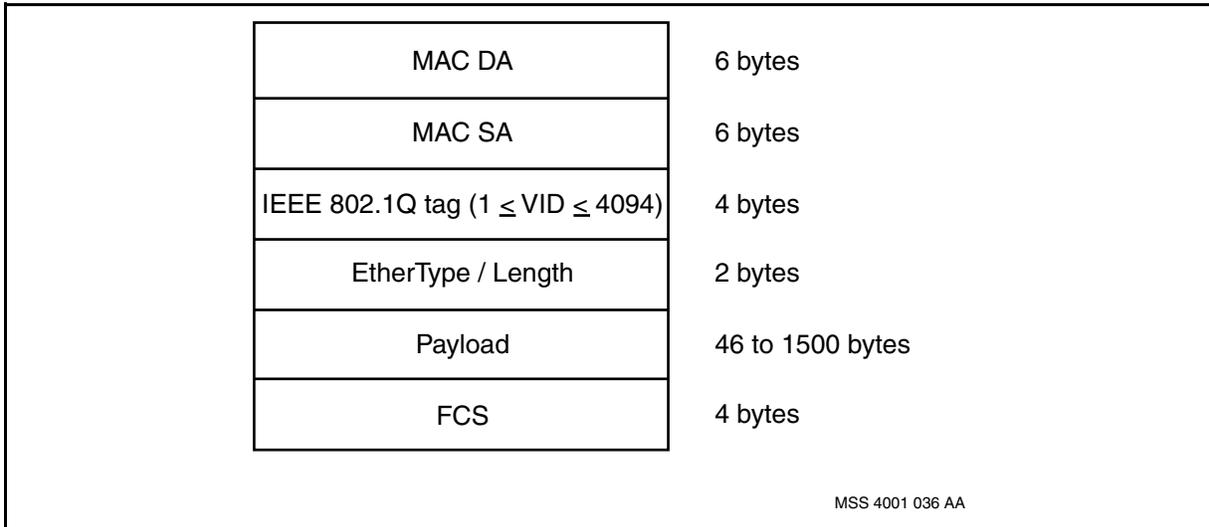|	
MAC DA	6 bytes
MAC SA	6 bytes
IEEE 802.1Q tag (VID=0)	4 bytes
EtherType / Length	2 bytes
Payload	46 to 1500 bytes
FCS	4 bytes

MSS 4001 035 AA

VLAN-tagged Ethernet frame format

A VLAN-tagged Ethernet frame consists of a MAC destination address (DA), MAC source address (SA), IEEE 802.1Q tag header with the VID between 1 and 4094, ethertype or length field, the payload and a frame check sequence (FCS). Refer to figure, VLAN-tagged Ethernet frame (page 24).

VLAN-tagged Ethernet frame

MAC DA	6 bytes
MAC SA	6 bytes
IEEE 802.1Q tag ($1 \leq VID \leq 4094$)	4 bytes
EtherType / Length	2 bytes
Payload	46 to 1500 bytes
FCS	4 bytes

MSS 4001 036 AA

Traffic treatment

The treatment of each traffic type is dependent on the configuration of the Multiservice Switch Ethernet interface policy and the operating mode of the interface.

The Ethernet policy has a number of attributes that influence the treatment of traffic received by and transmitted to the Ethernet interface: *unknownVlanIdTreatment*, *egressTagRule*, and *vlanAware*.

The *unknownVlanIdTreatment* attribute applies to the ingress traffic to control whether VLAN-tagged traffic is accepted or discarded by the solution configured under the *LanApplication* component. Each solution defines its own default behavior when operating in port mode. The default behavior for all solutions in VLAN mode is to discard unknown VLAN-tagged traffic. Unknown VLAN-tagged traffic is traffic received by an Ethernet interface that has a VID that is not configured on the interface.

The *egressTagRule* attribute applies to the egress traffic to control whether traffic transmitted to the Ethernet interface is untagged or VLAN-tagged.

The *vlanAware* attribute applies to the ingress traffic to control whether the interface is to behave as a VLAN aware interface or as a VLAN unaware interface.

Ingress and egress network access traffic is managed according to the operating mode of the Ethernet interface. Operating modes are port mode and VLAN mode. These modes influence the treatment of traffic received by and transmitted to the Ethernet interface. For additional information about the treatment of traffic types, see Treatment of traffic types (page 26).

Both Ethernet v 2.0 and IEEE 802.3 layer-2 header encapsulation are accepted by the interface. However, depending on each solution, either only the Ethernet v 2.0, or both the Ethernet v 2.0 and IEEE 802.3 frame formats can be transmitted to the Ethernet interface. It is possible in VLAN mode to have one solution configured on some VLANs transmitting Ethernet v 2.0 only traffic, and another solution configured on other VLANs transmitting IEEE 802.3 traffic.

Attention: For the 4-port 10/100 BaseT Ethernet and 8-port 10/100 BaseT Ethernet FPs, ensure that all devices on the LAN segment connected to this FP are configured to avoid flooding the LAN segment with multicast packets that may result in denial of service.

