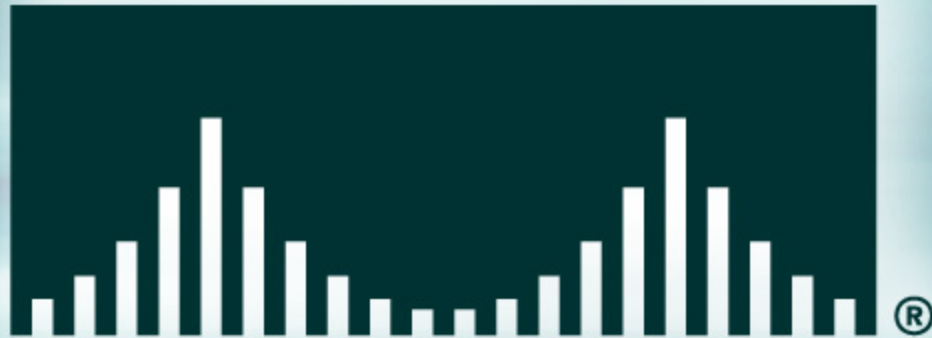# Next-Generation Signaling Transport

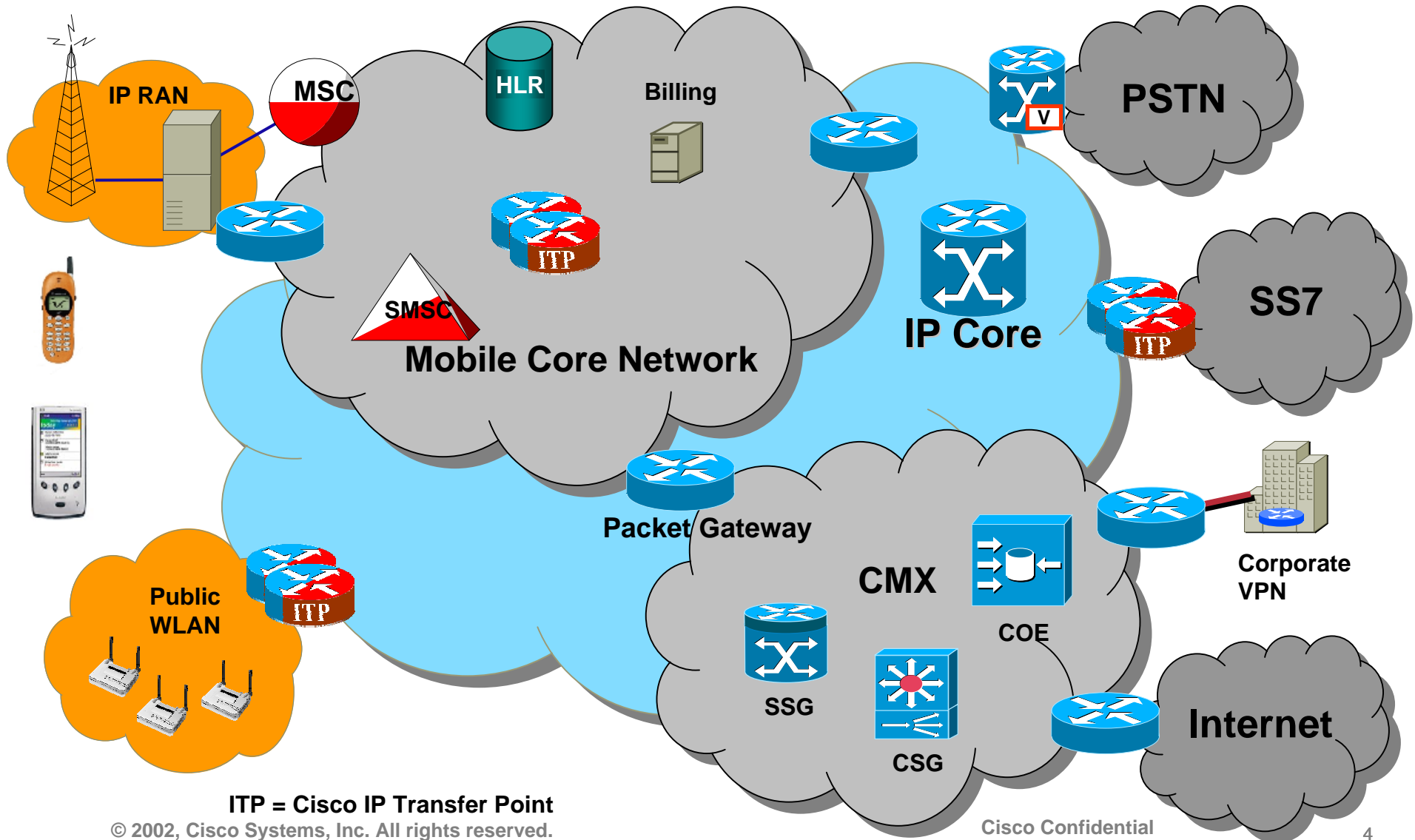# The Cisco Mobile Wireless Focus

- **Cisco Mobile Wireless Group (MWG):**

    Engineering and product management staff dedicated to mobile wireless solutions

    Located in San Jose, California, and RTP, North Carolina

- **Global System Engineering and Consulting Engineering teams focused on the needs of mobile operators**

- **Worldwide customer support and logistics**

- **Ecosystem partners; monitoring, applications, integration, and support**

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Cisco Mobile Wireless Solutions

IP RAN

MSC

HLR

Billing

PSTN

SMSC

Mobile Core Network

ITP

IP Core

SS7

ITP

Packet Gateway

CMX

COE

Corporate
VPN

Public
WLAN

ITP

SSG

CSG

Internet

ITP = Cisco IP Transfer Point
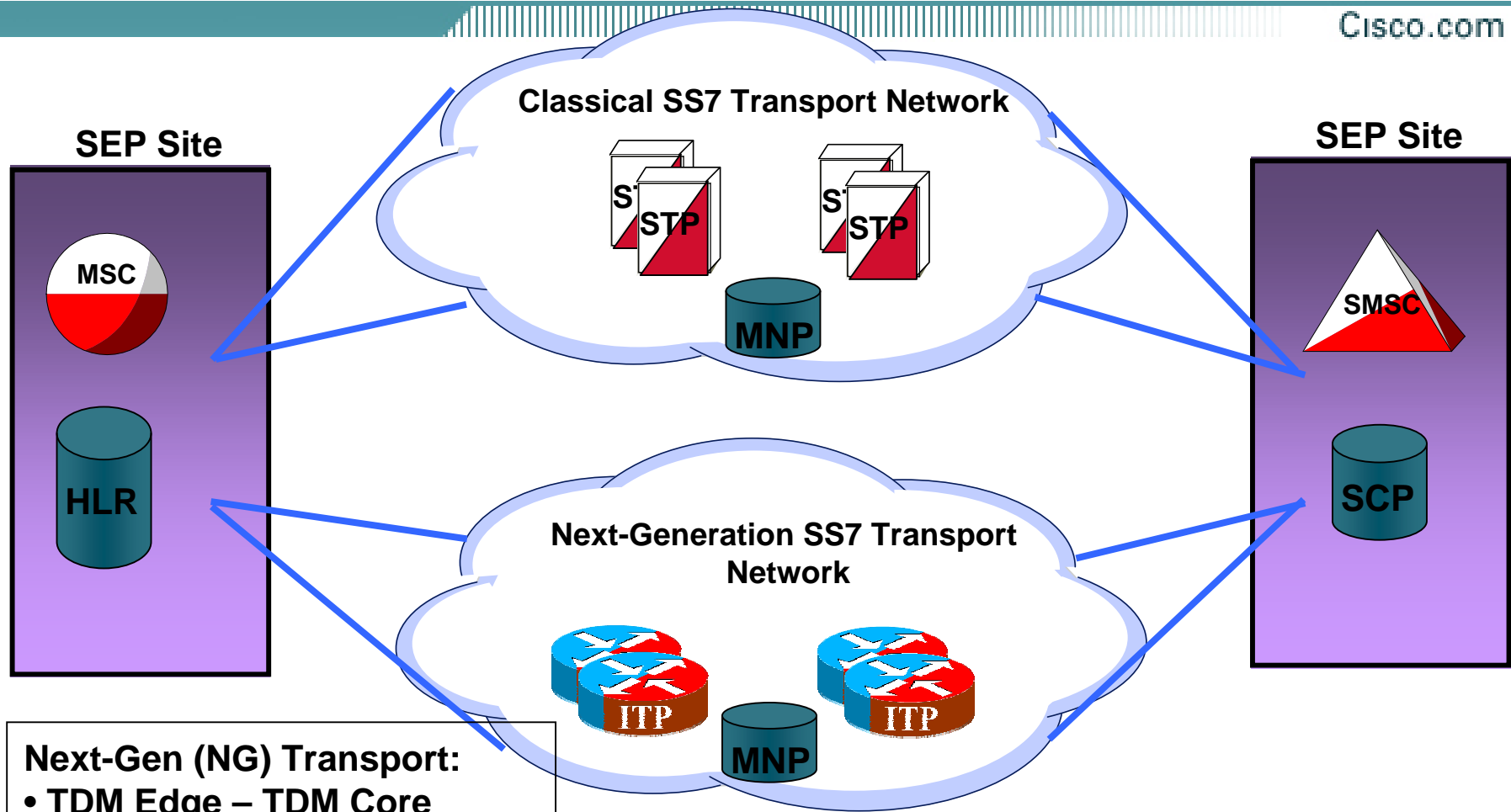
Cisco Confidential

4

Signaling Network Requirements

- **Lower costs**

    Reduce capital expenditures and operating expenses

- **High performance**

    Scalable link density, MSU/sec

- **Carrier grade platform**

    High availability, redundancy, stability, investment protection

- **Standards compliant**

    SS7 variants, IETF SIGTRAN, HSL

- **Facilitate Data Services Revenue**

Cisco Confidential

Introduce a Supplemental SS7 Transport Plane

Classical SS7 Transport Network

SEP Site

SEP Site

MSC

STP

STP

SMSC

MNP

HLR

Next-Generation SS7 Transport Network

SCP

ITP

ITP

MNP

Next-Gen (NG) Transport:
- TDM Edge – TDM Core
- TDM Edge – IP Core
- Mixed TDM/IP Edge – IP Core
- All IP

Cisco Confidential

No Architecture Changes—Reduce CapEx
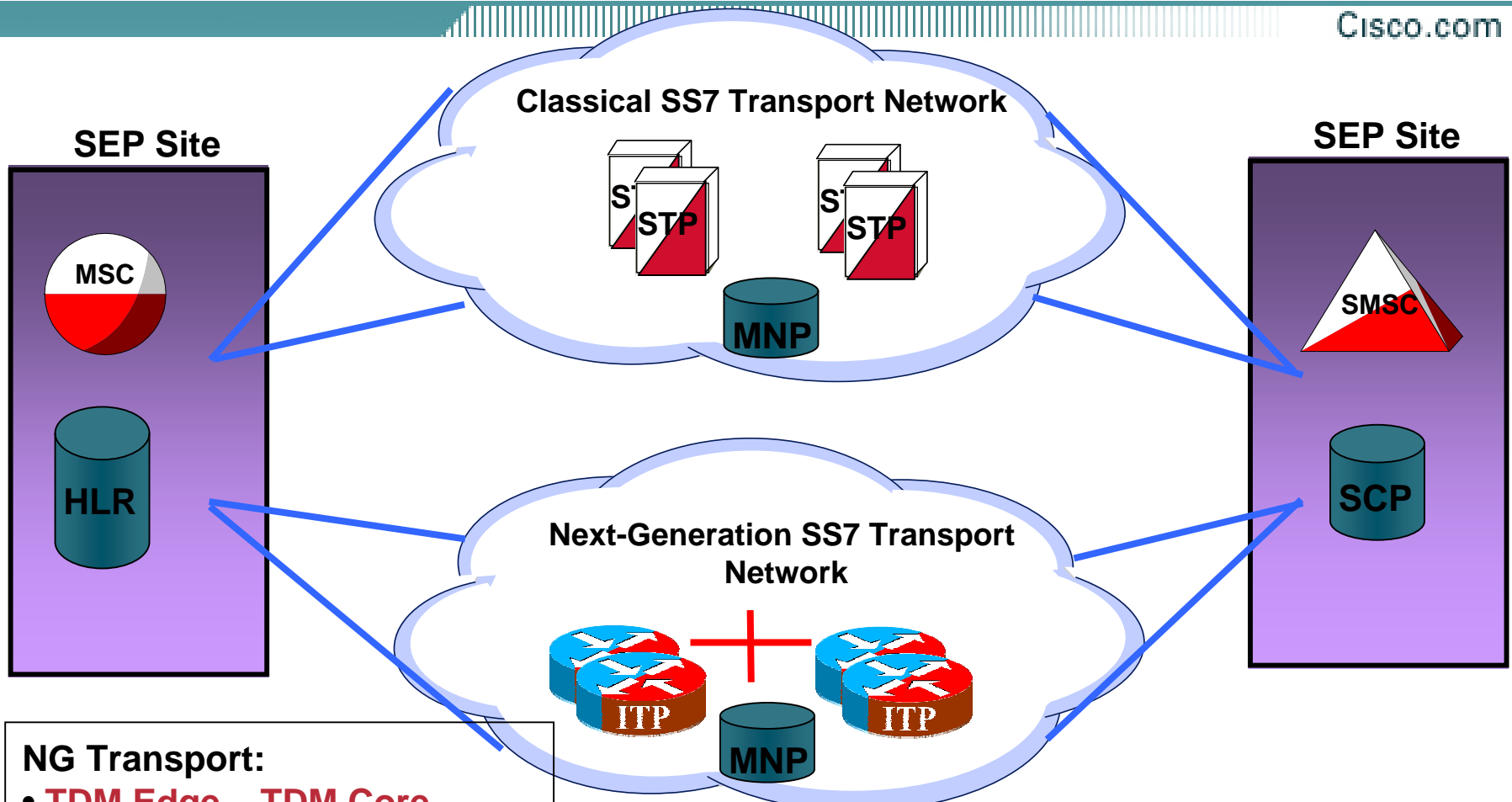
Classical SS7 Transport Network

