



PROVISION® PLUS

INTEGRATED ELEMENT AND SERVICE MANAGEMENT SOLUTION

PROVISION PLUS IS AVIAT'S ADVANCED MANAGEMENT PLATFORM FOR INTEGRATED ELEMENT AND SERVICE MANAGEMENT. PROVISION PLUS IS DESIGNED FROM THE GROUND UP TO MINIMIZE TOTAL COST OF OWNERSHIP AND MAXIMIZE INTELLIGENCE AND FLEXIBILITY OF MODERN MICROWAVE NETWORKS

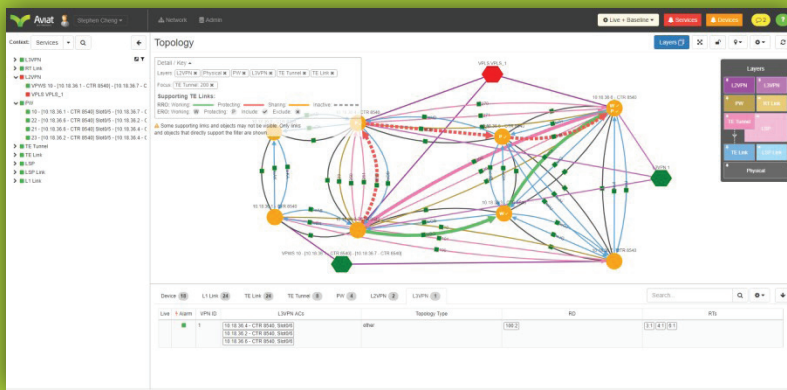


Figure 1: ProVision Plus Graphical User Interface

CHALLENGES

In today's competitive environment, network operators must operate with efficiency, speed, and agility.

Microwave networks are no longer just dumb pipes. They're often significant segments of a sophisticated layer 2 or layer 3 network. Aviat's advanced radios, including CTR 8000 and WTM 4000 products, deliver convergence of switching, routing, and microwave capabilities, combining radio frequency (RF), Layer 2, Layer 3, and IP/MPLS capabilities. However, with such impressive power and flexibility come potential complexities that can overwhelm network operators and traditional management systems that are not multi-layer aware.

To reduce operating expenses (OpEx), network operators are looking for management solutions that facilitate rapid end-to-end service deployment, effective fault resolution in a multi-layer network, leveraging of network intelligence to enable dynamic optimization, and automation to minimize human intervention.

The microwave network and its management system must enable cost effective and flexible integration into broader operation support systems (OSS) and orchestration systems. Such integration enables efficiency through automation, orchestration, and leveraging of system-wide intelligence.

KEY FEATURES AT A GLANCE

- Integrated element and service management solution developed for Aviat equipment
- Model-driven architecture with IETF standard YANG model
- Web-browser based
- Management against baseline design and configuration validation mechanisms
- Secure, reliable user access management—role-based access control; secure device access; audit logging, reporting, and client session management
- OSS integration and SDN-ready
- Can be deployed on customer servers or supplied as software as a service (SaaS)
- On-site training and installation services
- 24/7 or 9/5 technical helpdesk available by email and telephone
- Expert network auditing available
- Recommended server configuration:
 - Microsoft Windows 64-bit
 - Minimum 4-Core Intel processor, 16GB RAM, 50GB HDD (for small network deployment)
- Recommended client configuration:
 - Google Chrome browser on Windows, OSX and Linux
 - Microsoft Edge browser on Windows
 - Safari browser on OSX

PROVISION PLUS OVERVIEW

ProVision Plus is Aviat's next-generation integrated element management and service management platform. It's designed from the ground up to address the key challenges of managing a modern microwave network.

ProVision Plus helps microwave network operators:

- Improve speed-to-fault resolution through built-in automatic service-aware fault analysis
- Facilitate rapid deployment of complex end-to-end services
- Enable efficient collaboration and orchestration between microwave networks and other part of the system
- Reduce total cost of ownership through end-to-end management.

