

## **Oracle® Communications**

Diameter Signaling Router Virtual Signaling Transfer Point

Release 8.3

**E93203**

September 2018

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# Contents

## 1 Introduction

Revision History .....	1-1
Documentation Admonishments .....	1-1
Locate Product Documentation on the Oracle Help Center Site .....	1-1
Locate Product Release Software on the Oracle Software Delivery Cloud Site.....	1-2
Customer Training .....	1-2
My Oracle Support .....	1-2
Emergency Response.....	1-3

## 2 Overview of vSTP

vSTP Introduction.....	2-1
M3UA Protocol.....	2-1
M2PA Protocol.....	2-1
Global Title Translation.....	2-2
GTT Routing.....	2-3
GTT Action Feature.....	2-6
Flexible GTT Load Sharing.....	2-7
Flexible Intermediate GTT Load Sharing.....	2-7
Flexible Final GTT Load Sharing .....	2-7
Weighted GTT Load Sharing.....	2-8
Transaction-Based GTT Load Sharing .....	2-14
Scalability .....	2-17
In-Sequence Delivery of Class 1 UDT Messages.....	2-19

## 3 MMI Managed Objects

MMI Managed Objects.....	3-1
--------------------------	-----

## 4 DSR Managed Objects

Users .....	4-1
Groups.....	4-1
Networks.....	4-3
Devices .....	4-3

Routes .....	4-3
Services .....	4-3
Servers .....	4-4
Server Groups.....	4-5

**5 Alarms, Errors, KPIs, and Measurements**

vSTP Alarms and Events .....	5-1
vSTP Measurements .....	5-1
vSTP Errors .....	5-1

## List of Figures

2-1	M2PA Network.....	2-2
2-2	ANSI MSU (ANSI Message Signal Unit).....	2-2
2-3	ITU-I MSU (ITU International Message Signal Unit).....	2-3
2-4	14-Bit ITU-N MSU (14-Bit ITU National Message Signal Unit).....	2-3
2-5	24-Bit ITU-N MSU (24-Bit ITU National Message Signal Unit).....	2-3
2-6	Transaction-Based GTT Load Sharing SCCP Options.....	2-16
2-7	Only STP-MP site.....	2-17
2-8	STP-MP and DA-MP in a Site.....	2-18
2-9	Multiple STP Servers in a Server Group.....	2-18
2-10	HA Role for STP Servers.....	2-18
4-1	Global Action and Administration Permissions.....	4-2



## List of Tables

1-1	Admonishments.....	1-1
2-1	RC Group Weight Example.....	2-9
2-2	RC Group In-Service Threshold States.....	2-10
2-3	In-Service Threshold Example.....	2-11
2-4	Load Shared Group with Weighted GTT Load Sharing Example.....	2-12
2-5	Combined Dominant/Load Shared Group with Weighted GTT Load Sharing Example .....	2-13
4-1	Core Services.....	4-4
5-1	GTT Actions Errors.....	5-1
5-2	GTT Action Sets Errors.....	5-4
5-3	GTT Selectors Errors.....	5-5
5-4	GTT Addresses Errors.....	5-8
5-5	GTT Sets Errors.....	5-14
5-6	Link Sets Errors.....	5-15
5-7	SCCP Options Errors.....	5-17





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# Introduction

This chapter describes how to obtain help, where to find related documentation, and provides other general information.




## Revision History

Date	Description
January 2018	Accessibility changes throughout

## Documentation Admonishments

Admonishments are icons and text throughout this manual that alert the reader to assure personal safety, to minimize possible service interruptions, and to warn of the potential for equipment damage.

**Table 1-1 Admonishments**

Icon	Description
 DANGER	Danger: (This icon and text indicate the possibility of personal injury.)
 WARNING	Warning: (This icon and text indicate the possibility of equipment damage.)
 CAUTION	Caution: (This icon and text indicate the possibility of service interruption.)

## Locate Product Documentation on the Oracle Help Center Site

Oracle Communications customer documentation is available on the web at the Oracle Help Center site, <http://docs.oracle.com>. You do not have to register to access these documents. Viewing these files requires Adobe Acrobat Reader, which can be downloaded at <http://www.adobe.com>.

1. Access the Oracle Help Center site at <http://docs.oracle.com>.
2. Click **Industries**.

3. Under the Oracle Communications subheading, click **Oracle Communications documentation** link.

The Communications Documentation page displays. Most products covered by these documentation sets display under the headings Network Session Delivery and Control Infrastructure and Platforms.

4. Click on your product and then the release number.

A list of the documentation set for the selected product and release displays.

5. To download a file to your location, right-click the **PDF** link, select **Save target as** (or similar command based on your browser), and save to a local folder.

## Locate Product Release Software on the Oracle Software Delivery Cloud Site

Oracle Communications software is available for electronic download at the Oracle Software Delivery Cloud site, <https://edelivery.oracle.com>. Only authorized customers with a valid password may download software from the site.

For directions on downloading the software and other information about using this site, click **FAQ** in the top right corner.

## Customer Training

Oracle University offers training for service providers and enterprises. Visit our web site to view, and register for, Oracle Communications training at <http://education.oracle.com/communication>

To obtain contact phone numbers for countries or regions, visit the Oracle University Education web site at [www.oracle.com/education/contacts](http://www.oracle.com/education/contacts)

## My Oracle Support

My Oracle Support (<https://support.oracle.com>) is your initial point of contact for all product support and training needs. A representative at Customer Access Support can assist you with My Oracle Support registration.

Call the Customer Access Support main number at 1-800-223-1711 (toll-free in the US), or call the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. When calling, make the selections in the sequence shown below on the Support telephone menu:

1. Select **2** for New Service Request
2. Select **3** for Hardware, Networking and Solaris Operating System Support
3. Select one of the following options:
  - For Technical issues such as creating a new Service Request (SR), select **1**
  - For Non-technical issues such as registration or assistance with My Oracle Support, select **2**

You are connected to a live agent who can assist you with My Oracle Support registration and opening a support ticket.

My Oracle Support is available 24 hours a day, 7 days a week, 365 days a year.

## Emergency Response

In the event of a critical service situation, emergency response is offered by the Customer Access Support (CAS) main number at 1-800-223-1711 (toll-free in the US), or by calling the Oracle Support hotline for your local country from the list at <http://www.oracle.com/us/support/contact/index.html>. The emergency response provides immediate coverage, automatic escalation, and other features to ensure that the critical situation is resolved as rapidly as possible.

A critical situation is defined as a problem with the installed equipment that severely affects service, traffic, or maintenance capabilities, and requires immediate corrective action. Critical situations affect service and/or system operation resulting in one or several of these situations:

- A total system failure that results in loss of all transaction processing capability
- Significant reduction in system capacity or traffic handling capability
- Loss of the system's ability to perform automatic system reconfiguration
- Inability to restart a processor or the system
- Corruption of system databases that requires service affecting corrective actions
- Loss of access for maintenance or recovery operations
- Loss of the system ability to provide any required critical or major trouble notification

Any other problem severely affecting service, capacity /traffic, billing, and maintenance capabilities may be defined as critical by prior discussion and agreement with Oracle.



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## Overview of vSTP

This chapter provides a high level description of the features associated with vSTP.

### vSTP Introduction

The Virtual Signaling Transfer Point (vSTP) application uses signaling experience from both the Oracle Communication EAGLE STP and the vDSR products to build a common signaling platform for unified signaling solutions. The application is installed on virtual machines.

### M3UA Protocol

M3UA seamlessly transports SS7 MTP3 user part signaling messages over IP using SCTP. M3UA-connected IP endpoints do not have to conform to standard SS7 topology, because each M3UA association does not require an SS7 link. Each M3UA-connected IP endpoint can be addressed by an SS7 point code unique from the signaling gateway's point code. vSTP provides M3UA without routing keys.

M3UA does not have a 272-octet Signaling Information Field (SIF) length limit as specified by some SS7 MTP3 variants. Larger information blocks can be accommodated directly by M3UA/SCTP without the need for an upper layer segmentation or re-assembly procedure, as specified by the SCCP and ISUP standards. However, a Signaling Gateway will enforce the maximum 272-octet limit when connected to a SS7 network that does not support the transfer of larger information blocks to the destination.

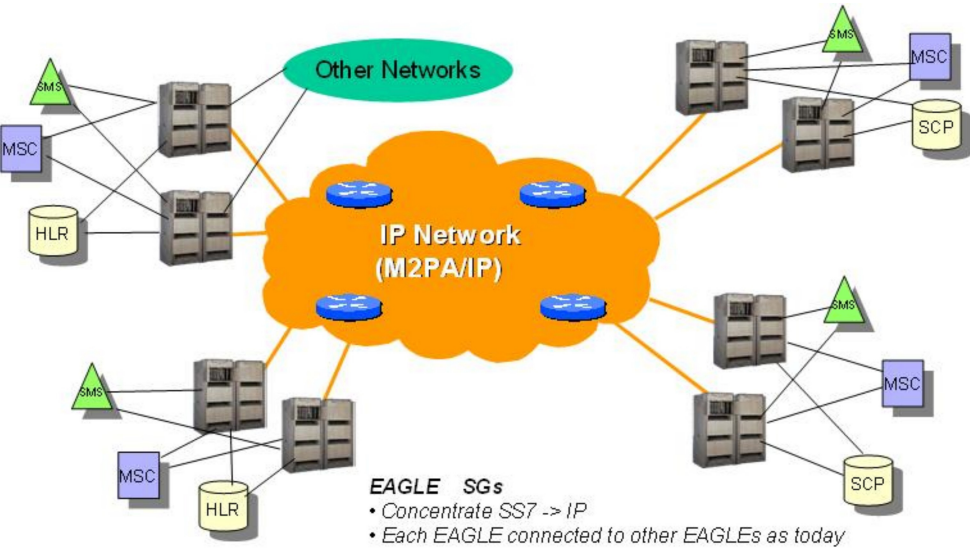
At the Signaling Gateway, M3UA indicates to remote MTP3 users at IP end points when an SS7 signaling point is reachable or unreachable, or when SS7 network congestion or restrictions occur.

### M2PA Protocol

M2PA is used primarily to replace B-, C-, and D-links. When used with A-links, M2PA connects to Service Switching Points, Signaling Control Points, Home Locator Registers and other endpoints. M2PA is a direct replacement for channelized TDM circuits because it provides specific controls for assurance of in-sequence delivery of messages. As such, M2PA is used to connect points that pass call-related data that is time-sensitive, such as ISUP calling data.

Congestion procedures conform to those specified by the ANSI/ITU standards.

Figure 2-1 M2PA Network



## Global Title Translation

The Global Title Translation (GTT) feature is designed for the Signaling Connection Control Part (SCCP) of the SS7 protocol.

The GTT feature uses Global Title Address (GTA) information to determine the destination of the MSU. The Translation Type (TT) indicates which GTT table is used to determine the routing to a particular service database. Each GTT table includes the Point Code (PC) of the node containing the service database, the SubSystem Number (SSN) identifying the service database on that node, and a Routing Indicator (RI). The RI determines if further GTTs are required. GTA and TT are contained in the Called Party Address (CdPA) field of the MSU.