SEP Site

SEP Site

MSC

STP
STP

STP
STP

SMSC

MNP

HLR

SCP

Next-Generation SS7 Transport Network

ITP

ITP

MNP

NG Transport:
- **TDM Edge – TDM Core**
- **TDM Edge – IP Core**
- **Mixed TDM/IP Edge – IP Core**
- **All IP**

HSL LINK	————	LSL TDM LINK	————
M3UA/SUA LINK	- - - -	M2PA LINK	- - - -

Cisco Confidential

7

Introduce IP in the Core—Begin Migration
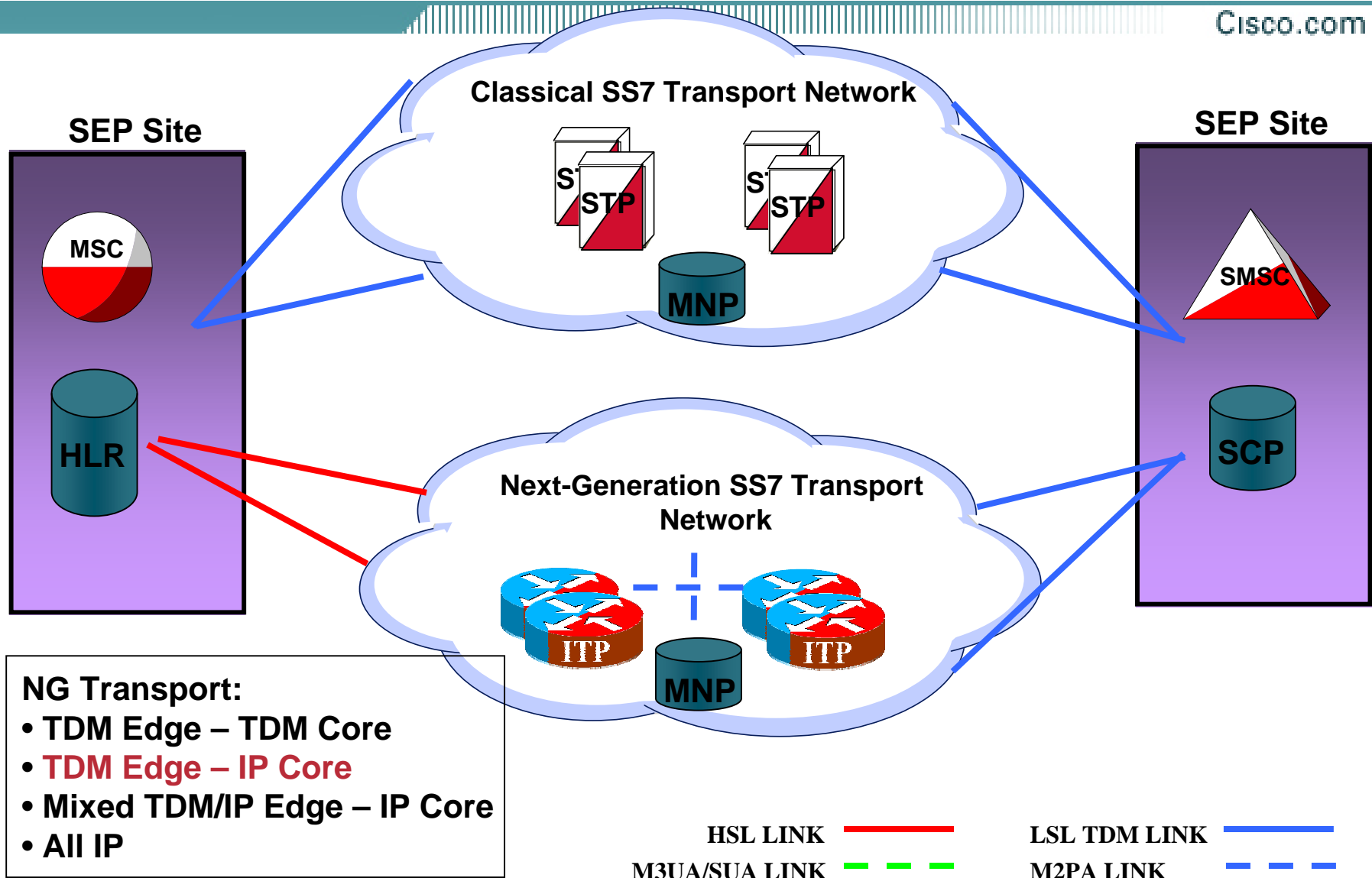
Classical SS7 Transport Network

SEP Site

SEP Site

MSC

STP
STP

STP
STP

SMSC

MNP

HLR

SCP

Next-Generation SS7 Transport Network
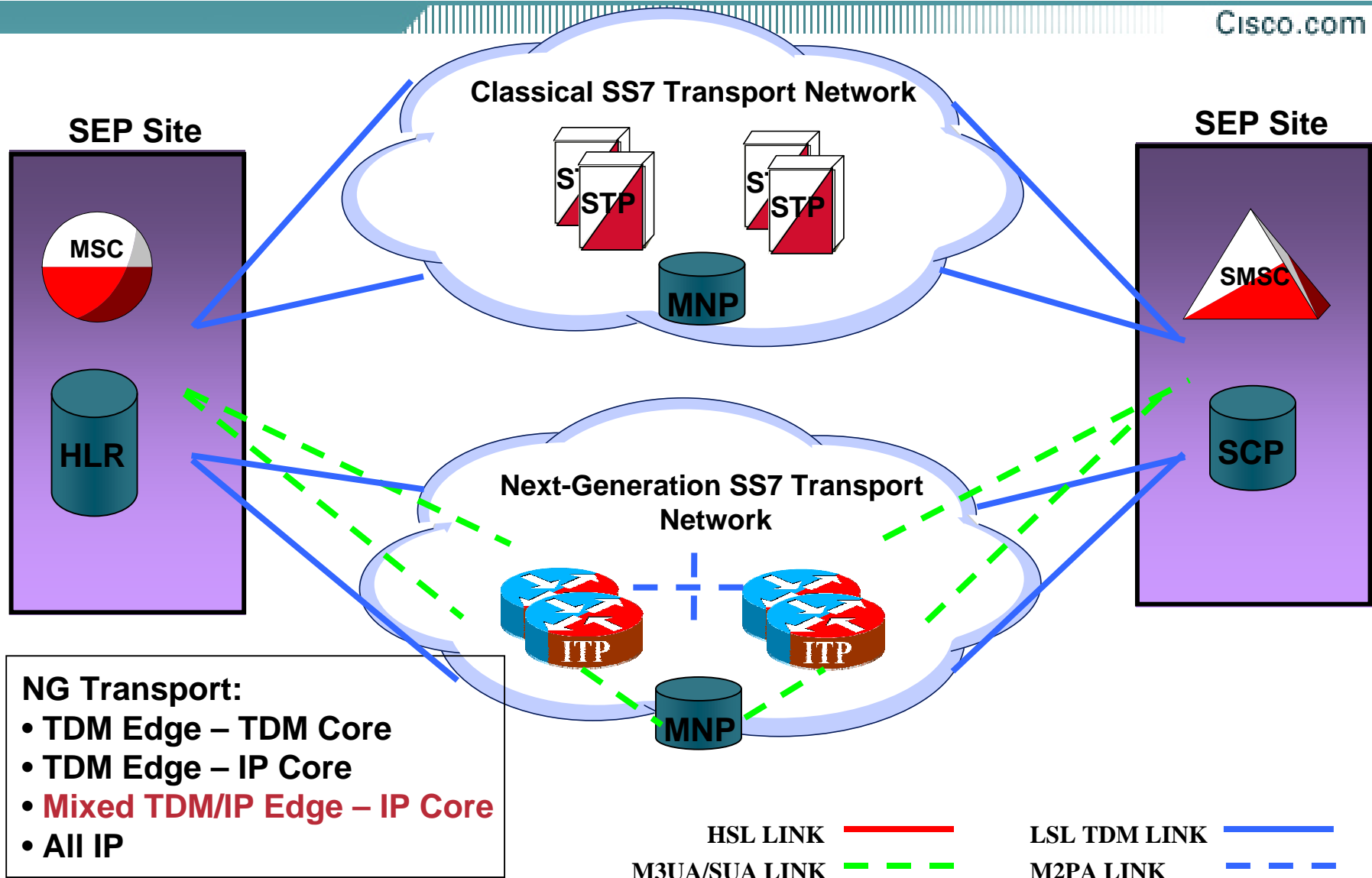
ITP

ITP

MNP

NG Transport:
- TDM Edge – TDM Core
- TDM Edge – IP Core
- Mixed TDM/IP Edge – IP Core
- All IP

