



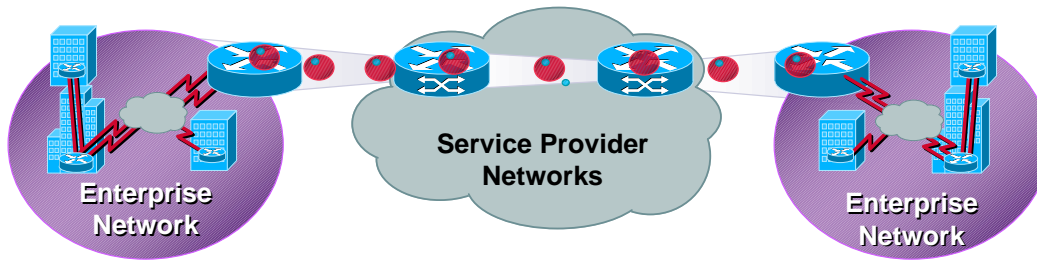
Agenda

- **Customer Requirements**
- **Solution Overview**
- **Available Capabilities**
- **Example Deployment**
- **Summary**



Customer Requirements

Customer Requirements for Service Level Management



- **SLAs are becoming an integral part of network service delivery**

Businesses are relying on them for critical applications and processes

Service providers are providing them as part of their differentiated service offerings

Customer Requirements for Service Level Management

- **Support SLM metrics—for IP, FR, ATM and network applications**

Performance (1-way/roundtrip delay, 1-way jitter, 1-way data loss, throughput, etc)

Availability and reliability (data integrity, data duplication, out-of-sequence delivery, etc)

QoS Support (by using IP ToS bits) and VPN support

- **Proactive service monitoring and management**

Scheduling of operations

Threshold crossing alarm and event notification

- **Storing real-time and historical data**

Secure bulk data transfer

Troubleshooting and problem analysis

- **Establishing Cisco ecosystem partners to provide turn-key solutions**



Solution Overview

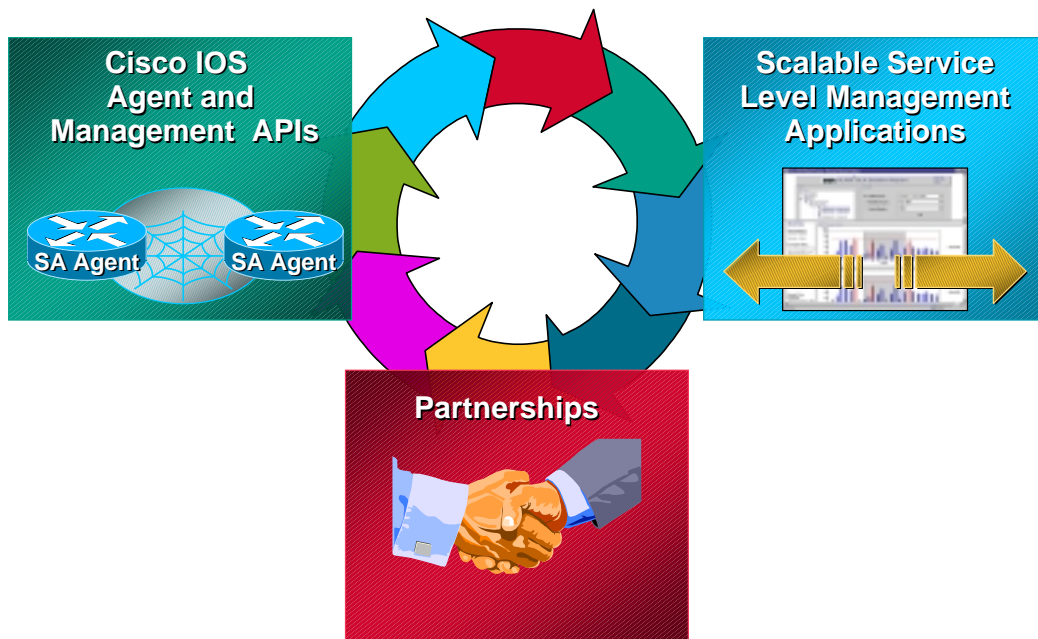
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Cisco Service Level Management Solution