The GTT feature changes the destination PC and the origination PC in the routing label. The GTA information is not altered.

Depending on how the GTT data is configured, the GTT may also change the RI, SSN, or the TT in the CdPA. The gray shaded areas in the following tables show the message fields affected by GTT.

Figure 2-2 ANSI MSU (ANSI Message Signal Unit)

BSN FSN LI	SIO xx xx xxxx NIC PRI SI		SIF		
			Routing Label	CGPA	CDPA Length
			DPC	Length Address Indicator	Address Indicator
			NCM NC NI	(x x xxxx x x)	(x RI xxxx xx)
			OPC	Subsystem Point Code	Subsystem Point Code
			NCM NC NI	(NCM NC NI)	(NCM NC NI)
			SLS		Address
			xx		(Translation Type)
					(Digits)

**Figure 2-3 ITU-I MSU (ITU International Message Signal Unit)**

BSN FSN LI	SIO xx xx xxxx NIC PRI SI			SIF		
				Routing Label	CGPA	CDPA Length
				DPC OPC SLS NCM AREA ZONE ID AREA ZONE xx	Length Address Indicator (x x xxxx x x) Subsystem Point Code (ID AREA ZONE)	Address Indicator (x RI xxxx xx) Subsystem Point Code (ID AREA ZONE) Address (Translation Type) (Digits)

**Figure 2-4 14-Bit ITU-N MSU (14-Bit ITU National Message Signal Unit)**

BSN FSN LI	SIO xx xx xxxx NIC PRI SI			SIF		
				Routing Label	CGPA	CDPA Length
				DPC OPC SLS NPC NPC xx	Length Address Indicator (x x xxxx x x) Subsystem Point Code (NPC)	Address Indicator (x RI xxxx xx) Subsystem Point Code (NPC) Address (Translation Type) (Digits)

**Figure 2-5 24-Bit ITU-N MSU (24-Bit ITU National Message Signal Unit)**

BSN FSN LI	SIO xx xx xxxx NIC PRI SI			SIF		
				Routing Label	CGPA	CDPA Length
				DPC OPC SLS MSA SSA SP MSA SSA SP xx	Length Address Indicator (x x xxxx x x) Subsystem Point Code (MSA SSA SP)	Address Indicator (x RI xxxx xx) Subsystem Point Code (MSA SSA SP) Address (Translation Type) (Digits)

## GTT Routing

The routing options described in this section allow you to add translations to parameters, code, and components for additional flexibility in routing a message.

### TCAP Opcode Based Routing (TOBR)

TOBR provides vSTP with the ability to route messages based on its operation codes. With the TOBR feature, vSTP considers the following information contained in TCAP portion of messages for performing GTT.

- ITU Messages
  - Message/Package type
  - Application context name
  - Operation code
- ANSI Messages
  - Package type
  - Operation code family
  - Operation code specifier

- Message Type support by TOBR for ITU and ANSI
- ITU TCAP
  - Begin
  - Continue
  - End
  - Abort
  - Unidirectional
- ANSI TCAP
  - Unidirectional
  - QueryWithPermission
  - QueryWithoutPermission
  - Response
  - ConversationWithPermission
  - ConversationWithoutPermission
  - Abort

TOBR works based on the following rules:

- If the message/package type is NOT one of those mentioned, vSTP treats it as an unknown message type and does not proceed with the decoding.
- vSTP attempts to decode the TCAP portion of all UDT/UDTS/Unsegmented XUDT/Unsegmented XUDTS queries coming to the SCCP layer for GTT.
- If decoding fails, the message still undergoes GTT using some default values for the TCAP data that denote their absence in the message.
- ACN is used for all supported ITU TCAP messages except ABORT. No attempt to retrieve ACN is made for Abort messages. All other supported messages may have a Dialog portion containing Dialogue Request/Unidirectional Dialogue/Dialogue Response PDU, from which the ACN is retrieved. If no Dialog portion is detected, then ACN is assumed to be NONE.
- TOBR attempts to find the Operation Code (Opcode) in all supported ITU TCAP messages except ABORT. These messages must contain Invoke or Return Result (Last or Not Last) as the first component. If not, Opcode is assumed to be NONE.
- TOBR attempts to find the Operation Family and Specifier in all supported ANSI TCAP messages (except ABORT) containing an INVOKE component. For all other messages, Family and Opcode are assumed to be NONE.

### **Flexible Linkset Optional Based Routing (FLOBR)**

FLOBR supports Linkset based routing and Flexible routing.

- Linkset based routing routes GTT traffic based on the incoming linkset



- Flexible routing routes GTT traffic based on parameters such as MTP, SCCP, and TCAP in a flexible order on a per translation basis

With the FLOBR feature, you can change the default CdPA GTTSET to point to any GTT set type and find the translation.

FLOBR works based on the following rules:

1. When GTT mode is FLOBR CDPA, CDPA fields in the MSU are used for GTT selector search and the GTT set is taken from the CDPA GTT SET Name configured in the selector entry.
2. When GTT mode is FLOBR CGPA, CGPA fields in the MSU are used for GTT selector search and the GTT set is taken from the CGPA GTT SET Name configured in the selector entry.
3. When GTT hierarchy is FLOBR CDPA and FLOBR CGPA, GTT selectors are searched as defined in 1. If no selector match is found or CDPA GTTSET is not provisioned, GTT selectors are searched as defined in 2.
4. When GTT hierarchy is FLOBR CGPA and FLOBR CDPA, GTT selectors are searched as defined in 2. If no selector match is found or CGPA GTTSET is not provisioned, GTT selectors are searched as defined in 1.
5. If GTT selectors are not found as specified in 1, 2, 3 or 4, then vSTP considers this a translation failure.
6. You can provision a fallback option for each translation in FLOBR to tell it how to route an MSU under the following conditions:
  - Routing when a search fails
  - Routing when the same GTT set name is referred to more than once
  - Limiting the number of database searches to seven (7)
7. When a fallback option is set to No, the GTT fails and the MSU is discarded.
8. When a fallback option is set to Yes, the GTT performs based on the last matched entry.

### **MAP Based Routing (MBR)**

MBR provides vSTP with the ability to route messages based on its MAP components. This can be done by using either IMSI or MSISDN GTT set types, which are linked by OPCODE set type.

MBR works based on the following rules:

- TCAP package types BEGIN, CONTINUE, and END are supported for MAP based routing, so OPTSN with one of the MAP GTT set types are allowed to be provisioned for TOBR GTA entries that have "pkgtype" as BGN, CNT, or END.
- When an MSU is processed by the TOBR GTT translation with the OPTSN as one of these new set types, Eagle decodes the TCAP part and extracts the required TCAP parameter from the MSU. The digits in this parameter are used as the key to search for the translation in the GTT set.
- If Dialogue Portion is present in the message, pick the last byte of the ACN.

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**Note:** MBR does not validate if the MAP operation is supported with the ACN in the message; it is only decoding the last byte of the ACN to determine the MAP version.

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- If Dialogue Portion is not present, the MAP version provisioned with the Opcode translation is used as the MAP version.

## GTT Action Feature

The Global Title Translation (GTT) action feature performs additional actions on the incoming/translated Message Signaling Unit (MSU) coming from the GTT. Configure GTT Action, GTT Action Set, and GTA Managed Object (MO) to use this is an optional feature.

There are five types of GTT actions including:

- Discard
- UDTs
- TCAP Error
- Forward
- Duplicate

### **Discard**

The Discard GTT action discards incoming MSU.

### **UDTS**

The Unit Data Service (UDTS) GTT action marks the MSU as discarded and an error response is sent back with an udts error code.

### **TCAP Error**

The Transaction Capabilities Application Part (TCAP) Error GTT action marks the MSU as discarded and an error response is sent back with an tcap error code.

### **Forward**

The Forward GTT action forwards the incoming/translated MSU to a specified point code per configuration. The MSU does not forward to translated point code.

If the Forward GTT action fails, then default actions are performed per configuration:

- Fallback means forward the MSU to translated point code
- Discard an incoming MSU
- Send a UDTs response with an udts error code per configuration
- Send a TCAP error response with an tcap error code per configuration

### **Duplicate**

The Duplicate action sends a copy of incoming/translated MSU to a specified point code per configuration. The MSU does sent to translated as well as duplicate point code.

## Flexible GTT Load Sharing

Flexible GTT Load Sharing (FGTTLS) provides more routing diversity for GTT traffic. There are two parts to Flexible GTT Load Sharing: Flexible Intermediate GTT Load Sharing applied to GTT traffic requiring intermediate global title translation, and Flexible Final GTT Load Sharing applied to traffic requiring final global title translation.

### Flexible Intermediate GTT Load Sharing

Flexible Intermediate GTT Load Sharing provides more flexible GTT load sharing arrangements for GTT traffic requiring intermediate global title translation (the routing indicator in the message is GT) than the load sharing arrangements provided by the Intermediate GTT Load Sharing feature. The Flexible GTT load sharing and Intermediate GTT load sharing features are enabled by default to perform Flexible Intermediate GTT Load Sharing.

#### Intermediate Load Sharing Feature Only

With the Intermediate GTT Load Sharing feature enabled and turned on and the load shares post-GTT destinations when intermediate GTT is being performed through the use of the MRN table. The destination point codes in the MRN table can appear in the MRN table only once. The MRN table contains groups of point codes with a maximum of 32 point codes in each group. This arrangement allows only one set of relationships to be defined between a given point code and any other point codes in the MRN group. All global title addresses in the GTT table that translate to a point code in the given MRN group will have the same set of load sharing rules applied.

For example, the following point codes and relative cost values are provisioned in the MRN table.

PC	RC
005-005-005	10
006-001-001	10
006-001-002	10
006-001-003	10
006-001-004	10
006-001-005	10
006-001-006	10
006-001-007	10

When the point code in the intermediate GTT is translated to 005-005-005, all traffic routed using the global title addresses in the global title translations containing this point code are load shared equally, no matter what the global title address is.

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**Note:** If you want to provision an IGT or GTT action without load sharing mode, then MRNSET is not specified.

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### Flexible Final GTT Load Sharing

Flexible Final GTT Load Sharing provides more routing diversity for GTT traffic requiring final global title translation (the routing indicator in the message is SSN) than the load sharing arrangements provided by the mated applications without the Flexible GTT Load Sharing feature enabled.

**Final Load Sharing Feature Only**

The destination point codes and subsystems in the MAP table can appear in the MAP table only once. The MAP table contains groups of point codes with a maximum of 32 point codes and subsystems in each group. This arrangement allows only one set of relationships to be defined between a given point code and subsystem and any other point codes and subsystems in the MAP group. All global title addresses in the GTT table that translate to a point code and subsystem in the given MAP group will have the same set of load sharing rules applied.

When the point code and subsystem in the final global title translation is translated to 005-005-005, subsystem 251, all traffic routed using the global title addresses in the final global title translations containing this point code and subsystem are load shared equally, no matter what the global title address is.