| HSL LINK | ———— | LSL TDM LINK | ———— |
| M3UA/SUA LINK | – – – – | M2PA LINK | – – – – |

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8

Move IP to the Edge—Reduce OpEx

Classical SS7 Transport Network

SEP Site

SEP Site

MSC

STP
STP

STP
STP

SMSC

MNP

HLR

ITP

ITP

ITP

SCP

ITP

MNP

Next-Generation SS7 Transport Network
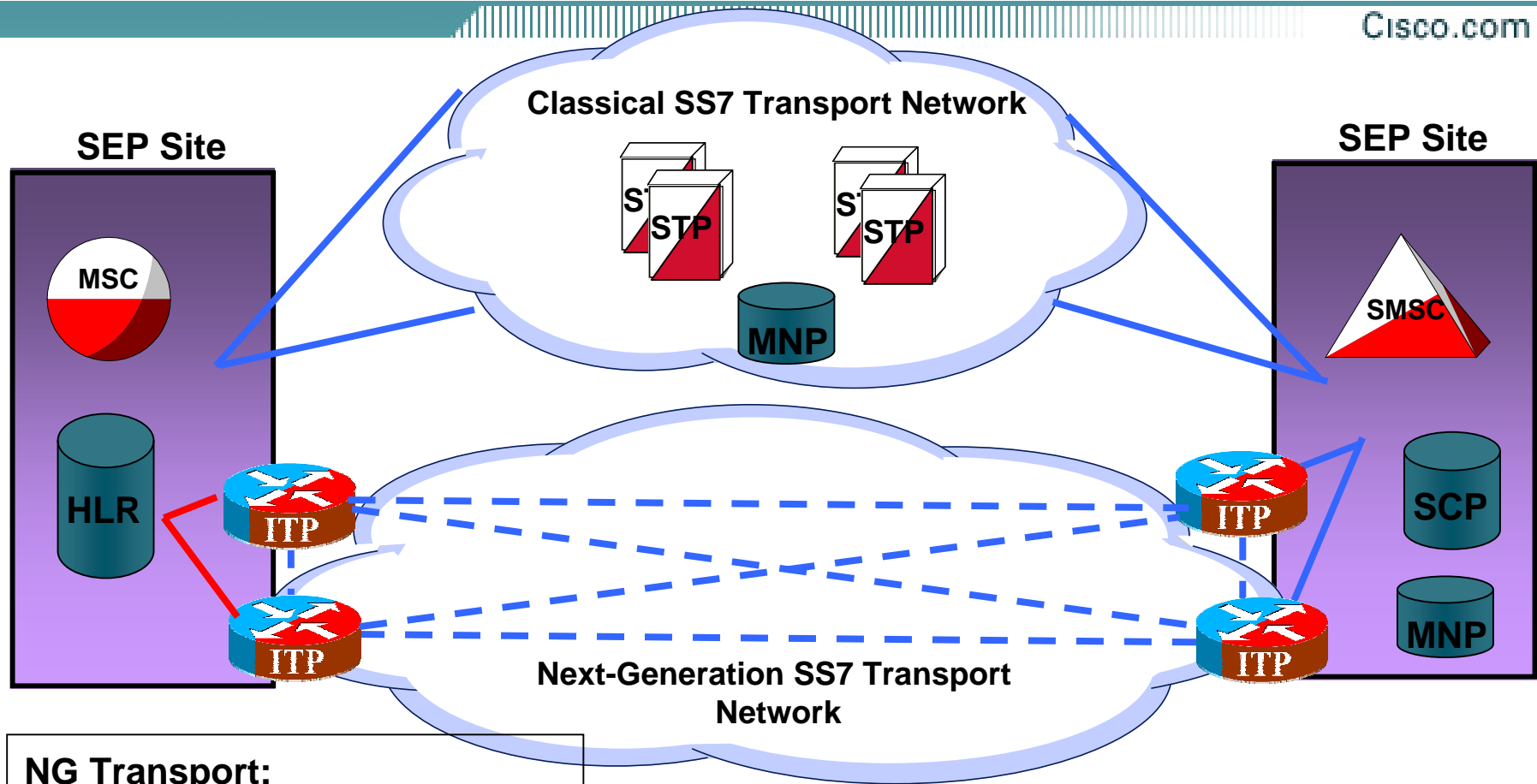
NG Transport:
- TDM Edge – TDM Core
- TDM Edge – IP Core (option 2)
- Mixed TDM/IP Edge – IP Core
- All IP

HSL LINK	――――	LSL TDM LINK	――――
M3UA/SUA LINK	– – – –	M2PA LINK	– – – –

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9

IP-Enable HLR, SMSC, SCPs, Apps—Increase Data Revenue

Classical SS7 Transport Network

SEP Site

SEP Site

MSC

STP
STP

STP
STP

MNP

SMSC

HLR

SCP

Next-Generation SS7 Transport Network

ITP

ITP

MNP

NG Transport:
- TDM Edge – TDM Core
- TDM Edge – IP Core
- **Mixed TDM/IP Edge – IP Core**
- All IP

HSL LINK	▬▬	LSL TDM LINK	▬▬
M3UA/SUA LINK	▬ ▬ ▬	M2PA LINK	▬ ▬ ▬

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Next-Generation SS7 Network
IP-Enable All Service Endpoints—Complete Migration

MSO North

MSC

SMSC

HLR

M3UA

SG North

STP STP

M2PA

SG Central

MSO Central

MSC

SMSC

HLR

M3UA

MSO South

MSC

SMSC

HLR

M3UA

SG South

M2PA

HSL LINK	TDM LINK
M3UA LINK	M2PA LINK

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11
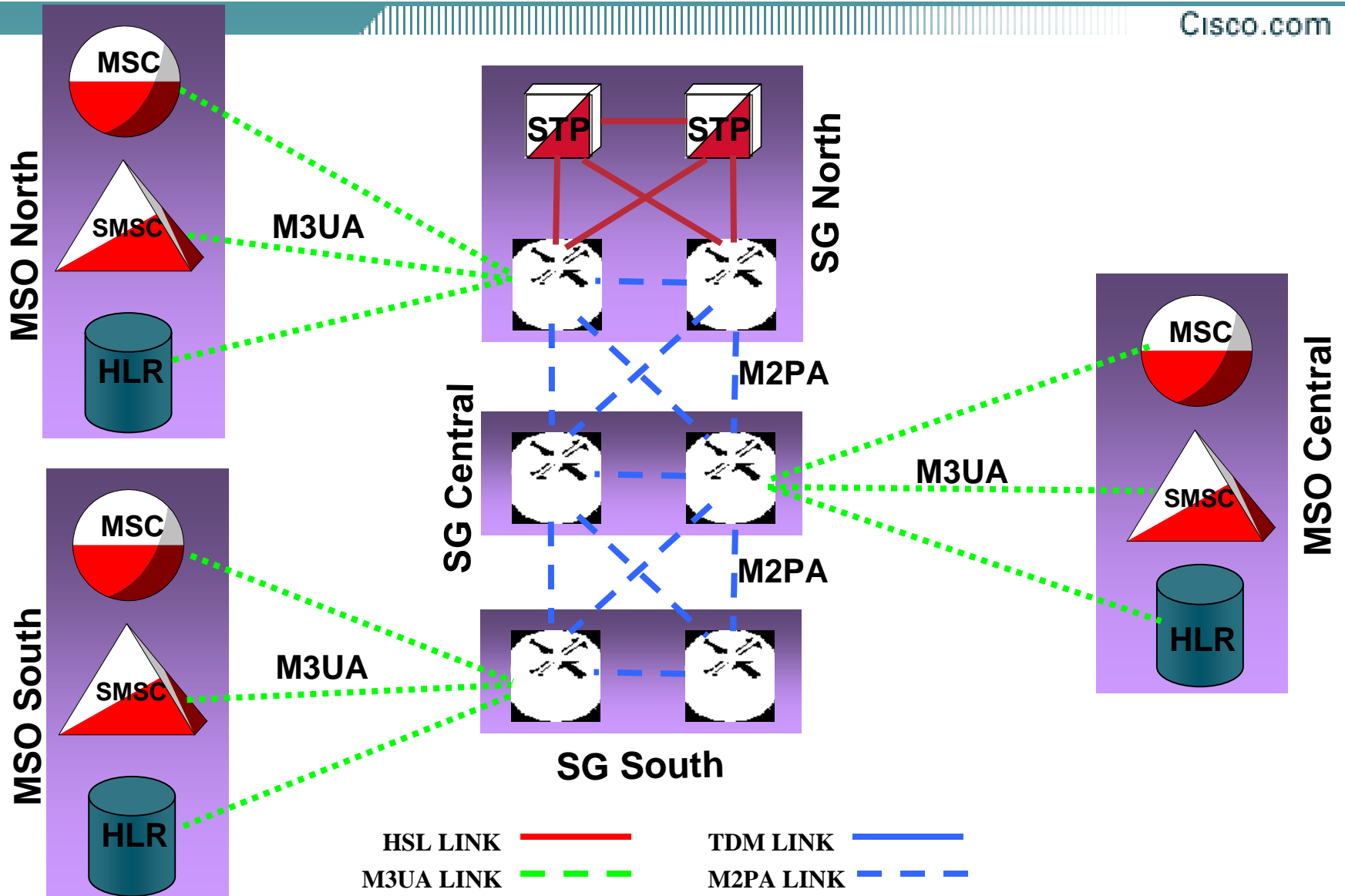
Cisco IP Transfer Point

SS7 Migration to IP

IETF SIGTRAN Working Group

- **Multivendor group that is designing SS7-over-IP (SS7oIP) standards**

- **http://www.ietf.org/html.charters/sigtran-charter.html**

- **SCTP (RFC 2960), M2UA, M2PA, M3UA, SUA**

  - **Cisco is an author on all of the above except SUA**

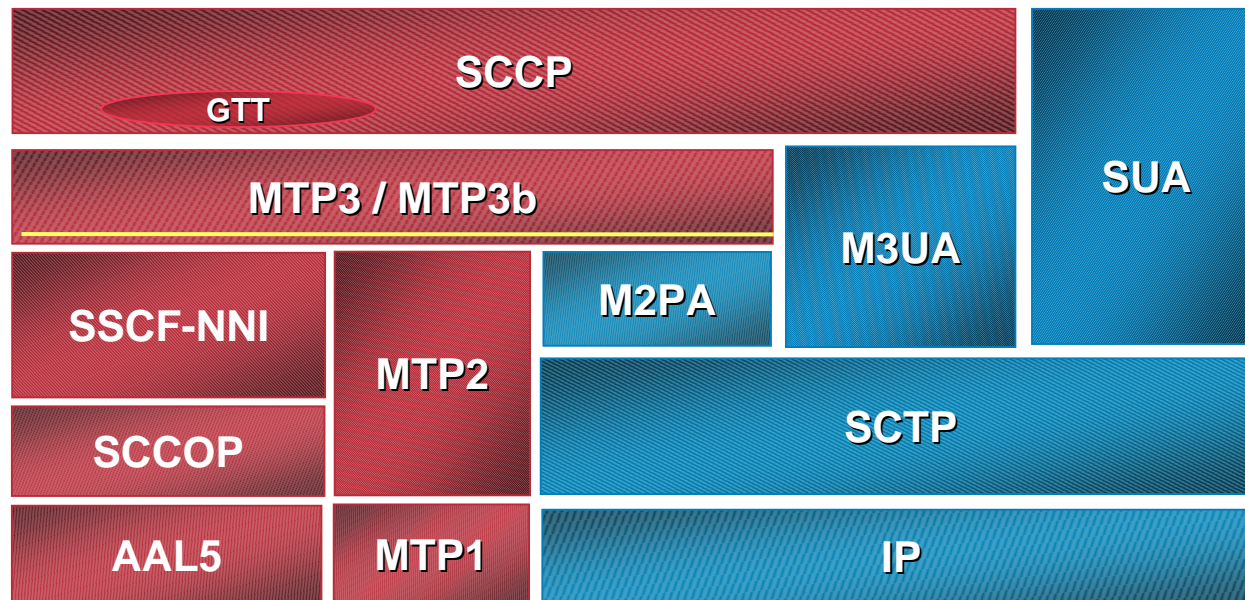# STP Peer-to-Peer SS7 Offload (M2PA) Protocol Architecture

14
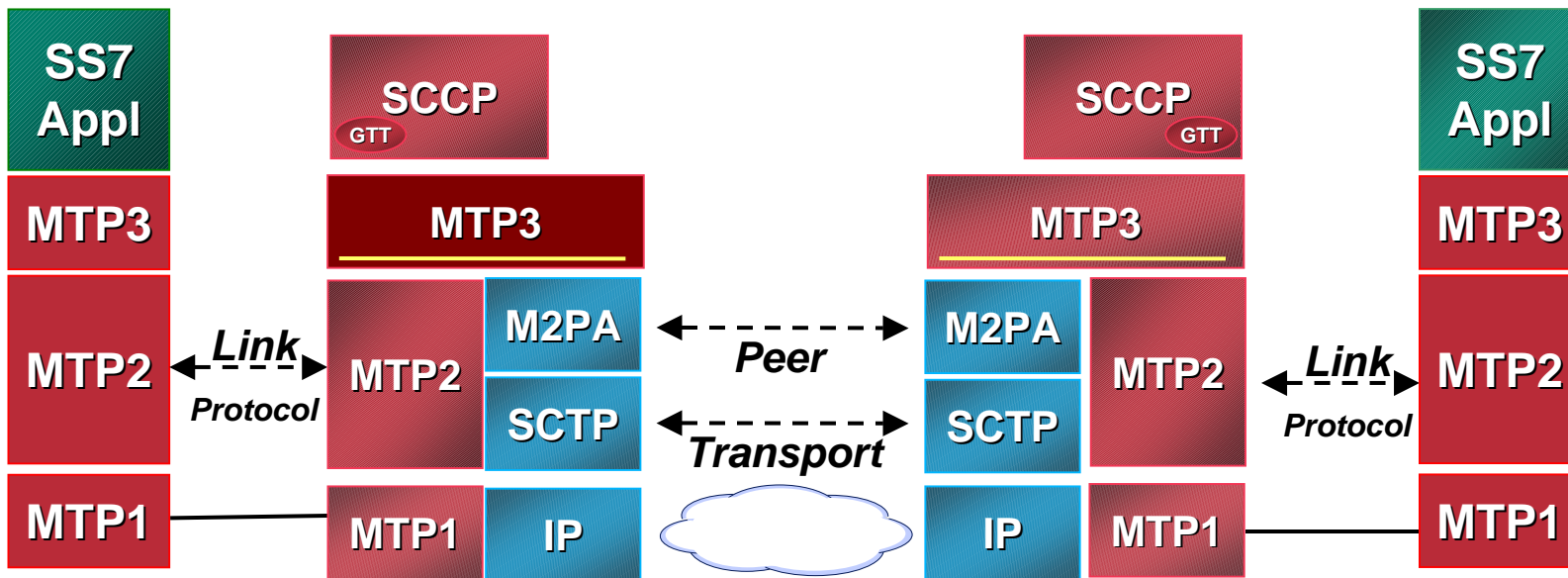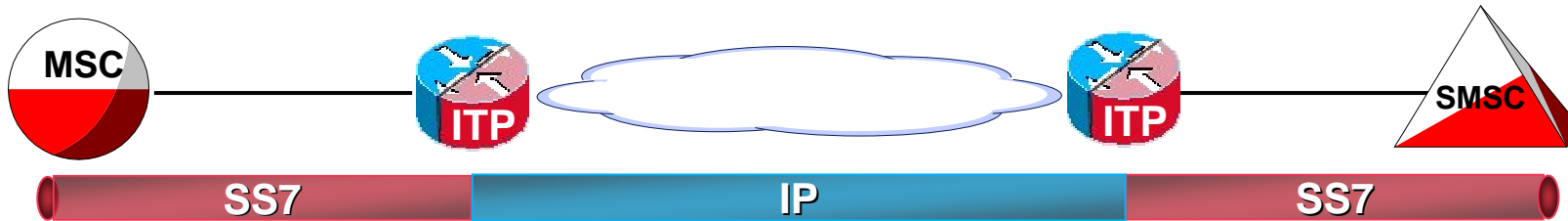
Signaling Gateway Protocol Architecture