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Cisco IOS Service Assurance Agent

- Integrated SLM capability in Cisco IOS
- Core SLM technology for service providers and enterprises
- **Previously was RTR**
- Extending SLM metric collections beyond **“delay”**



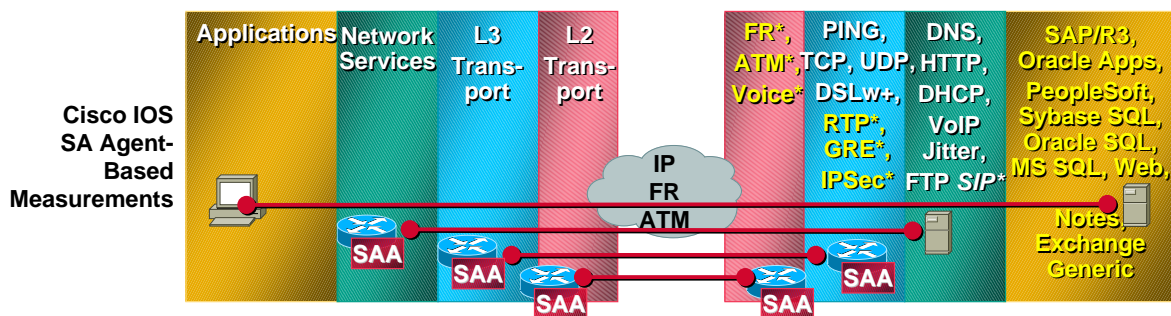
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Cisco IOS SA Agent Strategy



Cisco IOS
SA Agent-
Based
Measurements

BU and
Business
Partner
Applications

- Service level reports
- Health reports
- Trend reports
- Exception reports
- ...

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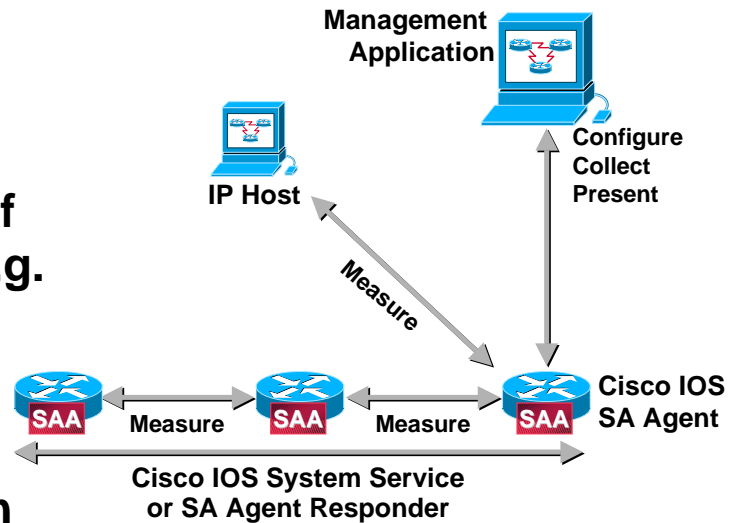
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Cisco IOS SA Agent Overview

- SA Agent via RTTMon MIB or CLI
- Measurement of SLM metrics (e.g. response time, availability, ...)
- Isolate cause of SLA violation to specific IP hop



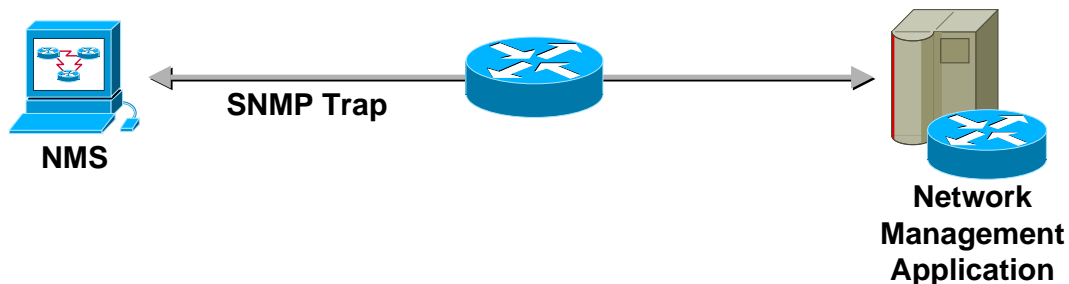
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Cisco IOS SA Agent Proactive Notification