**Weighted GTT Load Sharing**

The default behavior for performing load sharing between nodes with the same relative cost is to perform the load sharing in a round-robin fashion. A limitation of this design is that all destinations have equal processing power and should receive an equal load. However, as new hardware is added to load-sharing groups, the load-sharing groups may have different processing capabilities. Customization of the load-sharing group would allow the traffic load to be distributed on the individual characteristics of each destination.

Another default behavior is to route traffic to a load-shared group if any member of that group with the relative cost value is available. Depending on the traffic, this can overwhelm and congest a node, even though other nodes at different relative cost values could have handled the traffic.

Both of these scenarios can be solved with the Weighted GTT Load Sharing feature, which allows unequal traffic loads to be provisioned in mated application (MAP) and mated relay node (MRN) load sharing groups.

The Weighted GTT Load Sharing feature is enabled by default. The MAP and MRN sets are used by MAP and MRN load sharing groups. Weighted GTT Load Sharing can be applied to load shared only or combined dominant/load shared MAP or MRN groups, and cannot be applied to solitary mated applications, or dominant MAP or MRN groups.

This feature also allows provisioning control over load sharing groups so that if insufficient capacity within the load sharing group is available, the load sharing group is not used.

Weighted GTT Load Sharing provides two controls for GTT traffic distribution through either the MAP or MRN groups:

- Individual weighting for each entity in a relative cost (RC) group
- In-Service threshold for each RC group

An RC group is a group of entries in either a MAP group or an MRN group that have the same relative cost value. An entity is either a point code entry in the MRN table or a point code and subsystem number entry in the MAP table.

A MAP group or MRN group can also be referred to as an entity set.

Weighted GTT Load Sharing can be applied to only load shared or combined dominant/load shared MAP or MRN groups, and cannot be applied to solitary mated applications, or dominant MAP or MRN groups.

## Individual Weighting

Individual weighting is a method for assigning a different load capacity to each member of an RC group. Each entity is assigned a weight from 1 to 99 and receives a percentage of the traffic equal to its weight relative to the RC group's total weight. To calculate the percentage of traffic that a particular entity receives within its RC group (assuming all nodes are active and available for traffic), use the following equation:

$$\% \text{ of traffic for the entity} = (\text{weight value assigned to the entity} / \text{RC group weight}) \times 100\%$$

---

**Note:** With round-robin load-sharing, there is a concept of the preferred entity. The preferred entity is the outcome of GTT. It is the first entity used for load-sharing after initialization, and is the primary entity for Class 1 SCCP Sequenced traffic. When weights are applied, no entity has any preference over another based on GTT information. Distribution is based on the RC group chosen by GTT, not the specific entity.

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## Individual Weighting Example

Table 2-1 shows how weighting affects traffic delivery. Entity A has a weight of 40 and the total RC group weight is 110, entity A receives 36% of the traffic. Entity C has a weight of 10 and receives only 9% of the traffic for this group. The total group weight is the sum of the individual weight values assigned to each entity in the group.

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**Note:** In order to maintain 100% for the RC group, some rounding may occur. This rounding error will always be  $\pm 1\%$ .

---

**Table 2-1 RC Group Weight Example**

Entity	RC	Weight	RC Group Weight	Percentage of Traffic
A	10	40	110	$(40 / 110) * 100\% = 36\%$
B	10	30		$(30 / 110) * 100\% = 27\%$
C	10	10		$(10 / 110) * 100\% = 9\%$
D	10	30		$(30 / 110) * 100\% = 28\%$

If all entities in an RC group have the same weight, the outbound traffic pattern provides equal distribution. For weighted load shared or weighted combined load shared MRN or MAP groups with In-Sequence Class 1 SCCP option on, In-Sequence Class 1 SCCP traffic is routed using the provisioned data as the initial method of routing and dynamic data (if the entity selected by provisioned data is prohibited) as the secondary method of routing. This allows all Class 1 traffic to be delivered to the same destination, and the traffic routing is affected unless the original destination changes status. If Transaction-Based GTT Load Sharing is not turned on, then the Weighted GTT Load Shared MSU Key is used. This provides a consistent MSU Key for the Class 1 SCCP

An MSU Key is a value calculated from parameters of an MSU that allows the MSU to be assigned to an entity within an RC group. An MSU Key always maps to the same entity until there is a status change to the MAP or MRN group.

### In-Service Threshold

The in-service threshold defines the minimum percentage of weight that must be available for an RC group to be considered available. If the percentage of the available weight is less than the in-service threshold, then the entire RC group is considered unavailable for traffic. If the percentage of the available weight is equal to or greater than the in-service threshold, then the RC group is considered available, and traffic can be sent to any available entity in the RC group. The in-service threshold helps to prevent congestion when only a small portion of the RC group is available.

The in-service threshold has an initial value of 1%, and has a range of values from 1% to 100%. Current round-robin load sharing has an in-service threshold value of 1%, where if any entity in an RC group is available, it is always used.

The group weight that must be available to carry traffic (the required group weight) is determined by multiplying the total group weight (the sum of the individual weight values assigned to each entity in the group) by the in-service threshold value, expressed as a percentage. For example, if the RC group weight is 110, and the in-service threshold is 75%, the required group weight is 82.

An RC group can be in one of three states: Available, Prohibited, and Threshold-Prohibited. These states are determined by comparing the required RC group weight to the weight of the entities that are actually available for traffic, the entity available weight.

If the state of the entity in the RC group is Available, the entity available weight is the weight value assigned to the entity. If the state of the entity in the RC group is either Congested or Prohibited, the entity available weight is 0. The sum of all entity available weights in the RC group is the RC group available weight. [Table 2-2](#) shows how the states of the RC group are determined.

**Table 2-2 RC Group In-Service Threshold States**

RC Group State	Description
Available	The RC group available weight is greater than or equal to the Required RC group weight. Traffic can be routed to the RC group in all circumstances.
Prohibited	All entities in the RC group are prohibited (the RC group Available Weight = 0). No traffic can be routed to this RC group.
Threshold-Prohibited	<p>At least one entity in the RC group is not prohibited, but RC group available weight is less than the required RC group weight. Even if the RC group available weight is 0, if one entity is congested, then the state of the RC group is Threshold-Prohibited. Normally, no traffic is routed to this RC group.</p> <p>The Transaction-based GTT Load Sharing and the SCCP Class 1 Sequencing features may route traffic to this group if the primary node is congested. Instead of moving this transaction-based traffic to another node and then back quickly when the congestion abates, routing will continue to the primary node.</p>

### In-Service Threshold Example

In the example shown in [Table 2-3](#), the RC group consisting of entities A, B, C, and D does not have sufficient available weight for the group (70 is less than 82), and therefore the RC group is considered Threshold-Prohibited. This RC group is unavailable for traffic.

The RC group consisting of entities E and F does have sufficient available weight for the group, and the RC group is considered Available.

The RC group consisting of entities G and H is Prohibited, since both entities G and H are Prohibited.

The RC group consisting of entities I and J is Threshold-Prohibited, since entity I is Congested. In order for the RC group status to be Prohibited, all entities in the RC group must be Prohibited. Non-Transaction-Based GTT Load Sharing traffic is not routed to the RC group.

If the Transaction-Based GTT Load Sharing feature is enabled and turned on, or SCCP Class 1 Sequencing is used, then traffic can be routed to entity I if that is the primary entity for the traffic (traffic would be routed if entity I were Available).

**Table 2-3 In-Service Threshold Example**

Entity	RC	Wgt.	RC Group Wgt.	In-Service Thresh old	Req. RC Group Wgt.	Entity Status	Entity Avail. Wgt.	RC Group Avail. Wgt.	RC Group In-Service Threshold Status
A	10	40	110	75%	82	Available	40	70	Threshold - Prohibited
B	10	30				Prohibited	0		
C	10	10				Prohibited	0		
D	10	30				Available	30		
E	20	30	40	100%	40	Available	30	40	Available
F	20	10				Available	10		
G	30	20	70	50%	35	Prohibited	0	0	Prohibited
H	30	50				Prohibited	0		
I	40	25	50	50%	25	Congested	0	0	Threshold - Prohibited
J	40	25				Prohibited	0		

### Load-Sharing Groups

Weighted GTT Load-Sharing can be applied to only load shared mated application or MRN groups, or combined dominant/load shared mated application or MRN groups.

A load shared MAP or MRN group is a MAP or MRN group containing entries whose RC (relative cost) values are equal.

When Weighted GTT Load Sharing is applied to load shared MAP or MRN groups, traffic is distributed among the entities according to:

- Entity Status – traffic is only routed to an entity if the entity is considered Available.
- Entity Available Weight – the entity receives a percentage of the traffic determined by its weight relative to the total available weight of the RC group.
- RC group status - refer to [Table 2-2](#).
- Available RC group weight – The sum of all entity available weights in the RC group.

Table 2-4 shows an example of Weighted GTT Load Sharing applied to a load shared MAP or MRN group.

**Table 2-4 Load Shared Group with Weighted GTT Load Sharing Example**

Entity	RC	Weight	RC Group Weight	In-Service Threshold	Required RC Group Weight	Entity Status
A	10	40	110	50%	55	Available
B	10	30				Prohibited
C	10	10				Available
D	10	30				Available

Entity	Entity Available Weight	RC Group Available Weight	RC Group In-Service Threshold Status	MAP or MRN Group Status	Current Load %
A	40	80	Available	Available	50%
B	0				0
C	10				13%
D	30				37%

All entities in the load shared group are in the same RC group, so if the RC group is unavailable for traffic, all traffic is discarded.

A combined dominant/load shared MAP or MRN group is a MAP or MRN group containing a minimum of two entries whose RC (relative cost) values are equal and a minimum of one entry whose RC value is different.

When Weighted GTT Load Sharing is applied to combined dominant/load shared MAP or MRN groups, traffic is distributed among the entities according to:

- Entity Status – traffic is only routed to an entity if the entity is considered Available.
- Entity Available Weight – the entity receives a percentage of the traffic determined by its weight relative to the total available weight of the RC group.
- RC group status – refer to Table 2-2.
- Available RC group weight – The sum of all entity available weights in the RC group.
- MRN or MAP Group Status – the MRN or MAP group must be considered Available in order to route traffic.

Table 2-5 shows an example of a weighted combined load shared group.

Based on the results of global title translation, traffic is routed to one of the RC groups in the weighted combined load shared group. If that RC group is unavailable for traffic, the RC group with the next highest cost that is available for traffic is used to route the traffic. If a higher cost RC group is being used to route traffic, and a lower cost RC group becomes available, the lower cost RC group is then used to route the traffic.



The status of the combined dominant/load shared group is based on the status of the RC groups that make up the combined dominant/load shared group. If the status of any RC group is Available, then the status of the combined dominant/load shared group is Available. If no RC group is available for traffic, but the status of at least one of the RC groups is Threshold-Prohibited, then the status of the combined dominant/load shared group is Threshold-Prohibited. If the status of all the RC groups is Prohibited, then the status of the combined dominant/load shared group is prohibited.

