

Cisco MATE Collector Multivendor Capabilities

What You Will Learn

Multivendor networks have become a reality in global service provider networks. Cisco® MATE Collector interfaces with multivendor networks to support topology and traffic statistics collection, thereby enabling Cisco MATE Design, MATE Live, WAN Automation Engine (WAE) SDN applications, and business intelligence solutions.

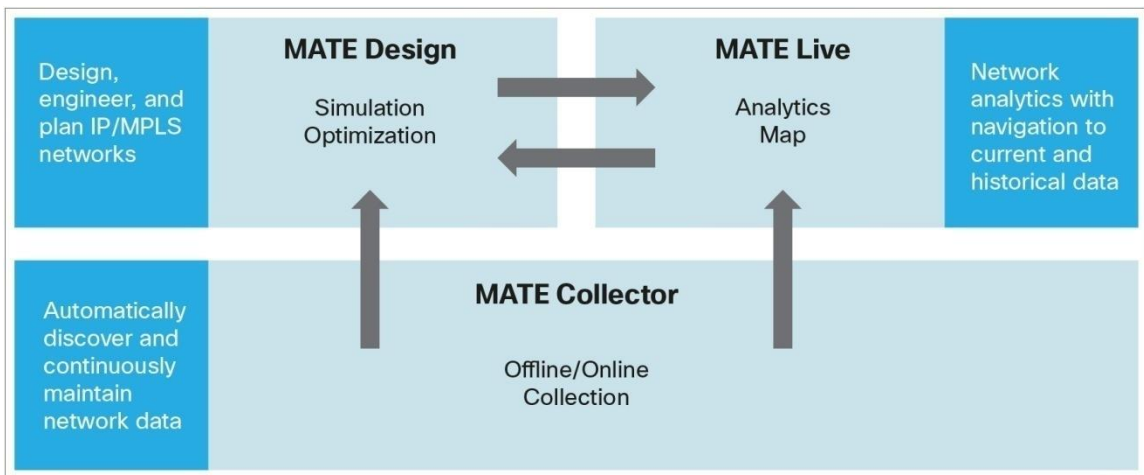
This paper describes some key features of Cisco MATE Collector and explains several examples of multivendor network deployment scenarios where it has been successfully deployed.

Introduction

Central to Cisco MATE Design traffic management functionality are plan files that represent current, past, or future network states. Engineers and planners use these plan files to design and evaluate network scenarios of interest. For example, plan files are used for risk assessment, forecasting, capacity planning, and traffic engineering. Furthermore, network operators rely on network topology, real-time traffic, and state data for trending and analytics purposes using MATE Live.

Figure 1 illustrates the high-level building blocks of the Cisco MATE portfolio.

Figure 1. Cisco MATE Portfolio



Cisco MATE Collector

Cisco MATE Collector allows the user to automate the process of network topology discovery, polling for measurements, modeling the plan file, and storing the results. This automation is achieved by instructing the Cisco MATE Collector on which discovery tasks to deploy. The collected information is stored in a plan file and made available for use in Cisco MATE Design, including the Cisco MATE Design Archive application and the Cisco MATE Live application.