- Rising and falling thresholds
- Robust threshold definition for SLAs
- SNMP traps generated when SLA violated
- Thresholds can trigger SA operation activation for further analysis

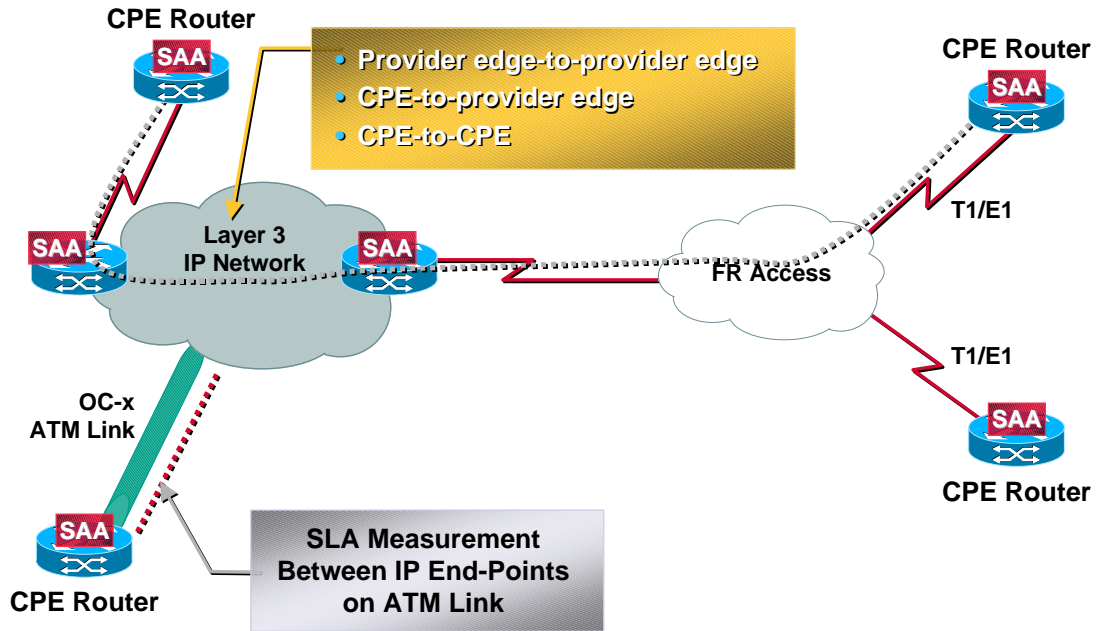
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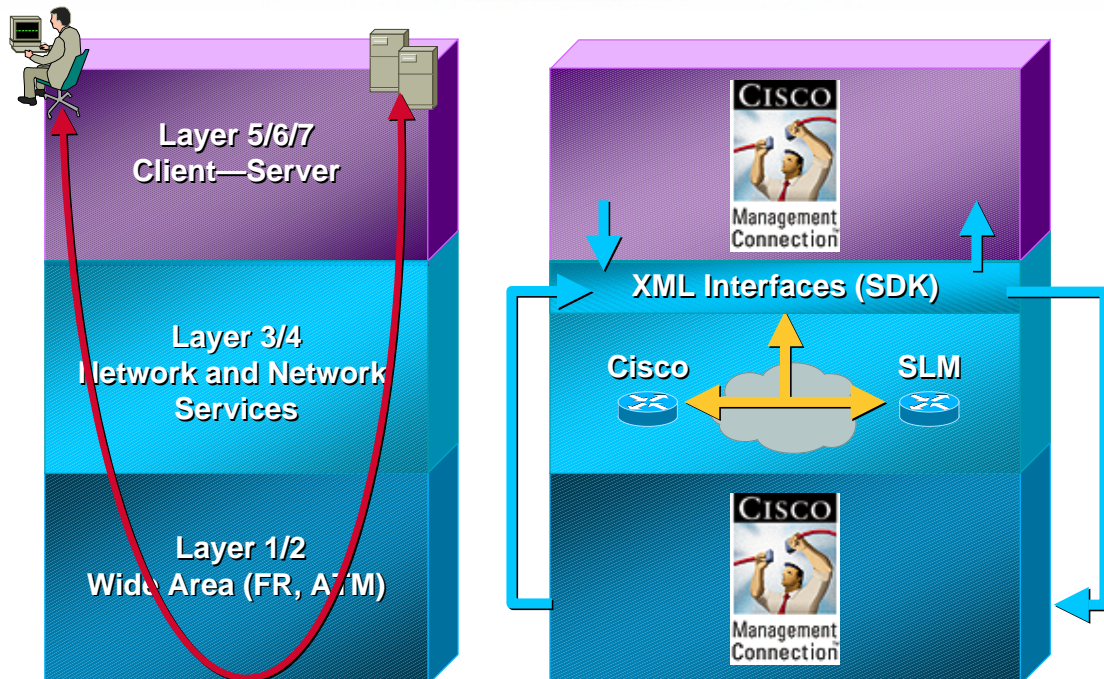
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Cisco IOS SA Agent In the Network (Example)