SUA SG

| MAP |
| TCAP |
| SCCP |
| MTP3 |
| MTP2 |
| MTP1 |

SG box: **GTT** SCCP | N I F | **SUA** ; MTP3 / MTP2 / MTP1 | **SCTP** | **IP**

IP Network

| MAP |
| TCAP |
| SUA |
| SCTP |
| IP |

SEP ◄···· **SS7** ····► **ITP** ◄─── **SCTP/IP** ───► **ASP**

M3UA SG

MAP	IS-41	I S U P	T U P
TCAP			
SCCP			
MTP3			
MTP2			
MTP1			

SG box: **GTT** SCCP ; MTP3 | N I F | **M3UA** ; MTP2 | **SCTP** ; MTP1 | **IP**

IP Network

MAP	IS-41	I S U P	T U P
TCAP			
SCCP			
M3UA			
SCTP			
IP			
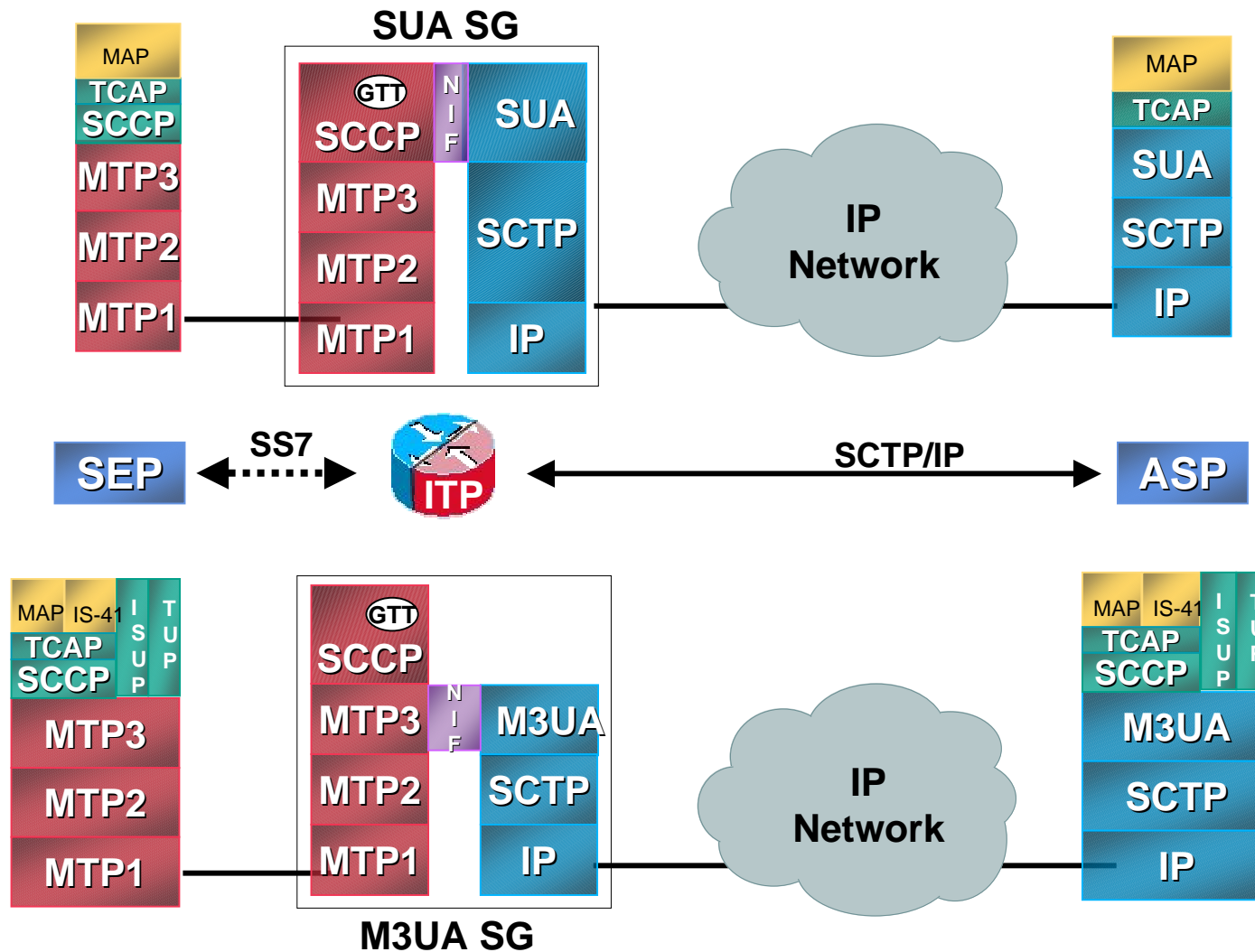
Cisco IP Transfer Point Protocol Architecture

Cisco IOS IP Base Bundle

SCCP (GTT)		SUA
MTP3 / MTP3b	M3UA	
SSCF-NNI	M2PA	
	MTP2	SCTP
SCCOP		
AAL5	MTP1	IP

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Cisco IP Transfer Point
SIGTRAN Vendor Interoperability

- **M2PA**

  Industry interoperability event completed with Alcatel, Radisys, Openss7, Airslide and Catapult

- **M3UA**

  Industry interoperability event completed with Ericsson, HP, Intellinet, Radisys, Siemens and Trillium

- **SUA**

  Industry interoperability event completed with Hughes Network Systems, Performance Technologies, Radisys and Siemens

- **Have completed interoperability testing with numerous industry-leading partners – please contact Cisco ITP team for solution details**

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Cisco SS7oIP Elements

- Ecosystem Integrator Partners
- Ecosystem Network Monitoring Partners
- Ecosystem Application Partners
- ITP Graphical Monitoring Tool (SGM)
- SIGTRAN Signaling Gateway
- SIGTRAN STP Offload
- Leading IP Network Design/Products

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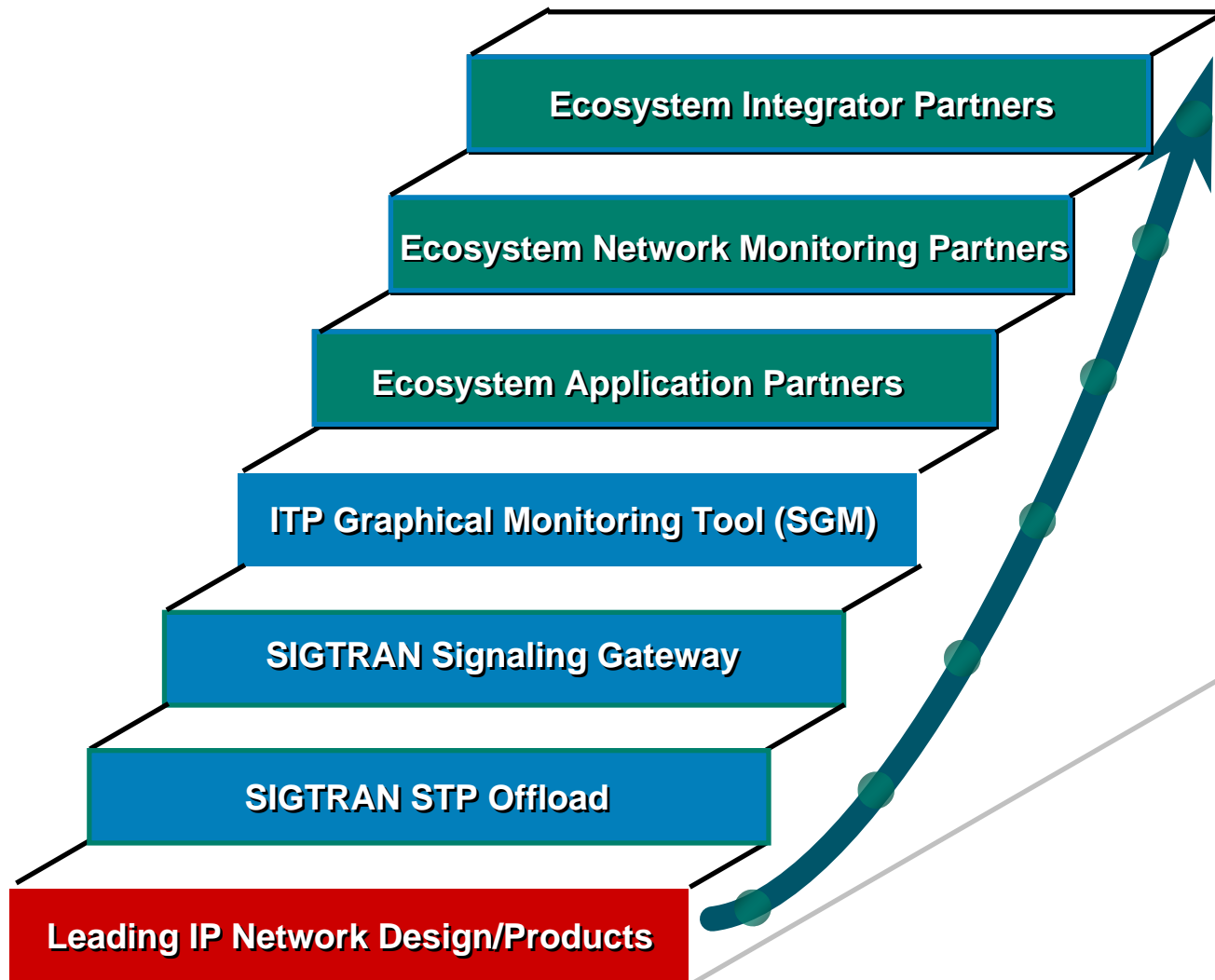
Cisco IP Transfer Point

Quality of Service

Quality-of-Service (QoS) Overview

The goal in a QoS-enabled environment is to ensure predictable delivery of specific traffic types, regardless of other traffic flowing through the network at any given time.