For more information about the denial of service protection on the 4-port 10/100 BaseT Ethernet and 8-port 10/100 BaseT Ethernet FPs, and the control plane protection for IP solutions, see the section on IP security mechanisms in NN10600-800 *Nortel Multiservice Switch 7400/15000/20000 IP Technology Fundamentals*.

The port VLAN is a reserved VLAN that defines the treatment for untagged, priority-tagged, and port-VLAN ID tagged traffic on the VLAN-aware Ethernet interface. The port VLAN ID tagged traffic has a port VLAN identifier (PVID). The PVID represents the default VLAN identifier on the Multiservice Switch and is always set to 1. On the Multiservice Switch, the port VLAN is represented by the *LanApplication* component when it is configured to operate in VLAN mode.

Treatment of traffic types

Traffic type	Ingress		Egress	
	Port-mode	**VLAN-mode**	**Port-mode**	**VLAN-mode**
untagged	accepted	accepted, if the port-VLAN is configured, discarded otherwise	solution dependent For some solutions, traffic is transmitted if the *egressTagRule* attribute is set to untagged. For other solutions traffic is always transmitted.	solution dependent Traffic is transmitted if port-VLAN is configured. For some solutions, traffic is transmitted only if the *egressTagRule* attribute is also set to untagged.
priority-tagged	accepted	accepted, if the port-VLAN is configured, discarded otherwise	solution dependent	solution dependent For some solutions, traffic is never transmitted. For other solutions, traffic is always transmitted if port VLAN is configured.
VLAN-tagged	accepted, if the *unknownVlanId Treatment* attribute is set to accept, discarded otherwise	accepted, if port-VLAN is configured and the *unknownVlanIdTreatment* attribute is set to accept for unconfigured VIDs, discarded otherwise	solution dependent For some solutions, traffic is transmitted if the *egressTagRule* attribute is set to tagged. For other solutions, traffic is always transmitted.	always transmitted based on configured VID

Procedure conventions

This document uses the following procedure conventions:

- You can enter commands using full component and attribute names, or you can abbreviate them. The commands used in the procedures contain the full component and attribute names in the first instance. In the second instance, the component and attribute names are abbreviated. For more information on abbreviating component and attribute names, see NN10600-060 *Nortel Multiservice Switch 7400/15000/20000 Component Reference*. All component and attribute names are formatted in italics.

- The introduction of every procedure states whether you must perform the procedure in operational mode or provisioning mode. For more information on these modes, see Operational mode (page 27) or Provisioning mode (page 28).

- When you complete a procedure, you can verify your changes and then activate them as the new node configuration. For more information on completing configuration changes and exiting provisioning mode, see Activating configuration changes (page 28).

Operational mode

Procedures contained within this document can either be performed in operational mode or provisioning mode. When you initially log into a node, you are in operational mode. Nortel Multiservice Switch systems use the following command prompt when you are in operational mode:

```
#>
```

where:
is the current command number

In operational mode, you work with operational components and attributes. In operational mode, you can

- list operational components and display operational attributes to determine the current operating parameters for the node

- control the state of parts of the node by locking and unlocking components

- set certain operational attributes and enter commands to perform diagnostic tests

Provisioning mode

To change from operational mode to provisioning mode, type the following command at the operator prompt:

```
start Prov
```

Only one user can be in provisioning mode at a time. Nortel Multiservice Switch systems use the following command prompt whenever you are in provisioning mode:

```
PROV #>
```

where:

is the current command number

In provisioning mode, you work with the provisionable components and attributes that contain the current and future configurations of the node. You can add and delete components, and display and set provisionable attributes. For information on completing the configuration changes, exiting provisioning mode, and returning to operational mode see Activating configuration changes (page 28).

For information on operational and provisionable attributes, see NN10600-060 *Nortel Multiservice Switch 7400/15000/20000 Component Reference*.

Activating configuration changes

Several procedures in this document ask that you complete the configuration changes. When you complete the configuration changes, you are activating the configuration changes, confirming that you want to activate them, and saving the changes. You are instructed to complete the configuration changes only at the end of procedures that you perform in provisioning mode.

> **CAUTION**
> **Activating a provisioning view can affect service**
> Activating a provisioning view can result in a CP reload or restart, causing all services on the node to fail. See NN10600-050 *Nortel Multiservice Switch 7400/15000/20000 Command Reference*, for more information.

> ⚠️ **CAUTION**
>
> **Risk of service failure**
>
> When you activate the provisioning changes (see step 3), you have 20 minutes to confirm these changes. If you do not confirm these changes within 20 minutes, the shelf resets and all services on the node fail.

1 Verify that the provisioning changes you have made are acceptable.

```
check Prov
```

Correct any errors and then verify the provisioning changes again.

2 If you want to store the provisioning changes in a file, save the provisioning view.

```
save -f(<filename>) Prov
```

3 If you want these changes as well as other changes made in the edit view to take effect immediately, activate, confirm, and commit the provisioning changes.

```
activate Prov
confirm Prov
commit Prov
```

4 End the provisioning session.

```
end Prov
```

Nortel Multiservice Switch 7400/15000/20000

Operations: Ethernet Services

N⊘RTEL