Cisco SLM Management APIs for SLA Monitoring





Available Capabilities

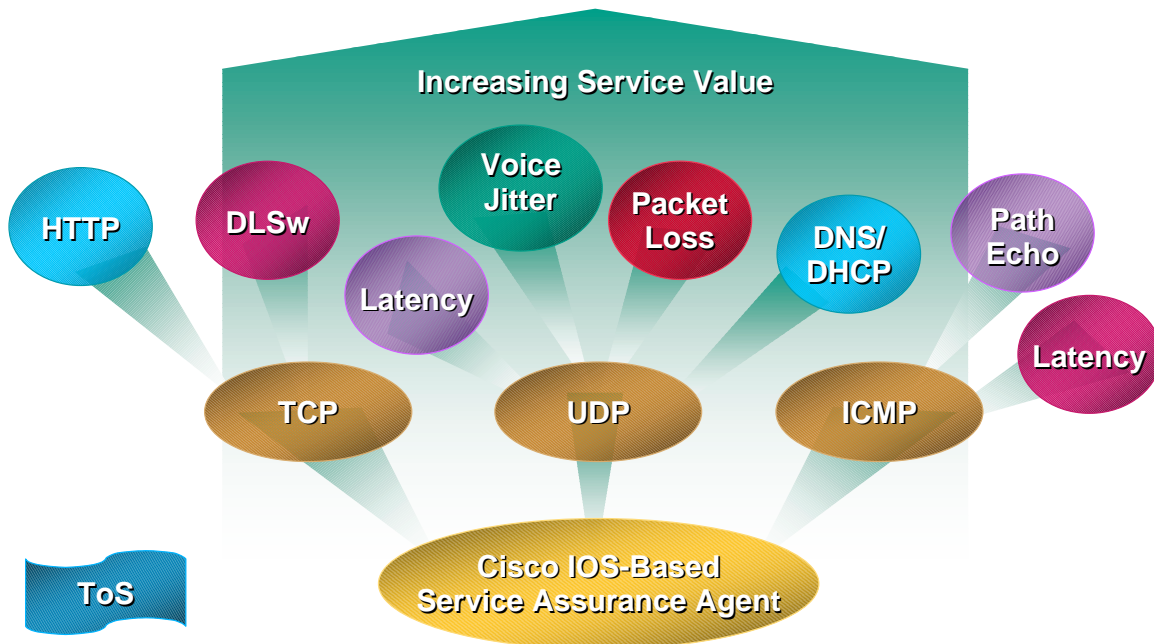
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Cisco IOS SA Agent Operations



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Cisco IOS SA Agent Example Use

- **QoS**
 - ToS Settings**
 - ICMP, UDP Echo-port**
 - Jitter**
 - TCP Connect**
 - HTTP**
- **Non QoS**
 - Network services**
 - DNS**
 - DHCP**
- **History 120m**
- **Real time**
- **Hop by hop path analysis**
- **Alarms (NMVT)**
- **Trap notification**
- **Action**