QoS in Legacy SS7 Network:
• Priority levels determined by SS7 service endpoints
• During congestion, MSUs dropped based on 2-3 priority levels
• Links are added for additional bandwidth and redundancy
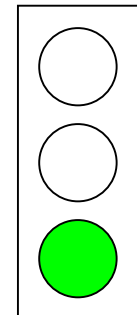
Opportunity to Improve QoS in SS7oIP Networks:
• Combination of traffic types are increasing as new services introduced
• IP network is QoS capable
• Transfer points should determine QoS
• Additional SCTP (logical links) do not provide additional bandwidth or redundancy

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Cisco IP Transfer Point QoS Implementation
QoS Architecture

The type-of-service (ToS) byte within the IP protocol represents the precedence or priority of an IP message (packet). The Cisco IP Transfer Point can establish ToS by any combination of the following MSU characteristics:

- Input link set (ex: link set from SMSC)

- Service Identifier (ex: ISUP or SCCP)

- Destination Point Code (ex: MSU destined to SMSC)
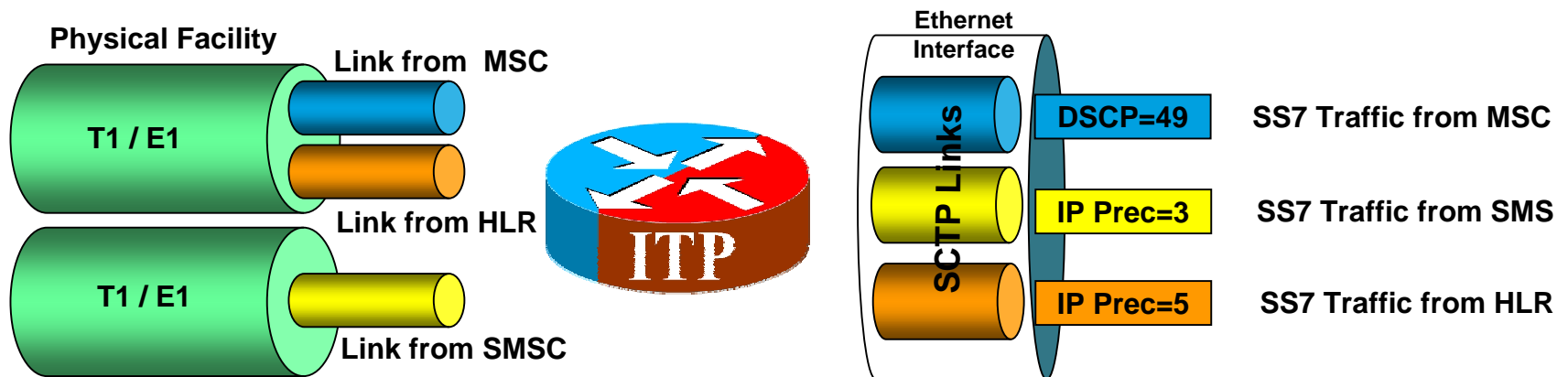
- Global Title Address (ex: TT or MSIDN of SMSC)

- M3UA/SUA Routing Key

IP Packet Header

IP	TOS (DSCP/ IPPrec)	Protocol Type	Source Address	Destination Address	Src/Dest Port

Core Router

MSC — SS7/MTP — ITP — SIGTRAN/IP — Core Router — IP Core Network
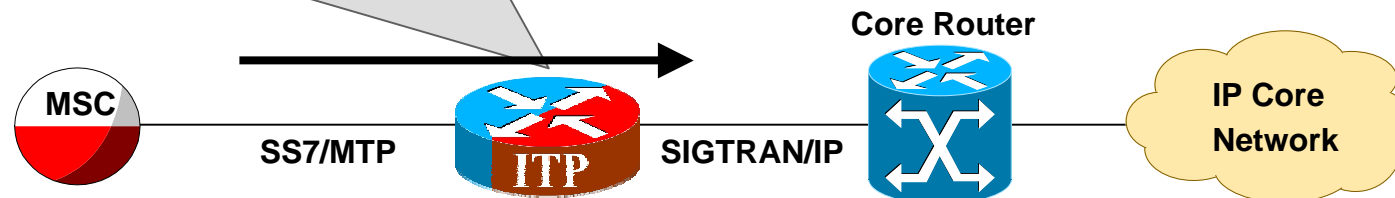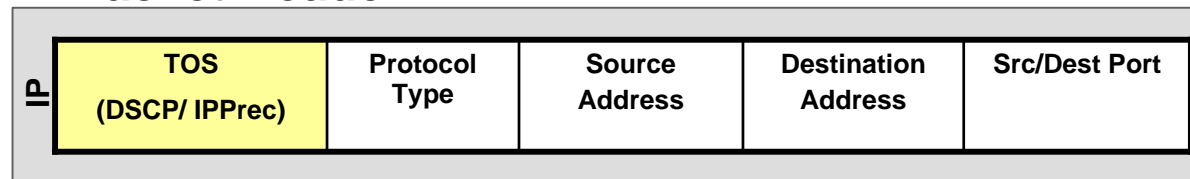
Cisco IP Transfer Point QoS Implementation
Classification/Marking—Input Linkset

Physical Facility

Link from MSC

T1 / E1

Link from HLR

T1 / E1

Link from SMSC

ITP

Ethernet Interface

SCTP Links

DSCP=49 — SS7 Traffic from MSC

IP Prec=3 — SS7 Traffic from SMS

IP Prec=5 — SS7 Traffic from HLR

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Cisco IP Transfer Point QoS Implementation
Classification/Marking—Service Indicator Classification

Physical Facility

MSC

T1 / E1

MSC

T1 / E1

HLR

ITP

Ethernet Interface

SCTP Links

DSCP=49   ISUP Traffic with SIO=5

IP Prec=5   SCCP Traffic with SIO=3

Cisco.com
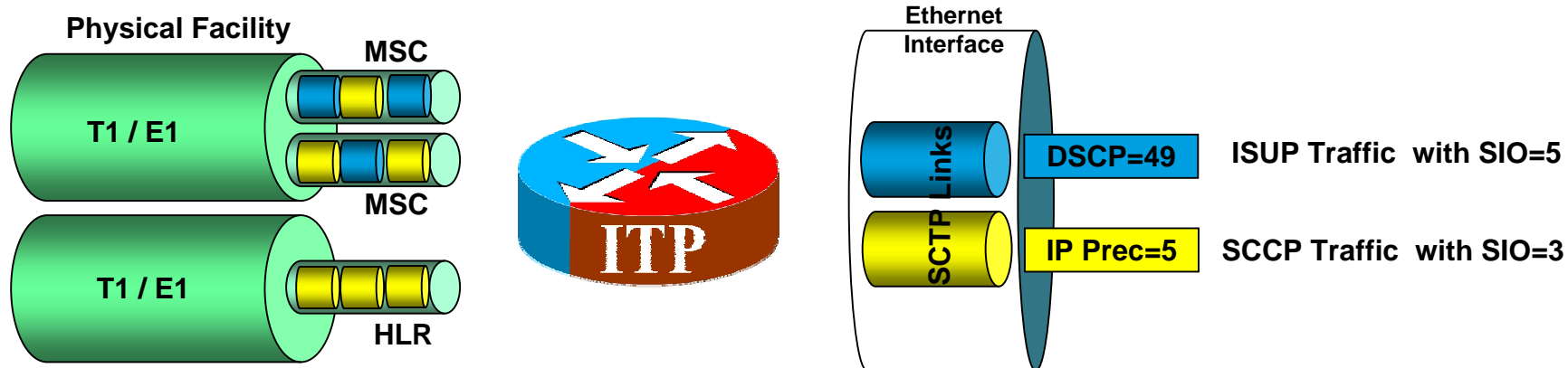
Cisco IP Transfer Point

Platform

Cisco IP Transfer Point Platforms

HIGH-END PLATFORM (Cisco 7507 and 7513)	LOW-END PLATFORM (Cisco 2651)
Cisco IP Transfer Point is Cisco IOS® Software bundled on existing Cisco platforms	
Dual processor	Single processor
Dual DC power	External dual DC power
Hot-swap line cards	No hot-swap capability
NEBS compliant	NEBS compliant
Any IP WAN media	Two 10/100 Ethernet ports and 1 network module for other WAN media
Up to 720 SS7 links	4 SS7 links
SS7 interfaces: T1, E1, V.35, RS-449	SS7 interfaces: T1, E1, V.35, RS-449

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Cisco 7500 Series Routers

- **More than 70 service and port adapters to choose from**

- **Industry-leading software features**

- **Scalable high-performance services**

- **Enhanced high availability**

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Cisco 7513

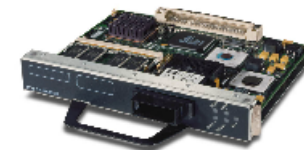**Route Switch Processors (RSP)**
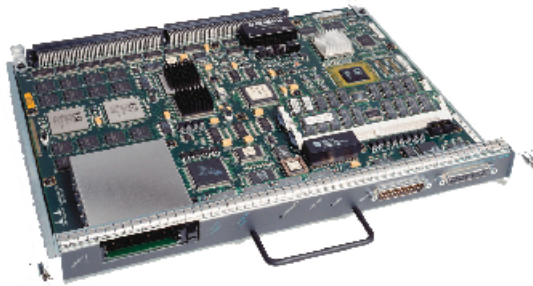
RSP8
Add Second RSP for HA (RPR+)

Versatile Interface Processors (VIP)
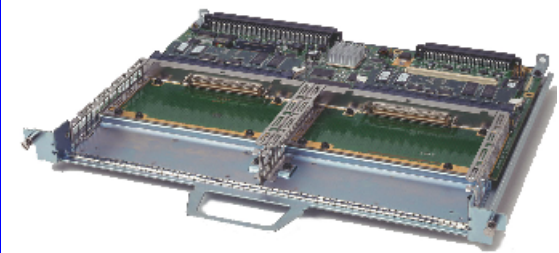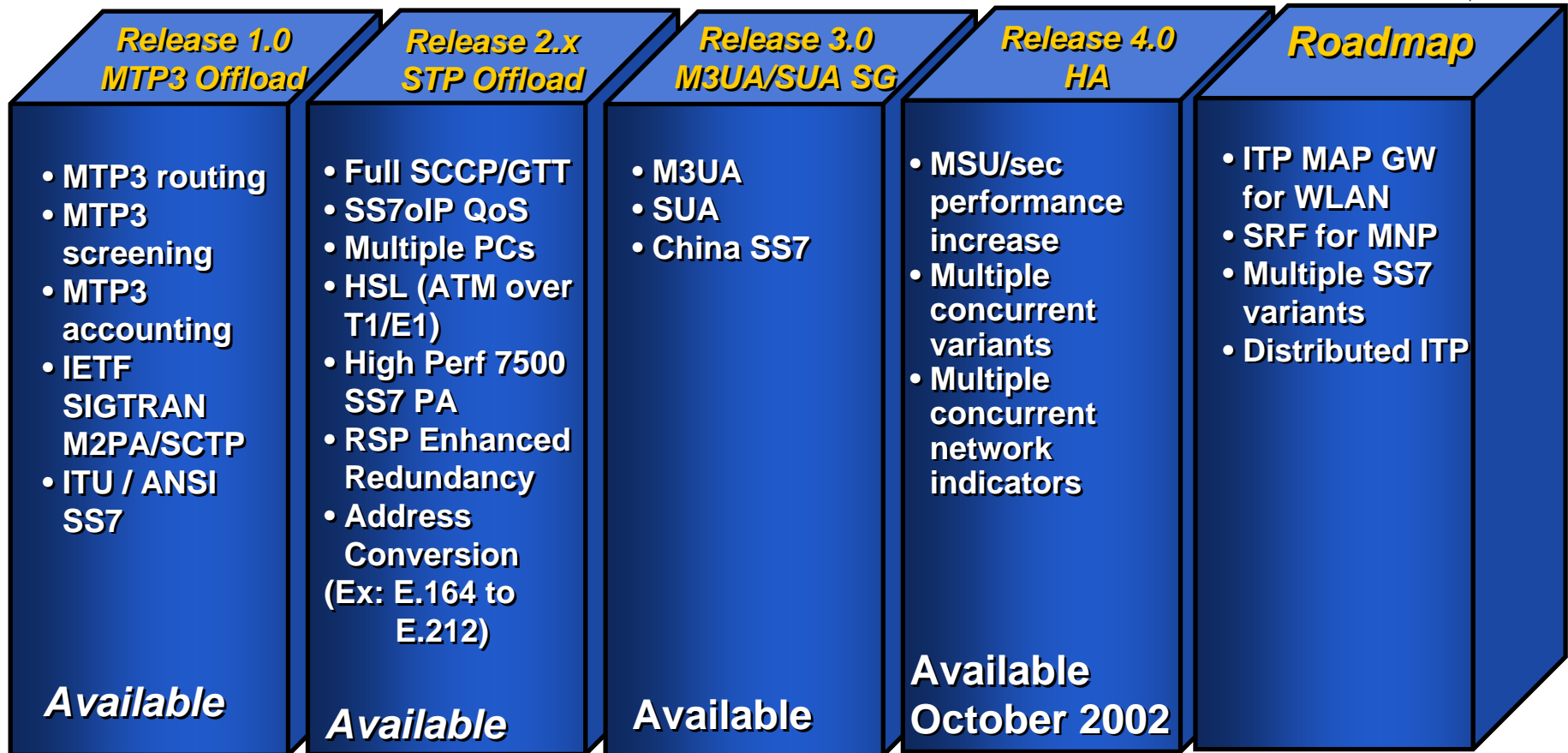
VIP4-80
Increase Performance