**Table 2-5 Combined Dominant/Load Shared Group with Weighted GTT Load Sharing Example**

Entity	RC	Weight	RC Group Weight	In-Service Threshold	Required RC Group Weight	Entity Status
A	10	40	110	75%	82	Available
B	10	30				Prohibited
C	10	10				Prohibited
D	10	30				Available
E	20	30	40	100%	40	Available
F	20	10				Available
G	30	10	10	1%	1	Available

Entity	Entity Available Weight	RC group Available Weight	RC group In-Service Threshold Status	MRN or MAP Group Status	Current Load %
A	40	70	Threshold - Prohibited	Available	0
B	0				0
C	0				0
D	30				0
E	30	40	Available		75%
F	10				25%
G	10	10	Available		100%

**Note:** The Current Load % column shows the percentage of traffic each entity in the RC group handles.

### MSU Routing under Congestion

For Transaction-Based GTT Load Sharing or SCCP Class 1 Sequenced traffic, the original destination of the traffic must be maintained under congestion. Diverting traffic during congestion can lead to invalid transaction states, and the originator is not informed of any problem. If a congested node is selected, then traffic is routed to that node. If the message is discarded, then a UDTS is generated so the originator is

informed of a problem. If the node is prohibited, then the selection of an alternate node is acceptable.

For all other traffic, rerouting this traffic away from a congested node is acceptable, since no sequencing or state information needs to be maintained. This can be accomplished by considering a congested entity as Unavailable (thus, its available weight is 0). The congested node receives no traffic. The state of the RC group may transition from Available to Threshold-Prohibited.

## Transaction-Based GTT Load Sharing

Transaction-Based GTT Load Sharing allows messages with the same transaction parameters (TCAP, SCCP, MTP, or ENHMTCP parameters) to be routed to the same destination within an entity set.

---

**Caution:**

This feature is not enabled by default and once it is enabled, it cannot be disabled. To enable it, use MMI, which is described in the MMI API guide under the Vstp: Feature Admin States section.

---

An entity set is a group of entities that are used to determine the proper destination of a post-GTT message. This group of entities can be one of the following:

- A mated application (MAP) group
- A mated relay node (MRN) group
- A mated application set (MAPSET), if the Flexible GTTLoad Sharing feature is enabled
- A mated relay node set (MRNSET), if the Flexible GTT Load Sharing feature is enabled.

This feature applies to the following types of SCCP messages:

- UDT/UDTS class 0 messages
- UDT/UDTS class 1 messages
- XUDT/XUDTS class 0 messages
- XUDT/XUDTS class 1 messages.

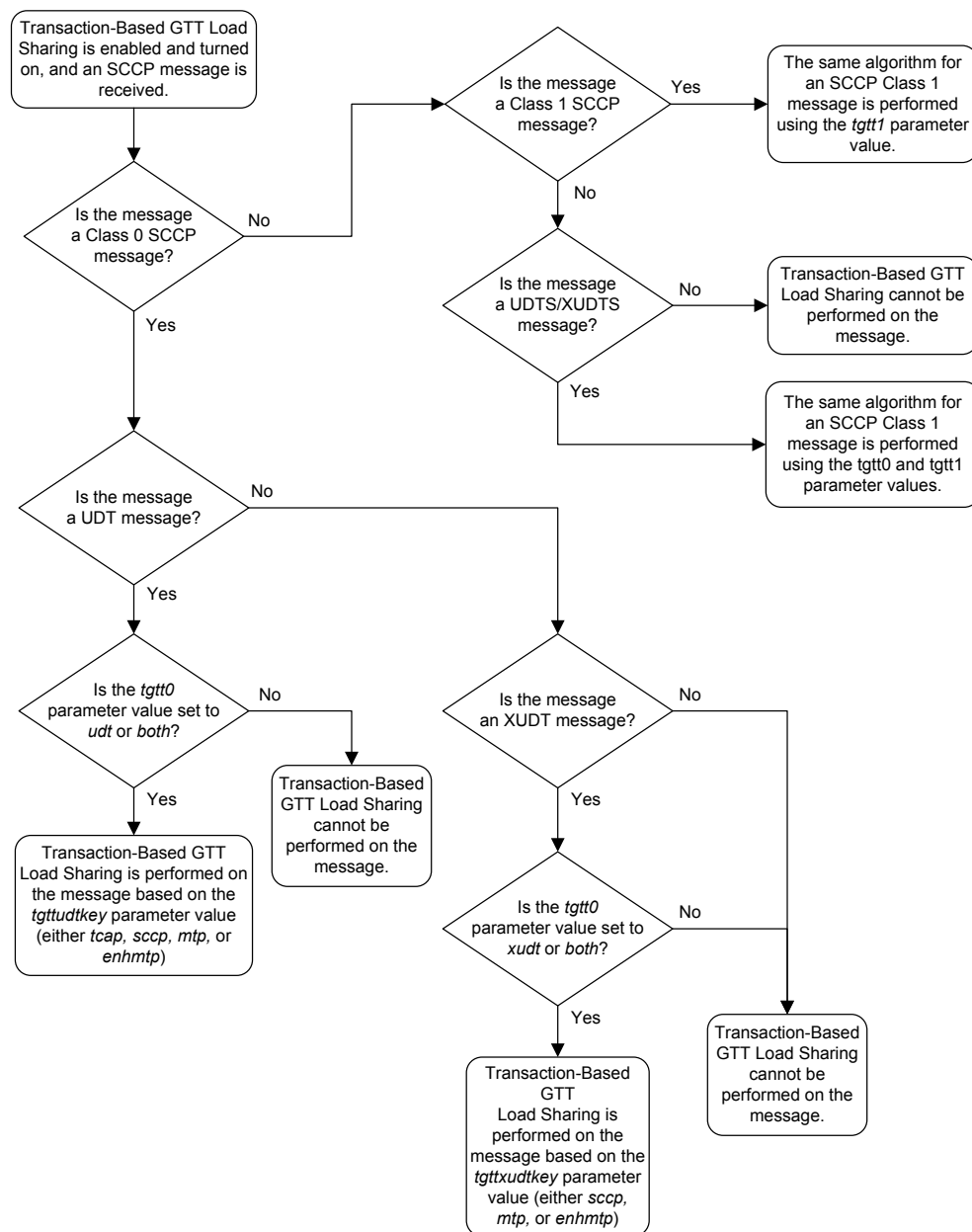
UDT/UDTS and XUDT/XUDTS messages are load shared using a key derived from these elements in the message.

- MTP parameters - the first 3 bytes of the incoming OPC and 1 byte of the SLS.
- SCCP parameters - the last 4 bytes of the global title address field of the called party address.
- TCAP parameter - the TCAP Transaction ID in the messages.
- Enhanced MTP parameter - a combination of the SLS and the incoming OPC values.

SCCP opts can be changed using MMI. Refer to MMI API documentation for updating the SCCP opts parameter. These parameters are:

- `tgtt0` – enable or disable Transaction-Based GTT Load Sharing for SCCP Class 0 UDT, UDTS, XUDT, or XUDTS messages.
- `tgtt1` – enable or disable Transaction-Based GTT Load Sharing for SCCP Class 1 UDT, UDTS, XUDT, or XUDTS messages.
- `tgttudtkey` – the Transaction Parameter for the incoming UDT or UDTS messages.
- `tgtxudtkey` – the Transaction Parameter for the incoming XUDT or XUDTS messages.

[Figure 2-6](#) describes how the Transaction-Based GTT Load Sharing SCCP options are used.

**Figure 2-6 Transaction-Based GTT Load Sharing SCCP Options**

Only load shared and combined dominant/load shared entity sets are used to determine the routing for messages that are processed by the Transaction-Based GTT Load Sharing feature.

Using a load shared entity set, the entire entity set is a part of one RC group and the messages are load-shared based on the Transaction Parameter in the entities in the entity set. If none of the entities in the entity set are available for routing, then the message is discarded and a UDTS/XUDTS message is generated if Return on Error is set in the SCCP message. A UIM is generated indicating that the message has been discarded.

Using a combined dominant/load shared entity set, the RC group containing the point code, or point code and SSN, obtained as a result of the global title translation process is used to determine how the message is routed. If none of the entities in this RC group are available for routing, the next higher cost RC group is chosen. This is repeated until an entity in an entity set is available for routing. When an entity is found that is available for routing, the message is routed according to the criteria in that entity. If none of the entities in the entity set are available for routing, the message is discarded. A UDTS/XUDTS message is generated if "Return on Error" is set in the SCCP message. A UIM is generated indicating that the message has been discarded.

## Scalability

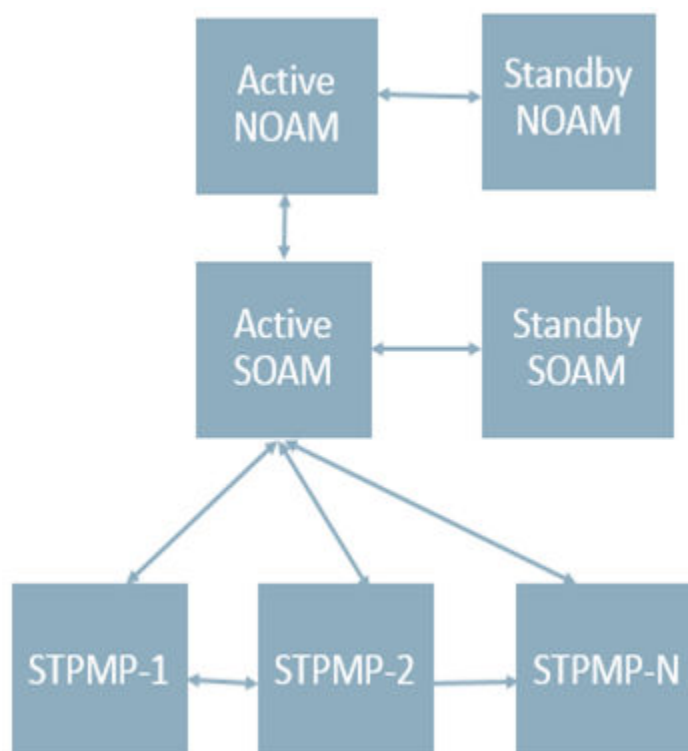
vSTP supports 320K MPS SS7 traffic capacity at the system level. This allows vSTP to support redundancy and diversity at the signaling interfaces. That is, more than one active STP-MP server can support signaling interfaces pointing toward the same remote signaling point.