Cisco IOS SA Agent Supported Operations (By Cisco IOS Release)

Operations/Cisco IOS	12.0 (Only RT)	12.0 (3) T	12.0 (5) T 12.0 (8) S	12.1 (1) T
ICMP Ping	X	X	X	X
ICMP Echo Path	X	X	X	X
LU0/LU2 (3270 Ping)	X	X	X	X
SSCP (SNA)	X	X	X	X
Responder		X	X	X
UDP Echo		X	X	X
TCP Connection Setup		X	X	X
Jitter			X	X
Jitter (Delay One Way)				X
DNS Name Resolution			X	X
FTP				X
DHCP Get IP Address			X	X
DLSw Peer Tunnel			X	X
HTTP			X	X

RT = Response Time

SA Agent Operation Attributes Cisco IOS 12.0(5)T and 12.0(8)S

	ToS	Response Time/Latency	Jitter	Packet Loss (Sampling)
ICMP Ping	X	2W		
ICMP Echo Path	X	2W		
LU0 (3270 Ping)		2W		
SSCP (SNA)		2W		
UDP Echo	X	2W		
TCP Connection Setup	X	2W		
Jitter	X	2W	1w	1w
Jitter (Delay One Way)	X	1W**	1w	1w
DNS Name Resolution		2W		
FTP	X**	2W**		
DHCP Get IP Address		2W		
DLsw Peer Tunnel		2W		
HTTP	X	2W		

** 12.1(1)T

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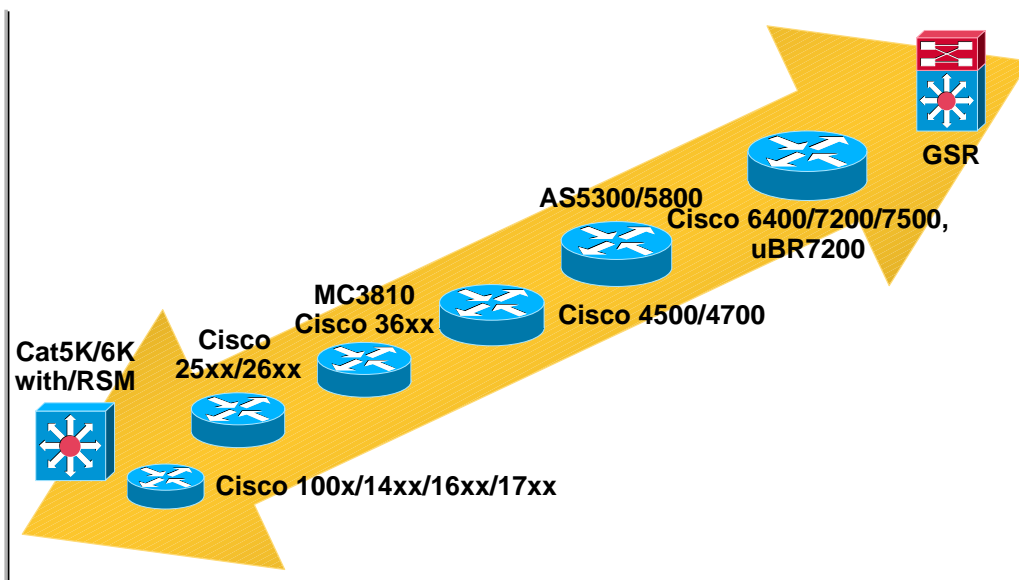
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2W = Round Trip Measurement
1W = Each Direction Measured

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Cisco IOS SA Agent Platforms Supported



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CiscoWorks 2000 Service Management Solution

- Service Level Manager application (SLM) NT or Solaris
- CW2000 RME 3.0
- CiscoView Web
- CW2000 management server
- Scalable data collection technology



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CiscoWorks 2000 Service Level Manager

- **Report browser**
 - Day, month, year
 - Link to admin
 - Printable reports
 - XML export via SDK**



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Cisco Service Assurance Management Ecosystem



Agilent



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Example Deployment (MPLS VPN Example)