Port and Services Adaptors

Industry-Leading 70+ LAN & WAN
Adaptors to Choose From

2 Power Supplies for Redundancy

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Cisco IP Transfer Point Product Roadmap

Infrastructure Efficiencies → **IP-Based Enabling Services**

Release 1.0 MTP3 Offload	Release 2.x STP Offload	Release 3.0 M3UA/SUA SG	Release 4.0 HA	Roadmap
• MTP3 routing • MTP3 screening • MTP3 accounting • IETF SIGTRAN M2PA/SCTP • ITU / ANSI SS7	• Full SCCP/GTT • SS7oIP QoS • Multiple PCs • HSL (ATM over T1/E1) • High Perf 7500 SS7 PA • RSP Enhanced Redundancy • Address Conversion (Ex: E.164 to E.212)	• M3UA • SUA • China SS7	• MSU/sec performance increase • Multiple concurrent variants • Multiple concurrent network indicators	• ITP MAP GW for WLAN • SRF for MNP • Multiple SS7 variants • Distributed ITP
Available	*Available*	**Available**	**Available October 2002**	

Cisco IP Transfer Point

Network Management and Monitoring

Cisco ITP Network Management Strategy

- **Use SNMP-based IP Management Tools for Cisco IOS**

  CiscoWorks2000, HP OpenView

- **Use IP Network Performance Monitoring Tools**

  Cisco Internetwork Performance Monitor

  InfoVista

- **Develop Cisco ITP-specific Network Management Products**

  Auto-discovery with Graphical SS7oIP Topology Map

  Status Monitoring with SS7oIP Events and Alarms

  Drill down analysis into IP Layer

  Configuration of Route and Global Title Translation Tables

- **Partner with leading SS7 management vendors such as Agilent**

  Call Trace, Packet Analysis, Long Term Trending and Analysis.

- **Provide support for IETF Standard and Cisco ITP SNMP MIBs**

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Cisco IP Transfer Point Network Management Scope

Traditional SS7 Management

SS7oIP Management

IP Cloud Management

Cisco Signaling Gateway Manager (SGM)

A

MSC

Cisco ITP

C

SMSC

Cisco ITP

Redundant IP Network

B / D

Cisco ITP

HLR VLR

Cisco ITP

SCP

MSC Site

MSC Site

31
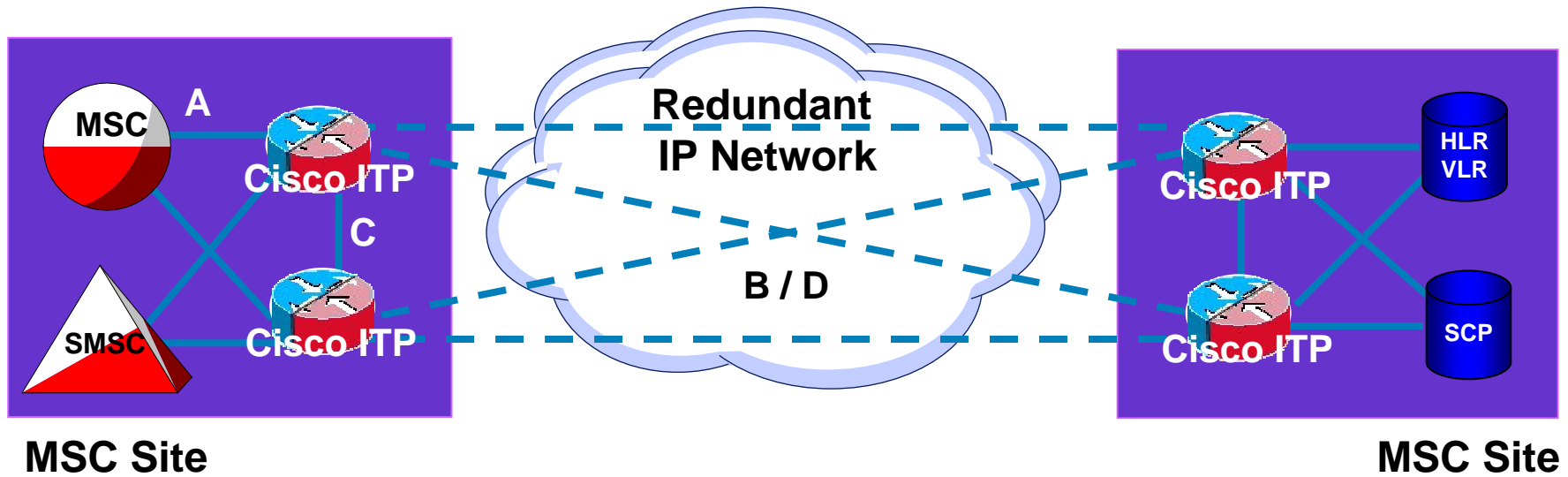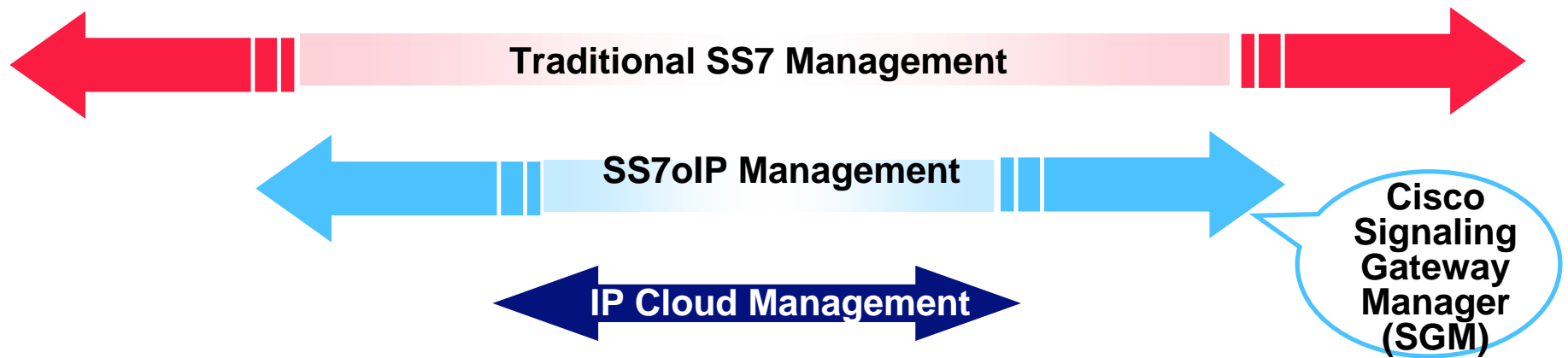
Cisco IP Transfer Point Network Management Deployment

Network Operations Center

SS7 Mgmt Tool

CiscoWorks 2000

Cisco SGM

SS7 Mgmt Tool

MSC

A

Cisco ITP

C

SMSC

Cisco ITP

Redundant IP Network

B / D

Cisco ITP

HLR VLR

Cisco ITP

SCP

MSC Site

MSC Site
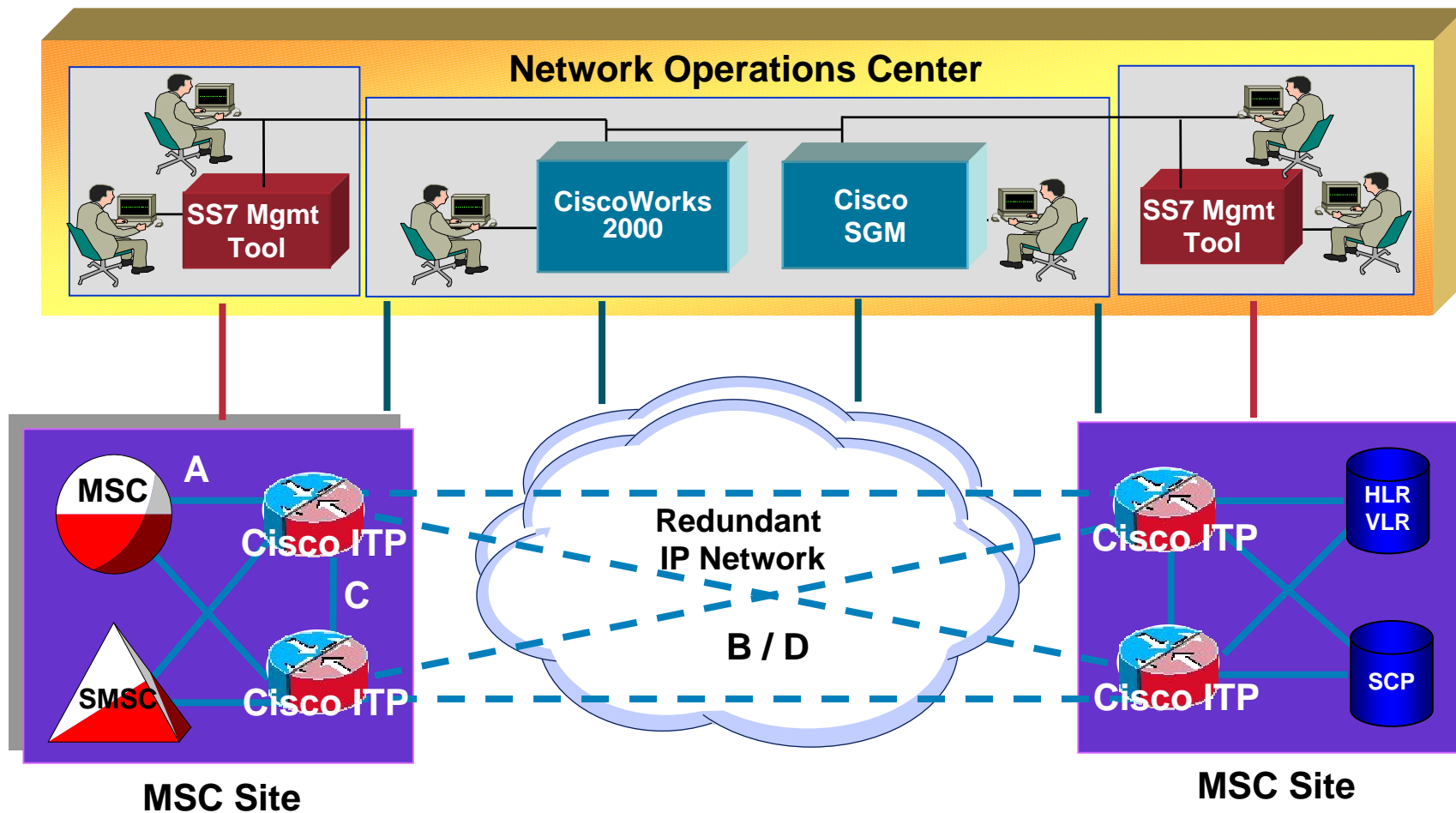
Cisco SGM Key Features

- **Supports Cisco ITP networks**

- **Automatic SS7oIP Network Discovery from any ITP Device**

- **SS7oIP Topology Map with Links to Legacy SS7 Devices**
    - **Vector Based Graphics, Layout, Zoom, Find, Grid, JPEG**

- **Status Monitoring of all SS7oIP Layer Events**

- **Linkset Status, Node Status, and Link Status Windows**

- **Real-Time Event Management Displays and Filters**
    - **Customizable Categories and Severities, Sorting, Acknowledgment**

- **Destination Point Code (DPC) Route Table Configuration**

- **Global Title Translation Table Configuration**

- **Web based Alarm History Viewing System**
    - **Sorting, Filtering, Archiving, Metrics**