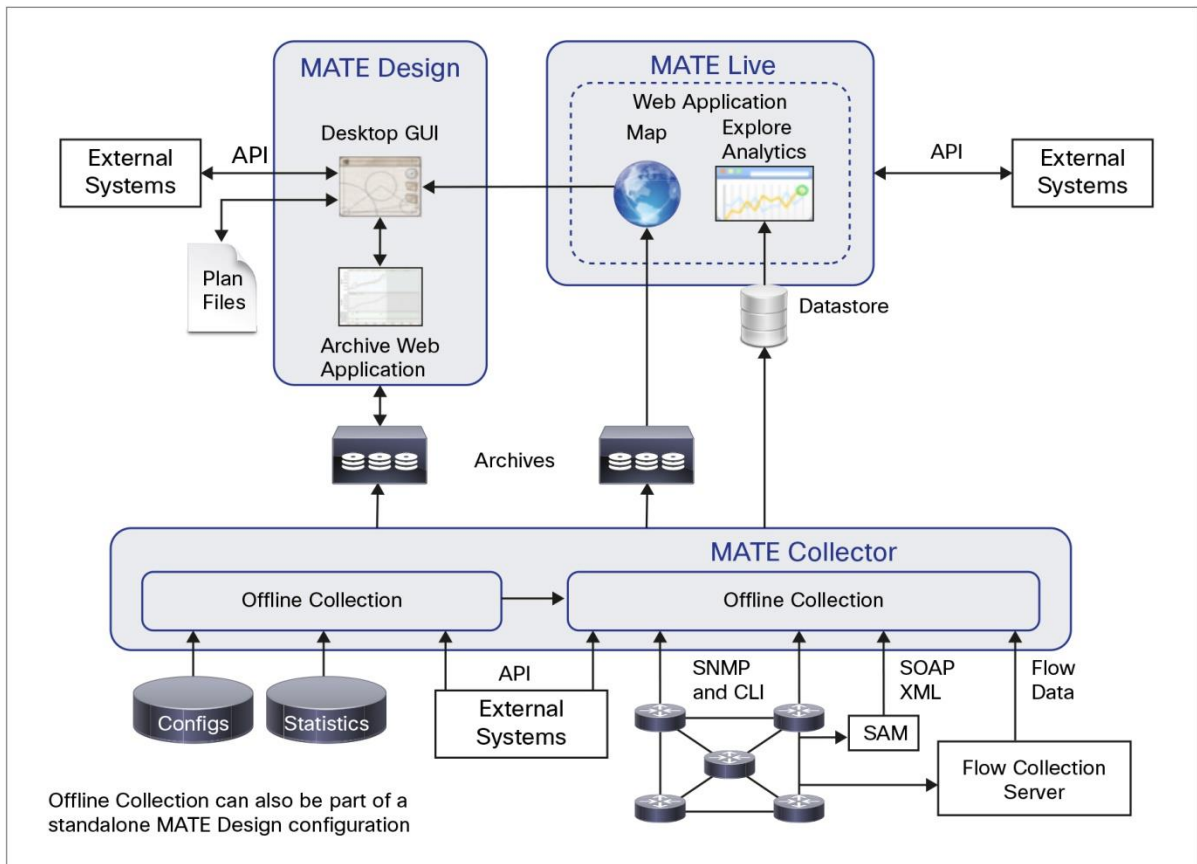
MATE Collector software provides an extensive set of network collection capabilities, including:

- Multivendor network integration with Cisco, Juniper, Alcatel-Lucent, and Huawei
- Multisource online and offline data collection using Simple Network Management Protocol (SNMP), command-line interface (CLI), router configuration, and NetFlow/IP Flow Information Export (IPFIX)
- Multiprotocol IP/Multiprotocol Label Switching (MPLS) technologies, including IPv4, IPv6, Open Shortest Path First (OSPF), Intermediate System-to-Intermediate System (IS-IS) Protocol, Border Gateway Protocol (BGP), Resource Reservation Protocol-Traffic Engineering (RSVP-TE), Fast Reroute Label Switched Paths (FRR LSPs), quality of service (QoS), IP Multicast, Label Distribution Protocol (LDP), and VPNs
- Intuitive web GUI for simple configuration and automated collection

Cisco MATE Collector software enables MATE Design and MATE Live applications in multivendor networks (Figure 2) by:

- Constructing a consistent network topology and peering relationships for visualization
- Collecting current network state, including traffic statistics, for traffic demand estimation and analytics
- Collecting NetFlow/IPFIX traffic and aggregating it to deduce the internal and external traffic demand matrix that can be used to augment demand deduction and to create advanced peering business intelligence reports

Figure 2. Online and Offline Collection



Multivendor Deployment Scenarios

There are numerous deployments where multivendor networks are encountered. This section provides a few examples by illustrating scenarios where MATE Collector has been deployed to perform multivendor network discovery in order to gain end-to-end network visibility.