SERVICE MANAGEMENT: VISIBILITY AND EFFICIENCY

ProVision Plus is engineered to bring an unparalleled degree of visibility and efficiency to the service management challenge. Central to the ProVision Plus philosophy is to present the network in ways that mirror the human cognitive model, allowing network operators to operate efficiently at a very high level of abstraction:

- Models the network as multiple interconnected layers of services
- Intuitive UI to graphically visualize end-to-end services and relationships between layers
- End-to-end services include VLAN, clock synchronization, L2VPN, L3VPN, Traffic Engineered Tunnels, and LDP-signaled LSPs

SINGLE PANE OF GLASS FOR ALL AVIAT PRODUCTS

Through the ProVision EM Integration Module, ProVision Plus integrates seamlessly with Aviat's ProVision NMS to provide a "single pane of glass" for all Aviat's products from a single web browser screen.

While preserving customer investment in ProVision, ProVision Plus adds to its already formidable capabilities. For further details please refer to the ProVision EM Integration Module datasheet.

MANAGEMENT AGAINST A BASELINE DESIGN

To be able to effectively manage a network, a yardstick is needed to measure performance against. Key to ProVision Plus is the concept of a Baseline Design. The Baseline Design provides the definition of the benchmark design of the network, including the configuration of devices and services.

Devices and services with configuration deviating from the Baseline Design are visually highlighted, and details of the configuration change are displayed.

Configuration mistakes have traditionally been one of the primary causes of network failures. Through this unique ProVision Plus capability, configuration changes can be effectively identified, audited, and validated to prevent human mistakes and unauthorized changes, avoiding costly issues downstream. Our customers find this checking function invaluable.

AUTOMATION, OSS INTEGRATION AND SDN-READY

ProVision Plus is fundamentally architected to enable network programmability, policies, and automation. The model driven architecture allows open access to a wealth of real-time network intelligence and historic performance information. Built on standard YANG models published by IETF and other standard bodies, ProVision Plus provides an optional north-bound-interface (NBI) for cost-effective and straight-forward integration with operation support systems (OSS) and other SDN controllers. ProVision Plus is SDN-ready, enabling SDN applications to be built on top of its model driven architecture.

WEB-BROWSER BASED

ProVision Plus is a web-based system accessed via modern web browsers such as Google Chrome and Microsoft Edge. No client application installation is required, minimizing deployment and support cost and opening up easy access to employees in any location with secure network access.

HIGHLY MODULAR DESIGN

ProVision Plus is implemented as a set of individually licensed Product Modules, which can be mixed and matched to meet your specific requirements. The Product Modules are fully integrated to provide a unified user experience. Some of the Product Modules are:

- Element Manager: EM Fault & Performance Module
- Element Manager: EM Integration For ProVision Module
- Service Manager: Carrier Ethernet Fault & Performance Module
- Service Manager: IP/MPLS Fault Module
- Service Manager: IP/MPLS Performance Module
- NBI Module
- High Availability Module

MULTIPLE SERVER DEPLOYMENT OPTIONS

Multiple server deployment options are available. ProVision Plus can be deployed on a customer premise server within a NOC or a central IT location. It is also available as a Software-as-a-Service (SaaS) hosted by Aviat NOC or a commercial cloud server provider.

PROVISION PLUS ELEMENT MANAGER: EM FAULT & PERFORMANCE MODULE OVERVIEW

The EM Fault & Performance Module is a foundation Product Module of ProVision Plus. It provides effective fault and performance element management capabilities for a range of Aviat devices, such as the WTM 4000 series radios.

KEY BENEFITS

- Reduce operational expenses
- Reduce skills required of network operators
- Increase network operator productivity
- Improve network and service quality and uptime
- Improve capability to comply with SLAs

TOPOLOGY DISCOVERY

The EM Fault & Performance Module dynamically discovers the topology of the layer 1 network. Instead of relying on out of date and inaccurate network design documents, network operators can now work off up-to-date automatically generated topology. Instead of extracting relevant information from multiple devices, and tediously collating the information, the full picture of the network becomes always-available—at the network operator’s fingertips.

NETWORK HEALTH MONITORING AND REPORTING

Real-time analysis of RF links and Ethernet transport instantly identifies degraded L1 network performance, to facilitate rapid remedial actions and improved network uptime. ProVision Plus offers a suite of network and link reports to simplify the identification of short-term and long-term performance trends, and to improve compliance with SLAs.