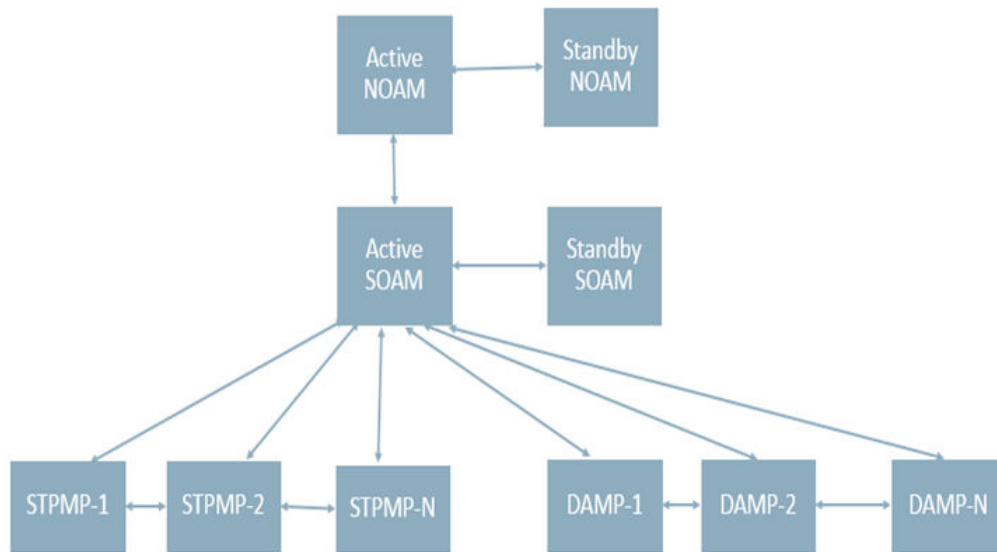
### Topology

vSTP supports two topologies.

- Only STP-MP servers in a site [Figure 2-7](#)
- STP-MP and DA-MP servers in a site [Figure 2-8](#)

**Figure 2-7 Only STP-MP site**



**Figure 2-8 STP-MP and DA-MP in a Site**

### Server Group Configuration

Figure 2-9 shows multiple STP servers in one server group.

**Figure 2-9 Multiple STP Servers in a Server Group**

Main Menu: Configuration -> Server Groups

Filter*		Warning																		
Server Group Name	Level	Parent	Function	Connection Count	Servers															
NO_SG	A	NONE	DSR (active/standby pair)	1	<div>Network Element NO_NE</div> <table><thead><tr><th>Server</th><th>Node HA Pref</th><th>VIPs</th></tr></thead><tbody><tr><td>pvscd2-noa</td><td></td><td></td></tr></tbody></table>	Server	Node HA Pref	VIPs	pvscd2-noa											
Server	Node HA Pref	VIPs																		
pvscd2-noa																				
SO1MP_SG1	C	SO_SG1	STP	1	<div>Network Element SO_NE1</div> <table><thead><tr><th>Server</th><th>Node HA Pref</th><th>VIPs</th></tr></thead><tbody><tr><td>pvscd2-so1mp1</td><td></td><td></td></tr><tr><td>pvscd2-so1mp2</td><td></td><td></td></tr><tr><td>pvscd2-so1mp3</td><td></td><td></td></tr><tr><td>pvscd2-so1mp4</td><td></td><td></td></tr></tbody></table>	Server	Node HA Pref	VIPs	pvscd2-so1mp1			pvscd2-so1mp2			pvscd2-so1mp3			pvscd2-so1mp4		
Server	Node HA Pref	VIPs																		
pvscd2-so1mp1																				
pvscd2-so1mp2																				
pvscd2-so1mp3																				
pvscd2-so1mp4																				
SO_SG1	B	NO_SG	DSR (active/standby pair)	1	<div>Network Element SO_NE1</div> <table><thead><tr><th>Server</th><th>Node HA Pref</th><th>VIPs</th></tr></thead><tbody><tr><td>pvscd2-soa1</td><td></td><td></td></tr></tbody></table>	Server	Node HA Pref	VIPs	pvscd2-soa1											
Server	Node HA Pref	VIPs																		
pvscd2-soa1																				

### HA Status

The HA role needs to be active for all STP servers as shown in Figure 2-10.

**Figure 2-10 HA Role for STP Servers**

Main Menu: Status & Manage -> HA

Hostname	OAM HA Role	Application HA Role	Max Allowed HA Role	Mate Hostname List	Network Element	Server Role	Active VIPs
pvscd2-soa1	Active	N/A	Active		SO_NE1	System OAM	
pvscd2-so1mp2	Spare	Active	Active	pvscd2-so1mp3 pvscd2-so1mp4	SO_NE1	MP	
pvscd2-so1mp3	Active	Active	Active	pvscd2-so1mp2 pvscd2-so1mp1 pvscd2-so1mp4	SO_NE1	MP	
pvscd2-so1mp1	Standby	Active	Active	pvscd2-so1mp2 pvscd2-so1mp3 pvscd2-so1mp4	SO_NE1	MP	
pvscd2-so1mp4	Spare	Active	Active	pvscd2-so1mp2 pvscd2-so1mp3 pvscd2-so1mp1	SO_NE1	MP	

## In-Sequence Delivery of Class 1 UDT Messages

The In-Sequence Delivery of Class 1 UDT Messages provides for the sequencing for both UDT and XUDT Class 1 MSUs. All UDT/XUDT Class 1 messages are routed out in the same order that they were received. To enable the sequencing of UDT/XUDT Class 1 messages, the `class1seq` parameter value of the SCCP options using MMI is set to `on`.

When the `class1seq` parameter value is `off`, load sharing of the UDT/XUDT Class 1 messages is performed using the load sharing configuration in the MAP and MRN tables. The delivery of the UDT/XUDT Class 1 messages in sequence is not guaranteed.

If the messages are not in the correct sequence when they arrive, they are not delivered to the next node in the correct sequence. Message re-sequencing is the responsibility of the originating and destination nodes.

GT-routed Class 0 UDT/XUDT messages are not sequenced.





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## MMI Managed Objects

This chapter provides basic information to access MMI configuration elements used by vSTP.

### MMI Managed Objects

MMI information associated with vSTP is accessed from a DSR NOAM or SOAM from **Main Menu > MMI API Guide**.

Once the *MMI API Guide* displays, use the application navigation to locate specific vSTP managed object information.



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## DSR Managed Objects

This chapter provides a basic overview of DSR system configuration elements used by vSTP.

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**Note:** Refer to the latest version of the *Operation, Administration, and Maintenance (OAM) Guide* for further details about DSR managed objects.

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### Users

The Users Administration page enables you to perform functions such as adding, modifying, enabling, or deleting user accounts. The primary purpose of this page is to set up users for logging into the system.

Each user is also assigned to a **group** or groups. Permissions to a set of functions are assigned to each group. The permissions determine the functions and restrictions for the users belonging to the group.

A user must have user/group administrative privileges to view or make changes to user accounts or groups. The administrative user can set up or change user accounts and groups, enable or disable user accounts, set password expiration intervals, and change user passwords.

### Groups

The Groups Administration page enables you to create, modify, and delete user groups. From this screen, you can control vSTP managed object permissions.

A group is a collection of one or more users who need to access the same set of functions. Permissions are assigned to the group for each application function. All users assigned to the same group have the same permissions for the same functions. In other words, you cannot customize permissions for a user within a group.

You can assign a user to multiple groups. You can add, delete, and modify groups except for the pre-defined user and group that come with the system.

The default group, **admin**, provides access to all GUI options and actions on the GUI menu. You can also set up a customized group that allows administrative users in this new group to have access to a subset of GUI options/actions. Additionally, you can set up a group for non-administrative users, with restricted access to even more GUI options and actions.

For non-administrative users, a group with restricted access is essential. To prevent non-administrative users from setting up new users and groups, be sure **User** and **Group** in the Administration Permissions section are unchecked. Removing the check marks from the Global Action Permissions section does not prevent groups and users from being set up.

**Figure 4-1 Global Action and Administration Permissions****Main Menu: Administration -> Access Control -> Groups [Insert]**

<b>Vstp Configuration Permissions</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Remote Hosts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Local Hosts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VstpConnections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
VstpConnectionStatus	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Vstp Connection Configuration Sets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Remote Signaling Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Local Signaling Points	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Link Sets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Links	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Routes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Link Status	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Vstp Link Set Status	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Vstp Remote Signaling Point Status	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>
Vstp Global Title Addresses	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp GTT Sets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp GTT Selectors	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Feature Admin States	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Sccp Options	<input type="checkbox"/>		<input type="checkbox"/>		
Vstp MRN Sets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp MAP Sets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp M2pa Options	<input type="checkbox"/>		<input type="checkbox"/>		
Vstp M3rl Options	<input type="checkbox"/>		<input type="checkbox"/>		
Vstp MP Leader	<input type="checkbox"/>				
Vstp GTT Actions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp GTT Action Sets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Vstp Capacity	<input type="checkbox"/>				
Vstp MP Peers Status	<input type="checkbox"/>				
Vstp Alarm Aggregation Options	<input type="checkbox"/>		<input type="checkbox"/>		

From the **Administration > Access Control > Groups** Insert page, mark the checkboxes to provide permissions and click **OK**. Return to the **Administration > Access Control > Groups** page and click **Report** to display a list of permissions for a group.

These checkboxes are grouped according to the main menu's structure; most folders in the main menu correspond to a block of permissions. The exceptions to this are the permission checkboxes in the Global Action Permissions section.

The Global Action Permissions section allows you to control all insert (**Global Data Insert**), edit (**Global Data Edit**), and delete (**Global Data Delete**) functions on all GUI pages (except User and Group). For example, if the **Network Elements** checkbox is selected (in the Configurations Permissions section), but the **Global Data Insert** checkbox is not selected, the users in this group cannot insert a new Network Element.

By default, all groups have permissions to view application data and log files.

## Networks

The Networks page is used to create the networks used for internal, external, and signaling communications. The networks are grouped into logical buckets called network elements. Only after creating these buckets can the networks themselves be defined. One advantage of this architecture is simplified network device configuration and service mapping.

The workflow is to first create the network elements and then define the individual networks inside each element.

## Devices

The Devices page is used to configure and manage additional interfaces other than what was configured during the initial installation.

## Routes

Use the route configuration page to define specific routes for traffic. You can specify routes for the entire network, specific servers, or specific server groups.

## Services

This feature allows for flexible network deployment by allowing you to map an application service to a specific network. Additionally, this feature allows for the differentiation of intra- and inter-networks on a per service basis. This means that traffic from different services can be segmented, which allows for service specific-networks and routes. This is predicated on the creation of network elements, networks, and routes to support the segmentation of service traffic.

Geo-redundant (spare) nodes and dual-path monitoring are special code on the node at the spare site that continually monitors the availability of the database instances at the primary site to determine if an automatic failover should occur due to loss of the active site servers. In the event of a network outage, it is possible that if the system is monitoring a single network path only and intra- and inter-networks are differentiated, an erroneous condition might occur where both sites try to assume activity. Inherent dual-path monitoring protects against this scenario.

The core services are:

- OAM
- Replication
- Signaling
- HA\_Secondary
- HA\_MP\_Secondary

- Replication\_MP

For example, segregation of replication traffic might occur for inter-network (WAN) traffic only. Prerequisite configuration work would have included the creation of at least one LAN network and two WAN networks along with the related routes. For the purposed of this example, these could be named LAN1, WAN1, and WAN2. The services mapping might look similar to the settings in [Table 4-1](#).