ISP

An ISP with a single-vendor backbone network (P, PE) that introduced a second vendor at the edge (PE) for its VPN features and also plans to introduce a third vendor at the core (P) for bandwidth scalability. Visibility into the following network properties is deemed critical:

- Cross-vendor Link Aggregation Group (LAG) ports and neighbor port matching for capacity planning
- Cross-vendor RSVP LSPs for failure simulation and traffic engineering

Mobile Backhaul

A mobile operator with a single-vendor backbone that has a second equipment vendor deployed in its IP Radio Access Network (RAN). End-to-end network visibility into the following features is necessary:

- IS-IS topology and interface traffic measurement and performance per IP RAN for planning
- Infrastructure Layer 2 VPNs, Virtual Private Wire Service (VPWS), for failure analysis

Cable Operator

A cable operator offering triple-play services that expanded its services to regions served by different equipment vendors. Their requirements are granular visibility into these network properties:

- IP QoS interface queue traffic measurements for class of service (CoS)/QoS simulation modeling
- IP Protocol Independent Multicast (PIM) Source Specific Multicast (SSM) (S, G) routes and traffic measurements for capacity planning

Greenfield

A service provider building a multivendor IPv6 network has the following requirements:

- Visualize the OSPFv3 topology and IPv6 BGP peers
- Collect IPv6 BGP peering interface traffic measurements
- Collect NetFlow Version 9/IPFIX flow measurements to build traffic matrices for capacity planning

While these are but a few deployment examples, they highlight capabilities that are important when performing multivendor network collection.

Challenges of Multivendor Collection

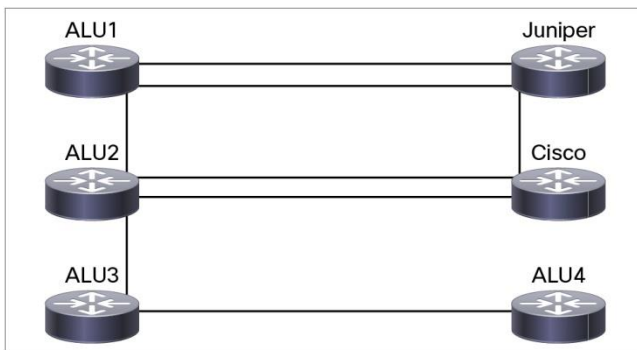
What makes multivendor collection especially hard is to be able to tap into the right sources of information for each vendor and then cross-reference this information across multiple sources to build a consistent and accurate model of the network. Experience gained over several years and over a large number of deployments has allowed the Cisco MATE portfolio to optimize multivendor collection to identify the collection sources that work for each vendor and to identify and eliminate any anomalies while building the network model.

Example: Multivendor Discovery Using Cisco MATE Collector

To illustrate Cisco MATE Collector's multivendor capabilities let us consider a simple multivendor network mimicking a service provider network. While the example network is small in size, it serves as a good representative setup to explain collection, visualization, and simulation of a multivendor network. There are cross-vendor LAGs, LSPs, and VPNs in this network. The Cisco MATE Collector SAM-OSS Interface collects network properties from Alcatel-Lucent (ALU) routers, while online tools collect information from Cisco and Juniper routers. The result is a fully integrated plan file and a corresponding OSPF network topology map showing parallel Equal Cost Multiple Path (ECMP) interfaces. The following steps illustrate the key information gathered from the network.

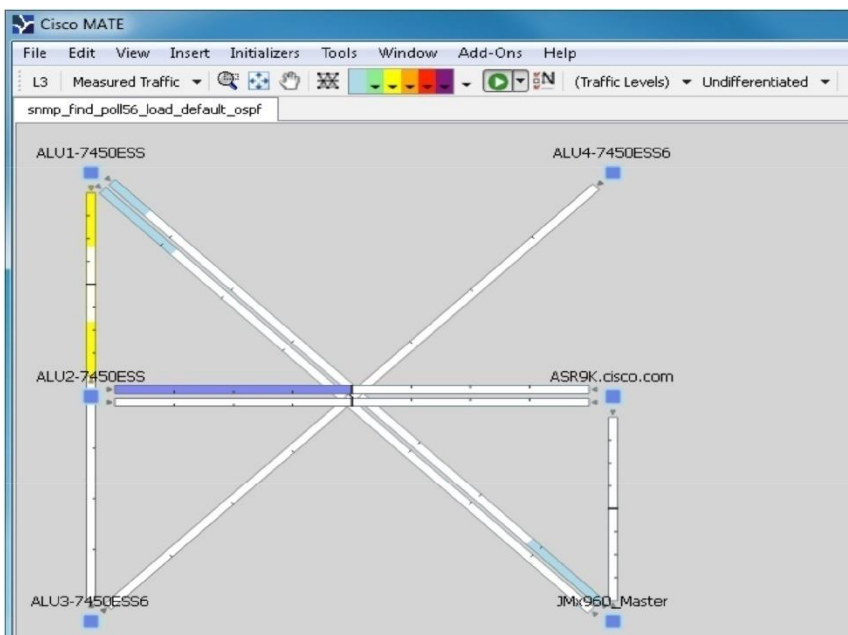
1. Topology of the multivendor network: This network consists of four ALU routers, one Juniper router, and one Cisco router (Figure 3).