Management Functional Areas

Fault

- HPOV – SNMP ITP Traps

- HPOV - SYSLOG

- SGM – SS7oIP Events/Alarms

- SGM – Topology

- Agilent access7 – CallTrace

- Agilent access7 – Protocol Analysis

Configuration

- Cisco IPT level – Cisco SGM

- Cisco IOS level – CiscoWorks2000

Performance

- HPOV + ITP SNMP MIBS

- CiscoView for IP level

- InfoVista

- Other third-party SNMP tools

Accounting

- HPOV + ITP SNMP MIBs

- Agilent access7

- Agilent access7/SS7oIP

Security

- Cisco SGM

- CiscoWorks2000

Cisco SGM SNMP Trap Event Handling

- **Cisco SGM SNMP Trap Receiver**

  Receives Cisco IP Transfer Point SNMP traps from Cisco IP Transfer Point routers

  Directly or via HP OpenView

  - Reduces management traffic

- **Cisco SGM SNMP Trap Processor**

  Schedules an immediate status update

  Filters event floods

  Drives near-real-time status displays

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SNMP Traps for Cisco IP Transfer Point Events

- **Linkset state change**

- **Link state change**

- **Congestion level change**

- **Link threshold exceeded**

- **Route state change**

- **GTT Map state change**

- **Destination IP address change**

Cisco Confidential

SGM Discovery Window

SGM: Discovery Dialog

File   Help

| Seed Settings | Discovery |

Discovery Settings

☑ Entire Network

☐ Delete Existing Data   **Discover Network**

Discovered Nodes

Name	Primary IPAddr	Point Code	Device Type	Status
sgm-26-52c	172.18.16.44	5.2.3	Cisco2600	🟡 Warning
sgm-75-70a	172.18.16.10	5.10.1	Cisco7507	🟡 Warning
sgm-26-52d	172.18.16.45	5.2.4	Cisco2600	🟡 Warning
sgm-26-53a	172.18.16.50	5.3.1	Cisco2600	🟢 Active
sgm-75-70d	172.18.16.13	5.10.4	Cisco7507	🟢 Active
sgm-75-70c	172.18.16.12	5.10.3	Cisco7507	🟢 Active
sgm-75-70b	172.18.16.11	5.10.2	Cisco7507	🟢 Active
sgm-26-53b	172.18.16.51	5.3.2	Cisco2600	🟢 Active
7.1.2	N/A	7.1.2	Unknown	⚫ Unmanaged
7.1.1	N/A	7.1.1	Unknown	⚫ Unmanaged

| **Back** | **Delete Node** | **Poll Node** |

Cisco SGM Network Topology Window

Cisco Confidential
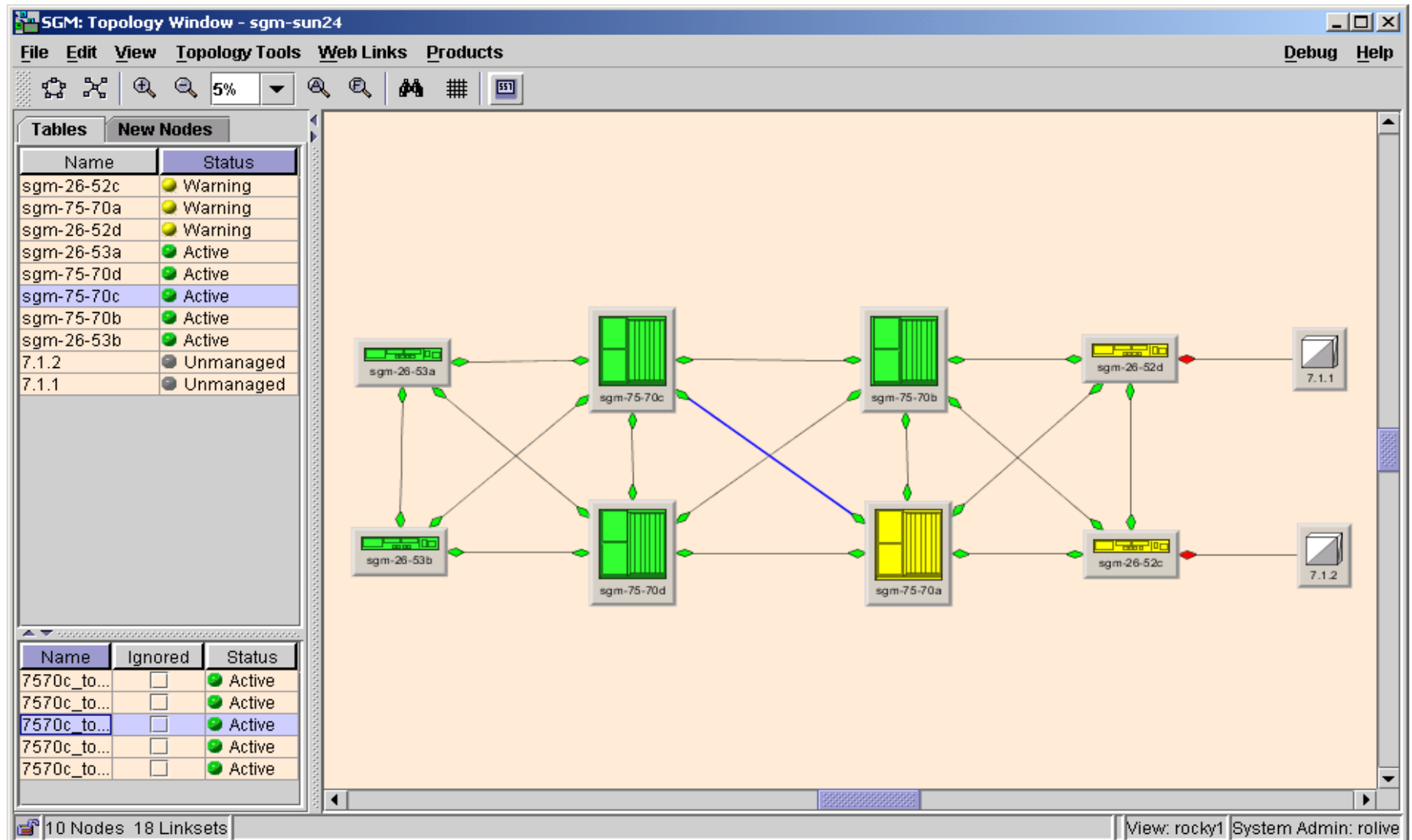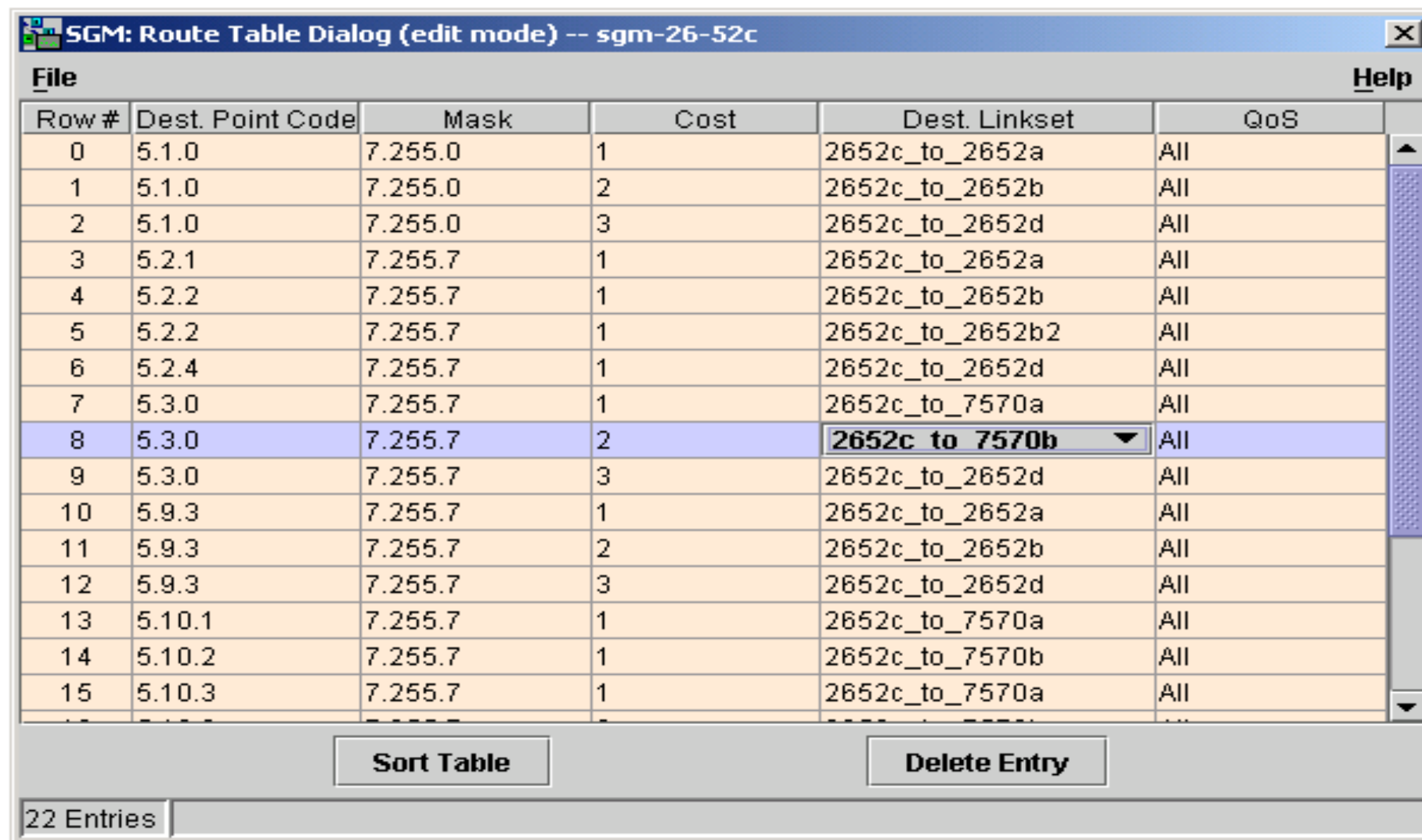
SGM Event Window

SGM: Event Window – sgm-sun24

File Edit View Event Tools Web Links Products Debug Help

Ack	Note	Severity	Time	Message
☐		None	3/28/02 10:57 AM	rolive login Successful.
☐		None	3/28/02 10:51 AM	The file /opt/CSCOsgm/prefs/rolive-w2k.prf was created by sgmClient.rolive-w2k.ecdd8ec539.
☐	📄	None	3/28/02 10:51 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.
☐		None	3/28/02 10:44 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.
☐		None	3/28/02 10:41 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.
☐		Admin	3/28/02 10:41 AM	Node 7.1.2 edited by user dhcp-64-102-86-221.cisco.com.
☐	📄	Error	3/28/02 10:40 AM	Link sgm-26-52c.cisco.com/to_stp2/0 added in state Failed.
☐		Error	3/28/02 10:40 AM	Linkset sgm-26-52c.cisco.com/to_stp2 added in state Unavailable.
☐		None	3/28/02 10:40 AM	Node 7.1.2 added in state Unmanaged.
☐		Warning	3/28/02 10:40 AM	Node sgm-26-52c.cisco.com changed state from Polling to Warning.
☐		None	3/28/02 10:40 AM	Node sgm-26-52c.cisco.com changed state from Warning to Polling.
☐		Admin	3/28/02 10:40 AM	Poll for sgm-26-52c.cisco.com requested by user dhcp-64-102-86-221.cisco.com.
☐		Admin	3/28/02 10:38 AM	Node 7.1.1 edited by user dhcp-64-102-86-221.cisco.com.
☐		Error	3/28/02 10:38 AM	Link sgm-26-52d.cisco.com/to_stp1/0 added in state Failed.
☐	📄	Error	3/28/02 10:38 AM	Linkset sgm-26-52d.cisco.com/to_stp1 added in state Unavailable.
☐		None	3/28/02 10:38 AM	Node 7.1.1 added in state Unmanaged.
☐		Warning	3/28/02 10:38 AM	Node sgm-26-52d.cisco.com changed state from Polling to Warning.
☐		None	3/28/02 10:38 AM	Node sgm-26-52d.cisco.com changed state from Active to Polling.
☐		Admin	3/28/02 10:38 AM	Poll for sgm-26-52d.cisco.com requested by user dhcp-64-102-86-221.cisco.com.
☐		None	3/28/02 10:31 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.
☐		None	3/28/02 10:30 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.
☐		None	3/28/02 10:30 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.
☐		None	3/28/02 10:27 AM	The file /opt/CSCOsgm/views/rocky1.vew was overwritten by sgmClient.rolive-w2k.ecdd8ec539.