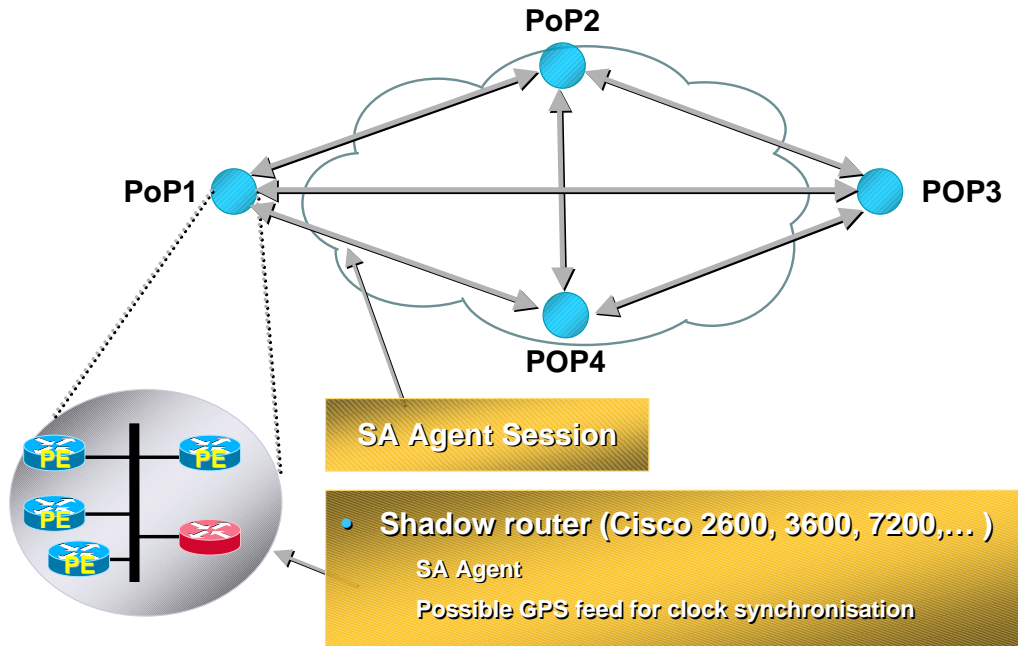
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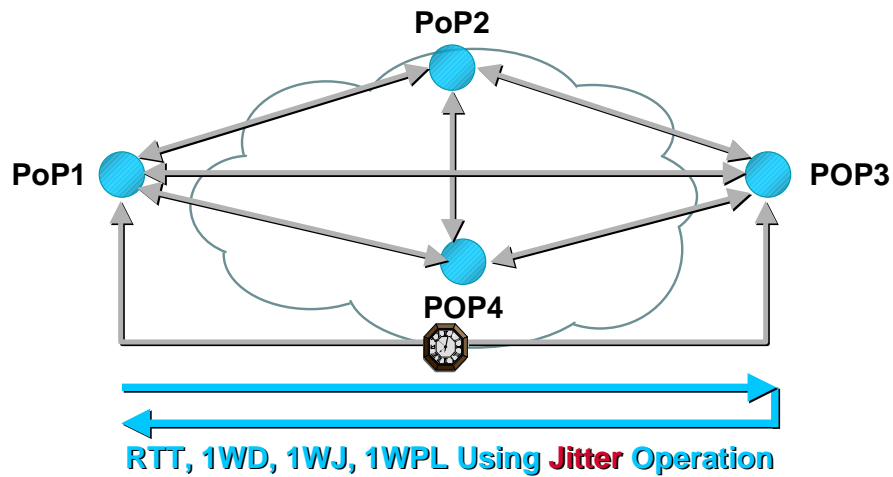
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Cisco IOS SA Agent Example Configuration



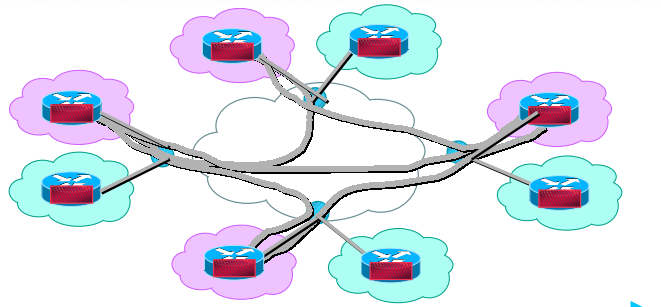
Internal Auditing



- Full-mesh of jitter operation
- Per CoS
- Measure 1-way delay, jitter and packet loss