**Table 4-1 Core Services**

Name	Intra-NE Network	Inter-NE Network
OAM	Unspecified	Unspecified
Replication	LAN1	WAN1
Signaling	Unspecified	Unspecified
HA_Secondary	Unspecified	Unspecified
HA_MP_Secondary	Unspecified	Unspecified
Replication_MP	LAN1	WAN2

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**Note:** Services might vary depending on the application. For example, DSR adds a service known as ComAgent to the existing core services. Additionally, workflow and provisioning instruction might differ from the direction provided here. Always follow the provisioning guidelines for your specific application and release.

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## Servers

Servers are the processing units of the application. Servers perform various roles within the application. The roles are:

- Network OAM&P (NOAMP) - The NOAMP is one active and one standby server running the NOAMP application and operating in a high availability global configuration. It also provides a GUI which is used for configuration, user administration and the viewing of alarms and measurements.
- System OAM (SOAM) - The SOAM is the combination of an active and a standby application server running the SOAM application and operating in a high availability configuration. SOAM also provides a GUI used for local configuration and viewing alarms and measurements details specific to components located within the frame (SOAM, MP). The SOAM supports up to 8 MPs.

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**Note:** SOAM is not an available role in systems that do not support SOAMs.

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- MP - MPs are servers with the application installed and are configured for MP functionality.

The role you define for a server affects the methods it uses to communicate with other servers in the network. For more information about how each interface is used, refer to the Network Installation Guide that came with the product.

## Server Groups

The Server Groups feature allows the user to assign a function, parent relationships, and levels to a group of servers that share the same role, such as NOAM, SOAM, and MP servers. For vSTP-MPs, MPs work as a vSTP server group can be configured as STP. The purpose of this feature is to define database relationships to support the high availability architecture. This relates to replication, availability, status, and reporting at the server level.

From the Server Groups page users can create new groups, edit groups, delete groups, and generate reports that contain server group data. Servers can be added or removed from existing groups using the edit function.

The Server Groups page can be accessed from the main menu by navigating to **Configuration > Server Groups**. The page displays a grid reflecting all currently configured server groups.

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**Note:** Depending on the application configuration, the preferred HA role preference, or NE HA Pref, may not be displayed.

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# Alarms, Errors, KPIs, and Measurements

This chapter describes the types of alarm, error, KPI, and measurements information that is available for vSTP.

## vSTP Alarms and Events

The vSTP alarms and events are described in the *Alarms and KPIs Reference*, which can be accessed as described in [Locate Product Documentation on the Oracle Help Center Site](#).

Active alarms and events and alarm and event history can be displayed on the **Alarms & Events > View Active** and **Alarms & Events > View History** pages.

## vSTP Measurements

Measurements for vSTP are collected and reported in various measurement groups.

A measurement report and a measurement group can be associated with a one-to-one relationship. A measurements report can be generated with report criteria selected on the **Measurements > Reports** page.

The *Measurements Reference*, which can be accessed as described in [Locate Product Documentation on the Oracle Help Center Site](#), explains the report selection criteria and describes each measurement in each measurement group.

## vSTP Errors

Errors for vSTP are collected and reported in various error groups.

### GTT Actions

Resource GTT Actions (/vstp/gttactions).

A GTT Action entry consists of an Action ID, an action, and action-specific data. The action specified in the entry determines the actions performed on the MSU during translation.

GTT Actions is added in DSR 8.2 as part of the GTT actions feature.

**Table 5-1 GTT Actions Errors**

Error Code Number	Description
001 - Missing Field Value	
002 - Invalid Syntax	CGPC must be in proper point code format.

**Table 5-1 (Cont.) GTT Actions Errors**

Error Code Number	Description
003 - Field value must be unique	The GTT Action entry specified by the actid parameter cannot already exist in the database.
071 - Operation failed. The entry no longer exists	<p>The specified MAP set must already exist in the database or MRN table.</p> <p>or</p> <p>The specified Action ID must already exist in the database.</p> <p>or</p> <p>The specified GTT Action entry must already exist in the database.</p>
50136 - MAPSET must be specified (only) if RI parameter is SSN	If the ri=gt parameter is specified, then the mapset parameter cannot be specified.
50137 - MRNSET must be specified (only) if RI parameter is GT	If the ri=ssn parameter is specified, then the mrnset parameter cannot be specified.
50141 - With FGTTLS feature in OFF state, MAP Set Id must not be specified	The Flexible GTT Load Sharing feature must be enabled before the mapset parameter can be specified.
50142 - With FGTTLS and IGTTLS feature in OFF state, MRN Set ID must not be specified	The Flexible GTT Load-Sharing feature must be enabled before the mrnset parameter can be specified.
50143 - RSP does not exist in the routing table	The value specified for the rsp parameter must already exist as a destination in the Route table.
50207 - RSP does not exist in specified MRNSET	If the Flexible GTT Load Sharing feature is enabled, the specified PC must already exist in the specified MRN set.
50208 - RSP/SSN does not exist in MAPSET	<p>The specified rsp and ssn must already exist in the specified MAP set.</p> <p>or</p> <p>If the rsp, ri=ssn and ssn parameters are specified, then the RSP/SSN must be populated in the MAPSET table.</p>

**Table 5-1 (Cont.) GTT Actions Errors**

Error Code Number	Description
50215 - Invalid parameter combination specified	<ul style="list-style-type: none"> <li>A value of disc, udts, tcaperr must be specified for the act parameter before a value of uimreqd can be specified for the on or off parameter.</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>A value of dup or fwd must be specified for the act parameter before the rspName, cgpc, cgpcogmsg, domain, ssn, ri, mrnset, mapset parameter can be specified and before a value of useicmsg can be specified for the on or off parameter.</li> <li>The act=tcaperr parameter must be specified before the atcaperr and itcaperr parameters can be specified.</li> <li>The act=udts parameter must be specified before the udtterr parameter can be specified.</li> <li>The act=fwd parameter must be specified before the defactid parameter can be specified.</li> </ul> <p>or</p> <ul style="list-style-type: none"> <li>A value of fwd, dup must be specified for the act parameter before a value of useicmsg can be specified for the on or off parameter.</li> </ul>
50216 - RSP and CGPC must be of same domain	<p>The values specified for the RSP and CGPC parameters must have the same domain.</p> <p>or</p> <p>The rspName and CGPC parameters must have the same domain.</p>
50217 - Maximum number of GTT Actions within this site has already been configured (max={2000})	The GTT Action table cannot contain more than 2000 entries.
50218 - CGPC/DOMAIN must be specified	<p>If a value of dup or fwd is specified for the act parameter then the rspName parameter must be specified.</p> <p>If the ri=ssn parameter is specified, then the ssn parameter must be specified.</p> <p>If the value of the cgpcogmsg=provcgpc parameter is specified, then the cgpc and domain parameter must be specified.</p>

**Table 5-1 (Cont.) GTT Actions Errors**

Error Code Number	Description
50219 - GTT Action ID does not exist	The GTT Action ID specified by the defactid parameter must already exist.
50220 - The type of the action for DEFACTID shall be disc, udts, tcaperr	A value of disc, udts, or tcaperr must be specified for the defactid parameter.
50221 - GTT Action entry is referenced	The value specified by the act parameter cannot be changed until the associated Action ID is referenced by an Action Set or by any forward action. or The Action ID specified by the actid parameter cannot be referenced by an Action Set or an action entry that is associated an action of fwd.
50222 - GTT Action entry is referenced and can only be changed from disc/udts/tcaperr to disc/udts/tcap.	The value can only be changed from disc/udts/tcaperr to disc/udts/tcap.
50223 - GTT Action ID must not be fallback	A value of fallback cannot be specified for the actid parameter.

**GTT Action Sets**

Resource GTT Action Sets (/vstp/gttactionsets).

Global Title Translation (GTT) Action Set consists of an Action Set name and a group of actions.

**Table 5-2 GTT Action Sets Errors**

Error Code Number	Description
001 - Missing Field Value	At least one Action ID should be provided in GTT Action Set.
50231 - GTT Action name already provisioned in GTT Action Set	The value specified by the actsn parameter cannot already exist in a GTT Action Set.
50232 - GTT Action ID does not exist	The Action ID specified by the actid1/actid2 parameter(s) must already exist in the GTT Action table.
50233 - Maximum number of GTT Action Set within this site has already been configured (max={20000}).	The GTT Action Set table cannot contain more than 20000 entries.

**Table 5-2 (Cont.) GTT Action Sets Errors**

Error Code Number	Description
50234 - Invalid Combinations. ACTID1 should be DUP	<p>If one action Id is provided, then it can be associated with an action of any type (dup, disc, udts, tcaperr, fwd) in GTT Action Set.</p> <p>If both action Ids are provided, then first action id should be associated with an action of 'dup', and second action id should be associated with an action of disc, udts, tcaperr, or fwd in GTT Action Set.</p>
50235 - GTT Action IDs should be unique in a GTT Action Set	The actid1/actid2 parameters must each specify a unique GTT Action ID in the command.
50236 - GTT Action Set does not exist	The specified GTT Action Set name must already exist in the database.
50236 - GTT Action ID does not exist	The Action ID specified by the actid1/actid2 parameter(s) must already exist in the GTT Action table.
50237 - GTT Action Set is referenced by translations	The GTT Action entry cannot be referred by any translation entry.
50334 - GTT Action DUP and FWD must have same domain	GTTASET: Dup and Fwd Actions must have same domain, implement error code as per Bug# 26809167.

### GTT Selectors

Resource GTT Selectors (/vstp/gttselectors).

Global Title Translation (GTT) Selector is an entity assigned to a GTT Set.