1021 Events   View: rocky1   System Admin: rolive

Cisco Confidential

SGM DPC Route Table Configuration

SGM: Route Table Dialog (edit mode) -- sgm-26-52c

File   Help

Row #	Dest. Point Code	Mask	Cost	Dest. Linkset	QoS
0	5.1.0	7.255.0	1	2652c_to_2652a	All
1	5.1.0	7.255.0	2	2652c_to_2652b	All
2	5.1.0	7.255.0	3	2652c_to_2652d	All
3	5.2.1	7.255.7	1	2652c_to_2652a	All
4	5.2.2	7.255.7	1	2652c_to_2652b	All
5	5.2.2	7.255.7	1	2652c_to_2652b2	All
6	5.2.4	7.255.7	1	2652c_to_2652d	All
7	5.3.0	7.255.7	1	2652c_to_7570a	All
8	5.3.0	7.255.7	2	2652c_to_7570b ▼	All
9	5.3.0	7.255.7	3	2652c_to_2652d	All
10	5.9.3	7.255.7	1	2652c_to_2652a	All
11	5.9.3	7.255.7	2	2652c_to_2652b	All
12	5.9.3	7.255.7	3	2652c_to_2652d	All
13	5.10.1	7.255.7	1	2652c_to_7570a	All
14	5.10.2	7.255.7	1	2652c_to_7570b	All
15	5.10.3	7.255.7	1	2652c_to_7570a	All

Sort Table   **Delete Entry**

22 Entries

SGM GTT Configuration

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SGM: GTT Configurator -- midsize.sample

File   Edit   Help

| Selectors and GTA | App Group | MAPs | CPC |

Selector Table   3 Entries

Name	Translation Type	Global Title Indicator	Numbering Plan	Nature of Addr. Indicator	QoS
automatic01	100	4	15	127	All
automatic02	100	2			All
automatic03	200	2			All

GTA Table Selector: automatic03   4000 Entries

Selector	Global Title Addr. Digits	Point Code	Routing Indicator	Subsystem Number	New Translation Type	App. Group	QoS
automatic...	18774841167		none			groupcos267	All
automatic...	18774841166		none			groupcos266	All
automatic...	18774841165		none			groupcos265	All
automatic...	18774841164		none			groupcos264	All

App Group Table groupcos266   8 Entries

Name	Multiplicity	Cost	Point Code	Routing Indicator	Subsystem Number
groupcos266	cos	1	2.102.2	gt	10
groupcos266	cos	2	2.204.4	gt	10
groupcos266	cos	3	3.50.6	gt	10
groupcos266	cos	4	4.101.0	gt	10
groupcos266	cos	5	4.204.0	gt	10

MAP Table Point Code: 2.204.4   2 Entries

Primary Pt. ...	Primary SSN	Multiplicity	Backup Pt. ...	Backup SSN	Congested ...	Adjacency	CPC List Na...
2.204.4	10	sol			☐	☐	list7n175
2.204.4	12	sol			☐	☐	list25n85

CPC List   25 Entries

Point Code
2.16.4
2.34.4
2.40.4
2.46.4

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Cisco SGM Linkset Monitoring

SGM: Linkset Window – sgm-sun10

File   Edit   View   Web Links   Products   Help

Node Name	Adjacent Node	Linkset Type	Links	Active Links	Congested Links	Ignored	Status
los-angeles-f	5.1.2	Other	0	0	0	☐	🔴 Unavailable
los-angeles-f	5.1.1	Other	0	0	0	☐	🔴 Unavailable
new-york-a	0.1.2	Other	0	0	0	☐	🔴 Unavailable
los-angeles-f	houston-u	SCTPIP	1	0	0	☐	🔴 Unavailable
new-york-a	0.1.1	Serial	1	0	0	☐	🔴 Unavailable
new-york-b	0.1.2	Serial	1	0	0	☑	🔴 Unavailable
new-york-b	0.1.1	Other	0	0	0	☑	🔴 Unavailable
los-angeles-e	5.1.2	Other	0	0	0	☐	🔴 Unavailable
los-angeles-e	5.1.1	Other	0	0	0	☐	🔴 Unavailable
los-angeles-f	los-angeles-e	Serial	2	1	0	☐	🟡 Warning
chicago-d	chicago-c	Both	3	2	0	☐	🟡 Warning
chicago-c	los-angeles-f	SCTPIP	1	1	0	☐	🟢 Active
chicago-c	los-angeles-e	SCTPIP	1	1	0	☐	🟢 Active
chicago-c	new-york-b	SCTPIP	1	1	0	☐	🟢 Active
new-york-a	los-angeles-e	SCTPIP	15	15	0	☐	🟢 Active
new-york-a	chicago-d	SCTPIP	1	1	0	☐	🟢 Active
new-york-a	chicago-c	SCTPIP	1	1	0	☐	🟢 Active
new-york-a	new-york-b	Serial	1	1	0	☐	🟢 Active
chicago-d	los-angeles-f	SCTPIP	1	1	0	☐	🟢 Active
chicago-d	los-angeles-e	SCTPIP	1	1	0	☐	🟢 Active
chicago-d	new-york-b	SCTPIP	1	1	0	☐	🟢 Active
new-york-b	houston-v	SCTPIP	1	1	0	☐	🟢 Active

View: usa

Link Details - Configuration

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Link Details - Status

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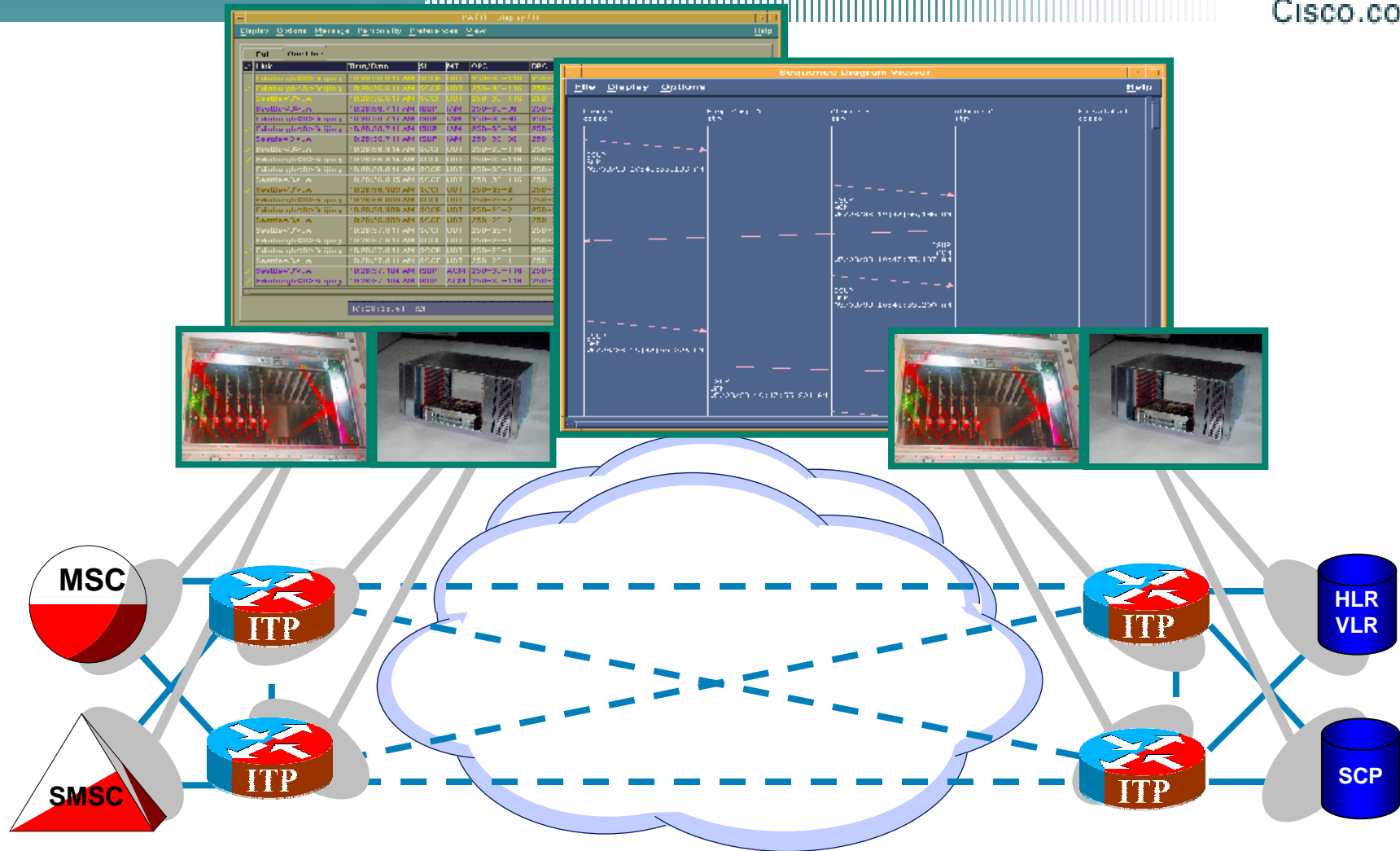# Cisco and Agilent Partnership and Strategy

Agilent Technologies

- **The Cisco IP Transfer Point—IP leadership /expertise extended to SS7oIP**

- **Agilent acceSS7—SS7 monitoring leadership extended to SS7oIP**

- **Extending the power of acceSS7 into packet networks by ensuring SS7oIP delivers its value proposition over traditional SS7**

  – **Manage services across PSTN/packet gateways**

  – **Accelerate the deployment of hybrid voice/data networks that deliver value-added services**

  – **Ensure service quality and availability**

  – **Scalability and cost efficiency**

- **Cisco IP Transfer Point with acceSS7 SIGTRAN running in live network Jan. 2002 with Call Trace and Protocol Analysis applications**

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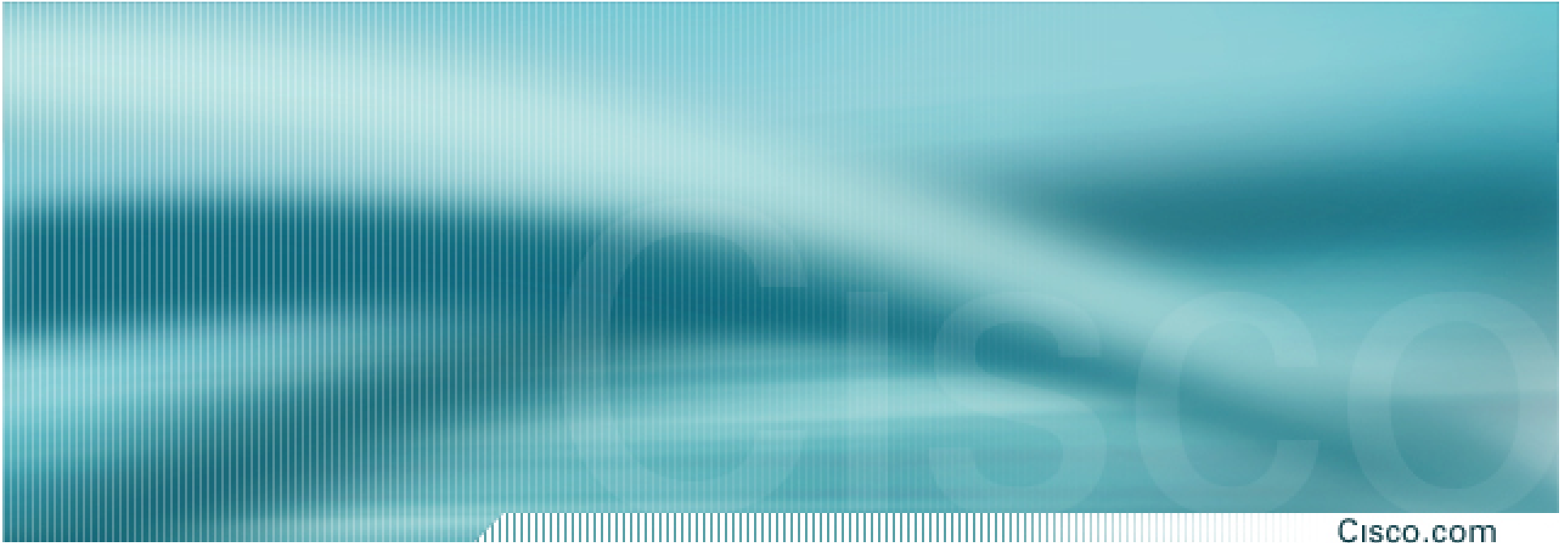
Agilent acceSS7 in a Combined SS7 and SS7oIP Network

MSC

SMSC

ITP

ITP

ITP

ITP

HLR
VLR

SCP

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Thank You!