Figure 3. The Multivendor Network



2. Figure 4 provides a representation of the multivendor network topology from MATE Design. The user can view the nodes, links, and the overall topology with navigation capabilities.

Figure 4. Typology of the Multivendor Network



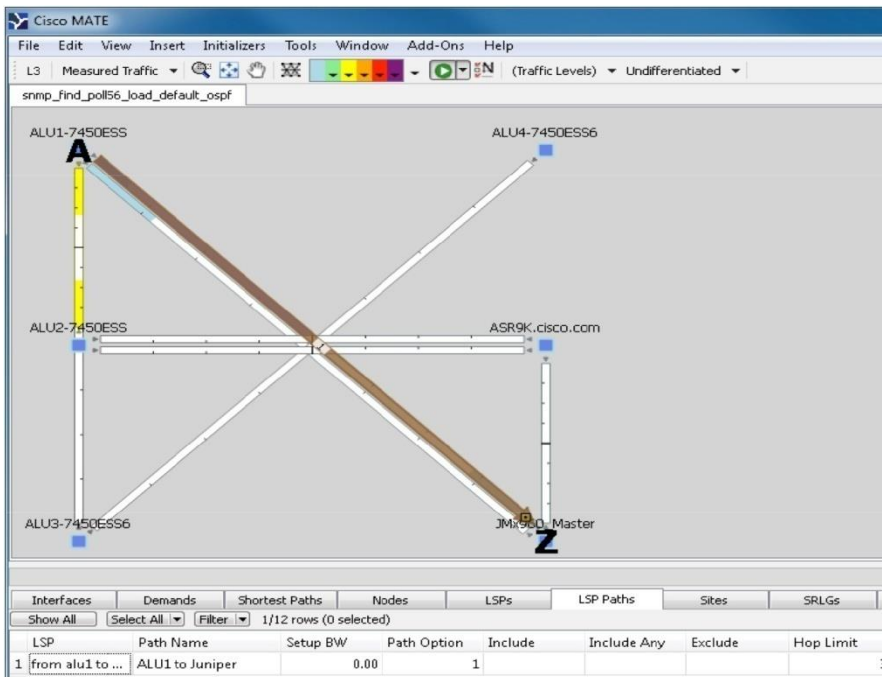
- Table1 shows the cross-vendor LAG port members for one interface: in this example the user can view LAG interface and LAG port members between the ALU 7450ES router and the Cisco ASR 9000 router.

Table 1. Cross-Vendor LAG Port Members for One Interface

Interfaces	Demands	Shortest Paths	Nodes	LSPs	Sites	SRLGs	A5	Ports		
Show All Select All Filter 2/18 rows (0 selected)										
Node	Port	Remote Node	Remote Port	L1 Node	Remote L1 No	Site	Interface	Traff Meas	Capacity	Util Meas
1 ASR9K.cisco...	GigabitEther...	ALU2-7450ESS	Port 1/1/3			ASR9K.cisco...	Bundle-Ether1	0.00	1000.00	0.00
2 ASR9K.cisco...	GigabitEther...	ALU2-7450ESS	Port 1/1/4			ASR9K.cisco...	Bundle-Ether1	0.00	1000.00	0.00

- Figure 5 shows a cross-vendor LSP path: in this example an LSP, MPLS Traffic Engineering Tunnel, between the ALU and Juniper router is highlighted. The user can navigate to get more detailed LSP information.

Figure 5. A Cross-Vendor LSP Path



Summary

In summary, Cisco MATE Collector is widely deployed in multivendor networks. Since deploying Cisco MATE Collector customers have been able to facilitate a single point of collection to drive all Cisco MATE and WAE applications to gain end-to-end visibility of their network. With this comprehensive view, not only can internal teams plan and design their complete network but they can also use it to troubleshoot and proactively resolve issues before they affect their customers.




Americas Headquarters
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San Jose, CA

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