**Table 5-3 GTT Selectors Errors**

Error Code Number	Description
001 - Missing Field Value	<p>At least one GTT set name parameter must be specified. These parameters include:</p> <ul style="list-style-type: none"> <li>• gttsn or</li> <li>• cdgttsn and/or cggtsn</li> </ul>

**Table 5-3 (Cont.) GTT Selectors Errors**

Error Code Number	Description
071 - Operation failed. The entry no longer exists	<p>The linkset specified by the linksetName parameter must already exist.</p> <p>or</p> <p>The value specified for the gttsn parameter must match the name of an existing GTT set.</p> <p>or</p> <p>The GTT set specified by the gttsn parameter must already exist in the GTT Set table.</p> <p>or</p> <p>The GTT set specified by the cdgttsn parameter must already exist in the GTT Set table.</p>
50106 - Translation Type, NAI(v) and NP(v) must be specified when GTI value is \TtNumEncodingNature\'	<p>If a value of 2 or 4 is specified for the gti(x) parameter, then the tt parameter must be specified.</p> <p>or</p> <p>If the gtii/gtin/gtin24/gtiis/gtins/gtin16=4 parameter is specified, an np(v)/nai(v) parameter combination must be specified. These parameters can be specified in any combination.</p> <p>or</p> <p>If the gtii/gtin/gtin24/gtiis/gtins/gtin16=4 parameter is specified, an np(v)/nai(v) parameter combination must be specified. These parameters can be specified in any combination: np/naiv, npv/nai, np/nai, or npv/naiv.</p>
50107 - Translation Type must be specified when GTI value is \TtOnly\'	<p>If a value of 2 or 4 is specified for the gti(x) parameter, then the tt parameter must be specified.</p>
50108 - NAI(v) or NP(v) must not be specified when GTI value is \TtOnly\'	<p>If the gti/gtia/gtii/gtin/gtin24/gtiis/gtins/gtin16=2 parameter is specified, then the np/npv and nai/naiv parameters cannot be specified.</p>
50109 - NAI(v), NP(v), or TT must not be specified when GTI value is \NoGlobal\''	<p>If the gti(x)=0 parameter is specified, then the tt, np/npv, and nai/naiv parameters cannot be specified.</p> <p>or</p> <p>If the gti(x)=0 parameter is specified, then the eaglegen, tt, np/npv, and nai/naiv parameters cannot be specified.</p>

**Table 5-3 (Cont.) GTT Selectors Errors**

Error Code Number	Description
50110 - NAI entries per TT-NP combination has reached allowed max of {max}	If the gti(x)=4 parameter is specified, then the GTT selector table cannot have more than 5 nai entries per tt/np combination.
50111 - NAI and NAI Value both cannot be specified	The nai and naiv parameters cannot be specified in the same command. or The nai and naiv parameters cannot be specified together in the same command.
50112 - NP and NP Value both cannot be specified	The np and npv parameters cannot be specified in the same command. or The np and npv parameters cannot be specified together in the same command.
50113 - CdPA GTT Set type must be cdgta	The GTT set specified by the gttsn parameter must have a set type of cdgta
50114 - GTT Selector domain does not match with the domain of the GTT set	The network domain of the specified GTT selector must match the domain of the GTT set that is specified by the cdgttsn and/or cggtsn parameter.
50165 - GTI and TT/NP/NAI/CGSSN/SELID/LINKSET combination is not unique	An entry cannot already exist that matches the gti, tt, and np(v), and nai(v) and cgssn and selid and linkset parameter combination for the specified CdPA and/or CgPA selector.
50248 - MBR settypes cannot be referenced by GTT selectors	The MBR supported GTT set types (IMSI/MSISDN) cannot be referenced by GTT selectors.
50249 - GTTSN and CDGTTSN/CGGTTSN/LINKSETNAME/CGSSN/SELID are mutually exclusive	The gttsn and cdgttsn/cggtsn/linkset name/cgssn/selid parameters cannot be specified together in the command.
50250 - CGSSN and CDGTTSN value both cannot be specified	The cgssn and cdgttsn parameters cannot be specified together in the command.
50251 - LinkSet domain must match the domain of GTT selector	The linkset domain must match the domain of the GTT selector.

**GTT Addresses**

Resource GTT Addresses (/vstp/globaltitleaddresses).

Global Title Translation (GTT) Global title address (GTA) information for applicable global title selectors required to specify a global title entry.

**Table 5-4 GTT Addresses Errors**

Error Code Number	Description
GTT Set Name: {ERR_ONT_002} - Invalid Syntax.	The gttsn parameter must be specified and must match an existing gttsn.
Routing Signaling Point: {ERR_ONT_002} - Invalid Syntax.	The pc parameter cannot be out of range.
50122 - Maximum Number of GTA have already been configured. (max={50000}).	The GTT table cannot be full in case a delete command causes a split requiring more entries to be added.
50122 - Maximum Number of GTA have already been configured. (max={270000}).	The GTA table cannot contain more than 270000 entries.
50122 - OPTSN GTT set type is not compatible with GTTSN set type	<p>If the GTTSN set has a set type of cdgta or cdssn, then the OPTSN set cannot have a set type of opc.</p> <p>If the GTTSN set has a set type of opcode, then the OPTSN set cannot have a set type of opc.</p> <p>If the GTTSN set has a set type of MBR (imsi/msisdn), then the OPTSN set type cannot have the same set type as GTTSN.</p> <p>If the OPTSN set has a set type of MBR (imsi/vmsisdn), then the GTTSET must have a set type of MBR (imsi/msisdn) or opcode.</p>
50126 - GTA End Address must be greater than or equal to the value of the GTA Start Address	If the endAddress/emapaddr parameter is specified, then the value of the endAddress/emapaddr parameter must be greater than or equal to the value of the startAddress/smapaddr parameter.
50128 - Routing Indicator must be specified as '\GT\' when Translate Indicator is '\DPCNGT\'.	If the xlat=dpcngt parameter is specified, then the ri=gt parameter must be specified.
50129 - Sub System Number must be specified when Translate Indicator is '\DPCSSN\'	If the xlat=dpcssn parameter is specified, then the ssn parameter must be specified.



**Table 5-4 (Cont.) GTT Addresses Errors**

Error Code Number	Description
50134 - Start Address and End Address Range is overlapping with existing GTA - {gttsets}	The specified startAddress/endAddress or smapaddr/emapaddr range must exist for the specified GTT set in the STP active database. While an exact match is not required, you cannot specify an overlap with another range. If the range overlaps, an error is generated that displays a list of overlapped global title addresses. An example follows that shows what happens when the user attempts to enter a global title address range (such as 8005550000 to 8005559999) that overlaps an existing range. The overlapping links must match. If they do not, the error message displays the list of overlapped global title addresses.
50135 - Translate Indicator must be \DPCSSN\ when Sub System Number is specified	If the ssn parameter is specified, then the xlat=dpcssn parameter must be specified.
50143 - RSP does not exist in the routing table	The value specified for the pc parameter must exist as a destination in the Route table or reside in a cluster that exists as a destination in the Route table (for global routing).
50176 - Length of ENDADDRESS/EMAPADDR must be equal to length of STARTADDRESS/SMAPADDR	If the endAddress/emapaddr parameter is specified, then the values of the startAddress/smapaddr and endAddress/emapaddr parameters must be the same length.
50176 - Exceeding max GTA Lengths supported per GTT SET (max={16}).	Since the Support for 16 GTT Lengths in VGTT feature is always turned on, up to 16 GTA/SADDR lengths can exist per GTT set. or The Support for 16 GTT Lengths in VGTT feature, then up to 16 GTA/SADDR lengths can exist per GTT set.
50182 - Update of GTT Set is not allowed	gtsn (Gtt Set name) should not be edited.
50183 - Update of GTA Start Address is not allowed	gta (start gta) should not be edited.

**Table 5-4 (Cont.) GTT Addresses Errors**

Error Code Number	Description
50204 - RSP does not exist in specified MAPSET	<p>If a final GTT (the ri=ssn parameter is specified with the xlat=dpc parameter), then the PC (pc/pca/pci/pcn/pcn24/pcn16) must exist in the Remote Point Code/MAP table.</p> <p>or</p> <p>If a final GTT (the ri=ssn parameter is specified with the xlat=dpc parameter), then the PC must exist in the Remote Point Code/MAP table.</p>
xxxxx - ACN parameter is allowed with ITU TCAP PKGTYPE	If the acn parameter is specified, then a value of bgn, ituabort, ituuni, any, end, or cnt must be specified for the pkgtype parameter.
xxxxx - Both FAMILY and OPCODE must be NONE if either is NONE	If the family and opcode parameters are specified in the command, then either both parameters must have a value of none or neither parameter can have a value of none.
xxxxx - CCGT must be NO when the RI is set to GT	If the ri=gt parameter is specified, then the ccgt=no parameter must be specified.
xxxxx - CDSSN param must be specified if GTTSN settype is CDSSN	If the GTT set specified by the gtsn parameter has a set type of cdssn (see the ent-gttset command), then the cdssn parameter must be specified. This parameter cannot be specified for GTT sets with other set types.
xxxxx - CGPCx parm must be specified if GTTSN is type of CGPC	<p>If the GTTSN set type has a value of cgpc, the cgpc/cgpca/cgpci/cgpcn/cgpcn24 parameter must be specified. This parameter cannot be specified for other set types.</p> <p>or</p> <p>If the GTTSN set type has a value of cgpc, the cgpc parameter must be specified. This parameter cannot be specified for other set types.</p>
xxxxx - CGSSN cannot be specified with OPTSN/OPCSN/CGSELID	<p>If the cgssn parameter is specified, then the optsn, opcsn, and cgselid parameters cannot be specified.</p> <p>or</p> <p>If the cgssn parameter is specified, then the optsn and cgselid parameters cannot be specified.</p>

**Table 5-4 (Cont.) GTT Addresses Errors**

Error Code Number	Description
xxxxx - CGSSN/CDSSN range cannot overlap an existing range	The range specified by the cdssn/ecdssn and cgssn/ecgssn parameters cannot overlap a currently existing range for the specified GTT set.
xxxxx - CGSSN parm must be specified if GTTSN is type of CGSSN	If the GTTSN set type has a value of cgssn, the cgssn parameter must be specified. The cgssn parameter cannot be specified for GTTSN of other types.
xxxxx - DEFMAPVR is supported by MBR GTT settypes	The defmapvr parameter can be specified in the GTA command for the ITU opcode entry if the GTT set specified by the optsn parameter is of MBR type (IMSI/MSISDN).
xxxxx - End value must be greater than or equal to a starting value	The value specified for the ecgssn or ecdssn parameter must be greater than the value specified for the cgssn or cdssn parameter.
xxxxx - FAMILY parameter is allowed with ANSI TCAP PKGTYPE	If the family parameter is specified, then a value of ansiuni, qwp, qwop, resp, cwp, cwop, ansiabort, or any must be specified for the pkgtype parameter.
xxxxx - GTA End Address must be greater than or equal to the value of the GTA Start Address	If the endAddress/emapaddr parameter is specified, then the value of the endAddress/emapaddr parameter must be greater than or equal to the value of the startAddress/smapaddr parameter.
xxxxx - GTA parm must be specified if GTTSN is type of CDGTA/CGGTA	The GTA must be specified if the GTTSN set type has a value of cdgta or cggta. The GTA cannot be specified for other set types.
xxxxx - GTT Action Set does not exist	The specified GTT Action Set must already exist in the database.
xxxxx - GTTSET MBR Settypes Support ITU BGN/CNT/END Pkgtype	If the GTT set specified by the optsn parameter is of MBR type (IMSI/MSISDN) in the GTA command for the ITU opcode entry, then the package type specified via the pkgtype parameter must be ITU BGN/CNT/END.
xxxxx - GTT Set specified by OPTSN/OPCSN does not exist	The GTT set specified by the optsn and opcsn (cgcnsn is not supported by VSTP) parameter must match an existing GTT set.
xxxxx - GTTSN set name must not be same as OPTSN set name	The same value cannot be specified for the gttsn and optsn parameters.