Customer Report

Method 1—Full-Mesh Measurements

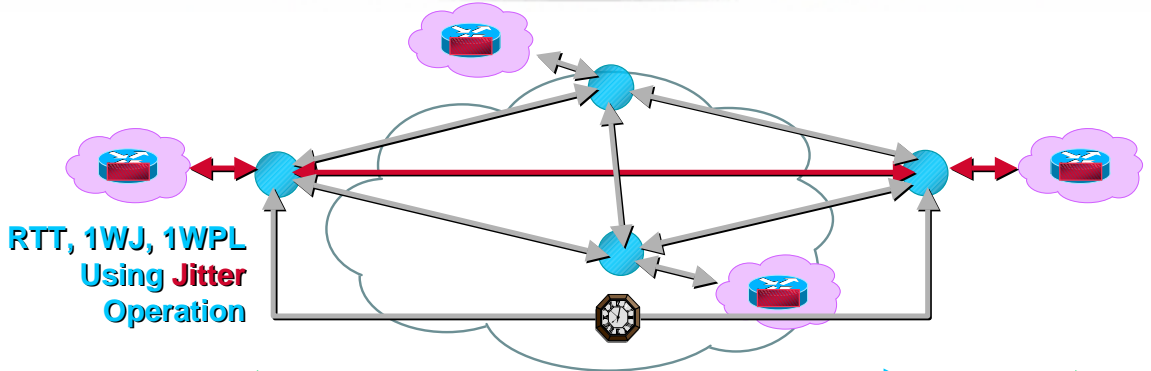


RTT, 1WJ, 1WPL Using **Jitter** Operation

- Each CE has SAA enabled
- Each CE probes all over CE Per-CoS Round-trip-delay, 1-way jitter and packet loss
For 1-way delay, CE2CE synchronisation is required
- **Provides accurate service level measurements**

Customer Report

Method 2—Segmented Measurements



RTT, 1WJ, 1WPL Using **Jitter** Operation

CE-PE is 1-hop, 1WD ~ RTT/2
RTT, 1WD, 1WJ, 1WPL Using **Jitter** Operation

- **Segmented measurements**
CE to POP shadow router
POP to POP shadow routers
POP shadow router to CE
- **Potential reuse of segment measurements**

Customer Report

Method 2—Segmented Measurements (Cont.)

- **More scalable at the expense of less accuracy**

Per-CoS

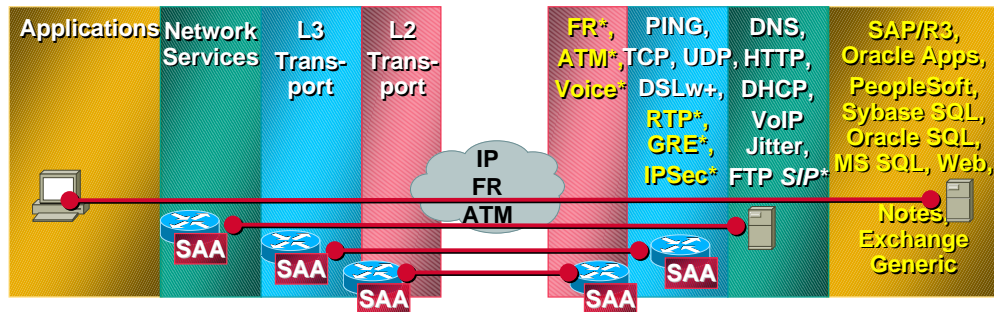
Aggregation report must be computed on a per-VPN basis

Concatenation of jitter

No GPS on CPE, thus only 2-way probes



Cisco IOS SA Agent Future Support



- FR, ATM and VPN measurements
- Network performance measurements of applications at an emulated Layer 7 level

Related Presentations at Networkers

- You may want to also attend the **Session 2218: Introduction and Update to NetFlow** presentation



**The Power of SA as a
SLM Tool**

Session 2219

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