**Table 5-4 (Cont.) GTT Addresses Errors**

Error Code Number	Description
xxxxx - Invalid parameter combination specified	<p>If the cgssn parameter is specified, then the ecdssn parameter cannot be specified. If the cdssn parameter is specified, then the ecgssn parameter cannot be specified.</p> <p>or</p> <p>If the xlat=none parameter is specified, then the ri, pc/pca/pci/pcn/pcn24/pcn16, force, ssN and ccgt parameters cannot be specified.</p> <p>or</p> <p>The specified GTT set must have a set type of opcode (see the ent-gttset command) before the opcode/acn/pkgtype or opcode/family/pkgtype parameters can be specified. The specified GTT set must have a set type of cdssn, cgssn, cdgta/cgta, opc, or cgpc before the cdssn, cgssn, gta, opc, or cgpc parameter, respectively, can be specified.</p> <p>or</p> <p>The acn and family parameters cannot be specified together in the command.</p> <p>or</p> <p>If the opc parameter is specified, then the startAddress/endAddress, (e)cgssn, (e)cdssn, and opcode parameters cannot be specified.</p>
xxxxx - OPCODE param must be specified if GTTSN settype is OPCODE	<p>If the GTT set specified by the gttsn parameter has a set type of opcode (see the ent-gttset command), then the opcode/acn/pkgtype or opcode/family/pkgtype parameter must be specified. These parameters cannot be specified for GTT sets of any other set types.</p>
xxxxx - OPCODE, PKGTYPE, ACN/FAMILY must be specified together	<p>The opcode, pkgtype, and family parameters must be specified together for ANSI TCAP translations. The opcode, pkgtype, and acn parameters must be specified together for ITU TCAP translations.</p>
xxxxx - OPCODE is valid with cdgta/cdssn/opcode GTTSN type	<p>The GTT set specified by the gttsn parameter must have a set type of cdgta, opcode, or cdssn (see the ent-gttset command) before the opcsn parameter can be specified.</p>

**Table 5-4 (Cont.) GTT Addresses Errors**

Error Code Number	Description
xxxxx - OPCS <sub>N</sub> set domain must be the same as GTTS <sub>N</sub> set domain	The OPC set name domain must be the same as the GTTS <sub>N</sub> set domain. If the GTT set domain is ANSI, then the OPC set name domain must be ANSI. If the GTT set domain is ITU, then the OPC set name domain must be ITU.
xxxxx - OPC <sub>x</sub> parm must be specified if GTTS <sub>N</sub> is type of OPC	The opc parameter must be specified if the GTTS <sub>N</sub> set type has a value of opc. These parameters cannot be specified for other set types.
xxxxx - OPTS <sub>N</sub> and CGSELID/CDSELID are mutually exclusive	The cdselid, cgselid, and optsn parameters cannot be specified together in the command. If the GTT set has a set type of cdgta, cdssn, or opcode, then the opcsn parameter can be specified with one of the above parameters.
xxxxx - OPTS <sub>N</sub> GTT set type is not compatible with GTTS <sub>N</sub> set type.	<p>If the GTTS<sub>N</sub> set has a set type of cdgta or cdssn, then the OPTS<sub>N</sub> set cannot have a set type of opc.</p> <p>If the GTTS<sub>N</sub> set has a set type of opcode, then the OPTS<sub>N</sub> set cannot have a set type of opc.</p> <p>If the GTTS<sub>N</sub> set has a set type of MBR (imsi/msisd<sub>N</sub>), then the OPTS<sub>N</sub> set type cannot have the same set type as GTTS<sub>N</sub>.</p> <p>If the OPTS<sub>N</sub> set has a set type of MBR (imsi/vmsisd<sub>N</sub>), then the GTTSET must have a set type of MBR (imsi/msisd<sub>N</sub>) or opcode.</p>
xxxxx - PKGTYPE abort requires ACN/FAMILY/OPCODE value none	If the pkgtype=ituabort parameter is specified, then a value of none must be specified for the acn and opcode parameters.
xxxxx - Point code out of range	The cgpc, opc parameters must have a valid value within the range for each subfield.
xxxxx - RI must be SSN when CCGT is YES	If the ccgt=yes parameter is specified, then the ri=ssn parameter must be specified.
xxxxx - Set type of GTT Set Name doesn't match	The GTT set name specified by the opcsn parameter must have a set type of opc (see the ent-gttset command).
xxxxx - SMAPADDR must be specified for MBR GTT settypes	The smapaddr parameter must be specified if the GTT set specified by the gtt <sub>N</sub> parameter is of MBR type (IMSI/MSISDN).
xxxxx - STARTADDRESS/CGPC/OPC/CG-CDSSN/OPCODE/DPC/SMAPADDR are mutually exclusive	The cgpc, cgssn, gta, opc, cdssn, opcode, and smapaddr parameters cannot be specified together in the command.

**Table 5-4 (Cont.) GTT Addresses Errors**

Error Code Number	Description
xxxxx - STARTADDRESS/CGPC/OPC/CGSSN/CDSSN/OPCODE/DPC/SMAPADDR must be specified	The startAddress, cgpc, opc, cgssn, cdssn, opcode/acn/pkgtype, opcode/family/pkgtype or smapaddr parameter must be specified.
xxxxx - Translation entry already exists	The translation entry specified by the cgpc, opcode, opc parameters cannot already exist.
SQL error: Database Operation Failed	Failure while reading GTT Action Set Table. or The GTT Set table is corrupt or cannot be found. or The GTA table is corrupt or cannot be found. or The Route table is corrupt or cannot be found. or The MRN table is corrupt or cannot be found. or The MAP table is corrupt or cannot be found.

### GTT Sets

Resource GTT Sets (/vstp/gttsets).

A GTT set consists of a GTT set name, the domain of the point codes used in the translation. After the GTT set is provisioned, you can enter subsequent GTT Selectors and GTAs. It is a collection of GTAs which are searched during GTT routing.

**Table 5-5 GTT Sets Errors**

Error Code Number	Description
003 - Field value must be unique	The gtsn parameter must be specified and must not match an existing gtsn.
071 - Operation Failed, the entry no longer exists.	The gtsn parameter must be specified and must match an existing GTT set. or The value specified for the gtsn parameter must match the name of an existing GTT Set.
50098 - Maximum number of GTT Set within this site have already been configured (max={2000})	The GTT Set table cannot contain more than 2000 entries.
50100 - Delete Failed. Selected GTT Set is associated with GTAs	The GTT set cannot be deleted if it is referenced in the GTTSEL or GTA tables.

**Table 5-5 (Cont.) GTT Sets Errors**

Error Code Number	Description
50101 - Delete Failed. Selected GTT Set is associated with GTT Selectors	The GTT set cannot be deleted if it is referenced by npsn.
50238 - GTT settype and NPSN settype should be of MBR settypes	The GTT set type of the GTT set entry and the set type of associated NPSN parameter should be of MBR (IMSI/MSISDN) set types.
50239 - NPSN SETTYPE should be different from GTT SETTYPE	The GTT set type of the GTT set entry referred to by the NPSN parameter should be different from the GTT set type referred to by the GTTSN parameter.
50240 - NPSN not configured under GTTSET	The value specified for the NPSN parameter must be an existing GTT set of MBR (IMSI/MSISDN) set types.
50241 - GTTSET and NPSN set domain mismatch	The GTTSET domain and associated NPSN set domain must match.
50242 - GTT Set does not exist	The specified GTT Set name must already exist in the database.
50243 - GTT Set already referenced in GTTSELECTOR/GTA/GTTSET. Domain/Type cannot be changed	If GTT Set is referenced in GTT Selector or GTA or in NPSN parameter of GTT Set, then user is not allowed to update domain and settype. In this case, only npsn parameter can be changed.
50244 - GTT Set already referenced in GTTSET as NPSN	
xxxxx - GTTSN and NPSN must not form Circular Entries	The GTT set specified by the gttsn parameter must not be associated with the GTT set referred by the NPSN parameter.
SQL error: Database Operation Failed	The GTT Set table must be accessible.

## Link Sets

Resource GTT Link Sets (/vstp/linksets).

A Link Set is a logical element representing link attributes assigned to a link and a far end-point assigned to a Route.

**Table 5-6 Link Sets Errors**

Error Code Number	Description
AS Notification: {ERR_ONT_002}	The ipsg=yes and adapter=m3ua parameters must be specified before the asnotif parameter can be specified.

**Table 5-6 (Cont.) Link Sets Errors**

Error Code Number	Description
Link TPS: {ERR_ONT_002}	The value specified for the slktps/ rsvdslktps and maxslktps parameters must be within the allowed range.  slktps/rsvdslktps maxslktps
Link Name: {ERR_ONT_003}	The specified linkset name cannot already exist in the database.
50068 - Maximum number of Link Set within this site have already been configured (max={max})	The maximum number of linksets that can be defined in the system is 1024.
50072 - Delete Failed: This Link Set is associated with Link	The linkset can be removed only if all links associated with the linkset have been removed.
50073 - Delete Failed: This Link Set is associated with Route	If the linkset is referenced by the historic routeset of any destination, then this command cannot be entered.
50075 - Point code already in use in Local Signaling Point={name}	The specified adjacent point code cannot be the same as the self-ID destination point code of the STP.  or  The adjacent point code cannot match the site point code.
50086 - ITU Transfer Restricted can only be configured for ITUN linksets	The itutfr parameter is valid only for ITU linksets.
50093 - Link Set type cannot be updated when current Link Set is referenced by any Link	If the IPSG linkset contains links, then the adapter parameter cannot be specified.
50161 - Remote Signaling Point must be unique for Link Sets	The specified adjacent point code cannot be assigned to any other linkset.  or  The value of the apc/apca/apci/apcn/ apcn24/apcn16 or sapc/sapca/sapci/sapcn/ sapcn24 parameter cannot be assigned to more than one linkset.  or  The apc/apca/apci/apcn/apcn24 or sapc/ sapca/sapci/sapcn/sapcn24 parameter can be defined only once per linkset.
50214 - Routing context can only be configured for M3UA linksets	The ipsg=yes and the adapter=m3ua parameters must be specified before the rcontext parameter can be specified.



**Table 5-6 (Cont.) Link Sets Errors**

Error Code Number	Description
50215 - Could not locate adapter type	The adapter type specified must be either m3ua or m2pa.
50246 - Could not locate adapter type	The adapter type specified must be either m3ua or m2pa.
50247 - Linkset referenced by GTT selector table	If the linkset is referenced by the GTT selector table, then this command cannot be entered.
HTTP/1.1 404 Not Found Item does not exist	The specified linkset must be in the database.
LinkSet: {ERR_OPR_FAILED_NO_ENTRY}	The linkset name must be in the database.

**SCCP Options**

Resource SCCP Options (/vstp/sccpoptions).

SCCP Options are those configuration values that govern the overall SCCP functionality.

**Table 5-7 SCCP Options Errors**

Error Code Number	Description
50177 - Transaction Based GTT Load Sharing Feature not enabled	The Transaction-based GTT Loadsharing feature must be enabled before the tggt0, tggt1, tggtudtkey, or tggtxudkey parameters can be specified.