PROACTIVE NETWORK BANDWIDTH MANAGEMENT

To get the most data capacity out of networks, and to identify spare capacity, ProVision Plus includes network bandwidth reporting. These capabilities support capacity planning and congestion problem-solving with:

- Ethernet Bandwidth Utilization: instantly shows over- or under-utilization across all network ports, predicts future utilization, and provides navigation to deep-dive analysis tools
- RF Capacity Reports: display the allocated, licensed, maximum & spare capacity available across all micro-wave interfaces in the network

SPECIFICATIONS

Prerequisites:	None
Devices supported:	WTM4100 and WTM4200
Capabilities supported:	L1 topology discovery; Inventory management; Ethernet and RF performance management; link and network reports; license management

PROVISION PLUS ELEMENT MANAGER: EM INTEGRATION FOR PROVISION MODULE OVERVIEW

The EM Integration For ProVision Module is a part of the ProVision Plus platform. It enables seamless integration between Aviat’s widely deployed ProVision NMS system with Aviat’s next-generation ProVision Plus platform, enabling ProVision Plus to manage CTR 8000 series, Eclipse series, and other selected devices.

KEY BENEFITS

- Single Pane of Glass for all Aviat products
- Web-based interface
- Remote access to network management capabilities
- Unified reporting
- Unified NBI

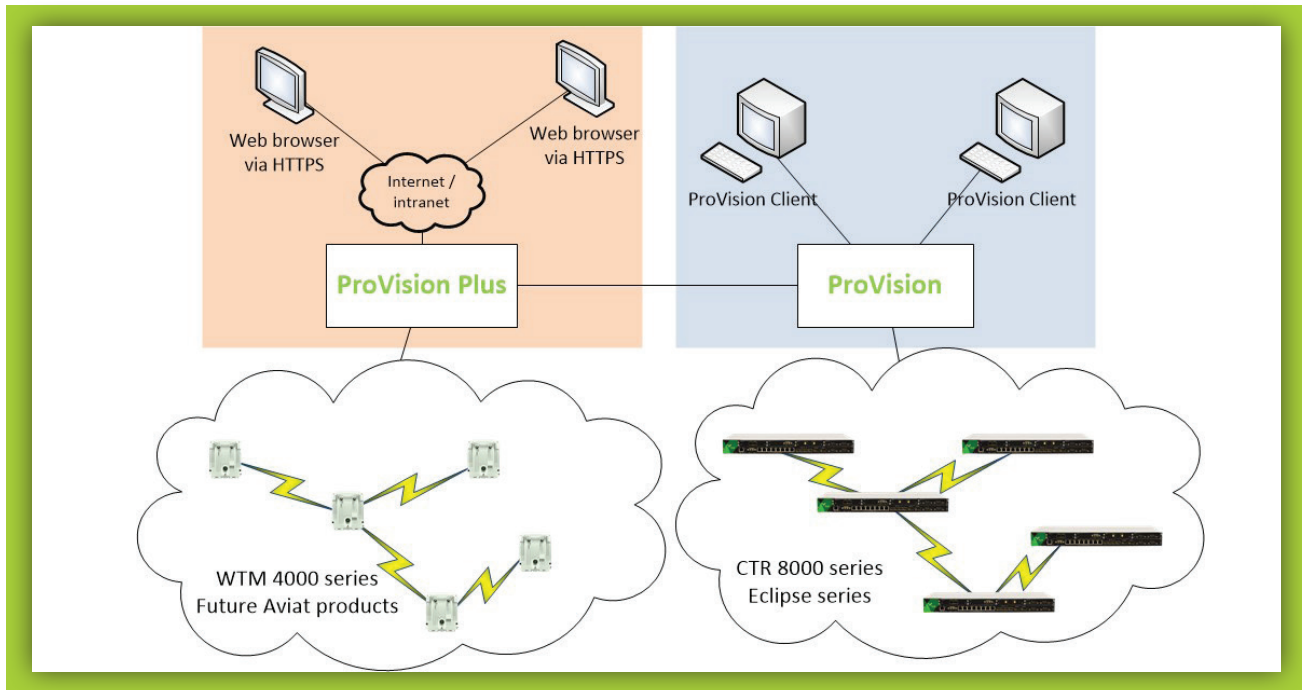


Figure 2 ProVision and ProVision Plus Integration

SEAMLESS ELEMENT MANAGEMENT INTEGRATION WITH PROVISION

ProVision has traditionally provided highly effective element management capabilities for a broad range of Aviat’s products, Aviat’s partner products and through Generic Device Support (GDS) third-party products. Through this EM Integration For ProVision Module, ProVision Plus integrates tightly with ProVision to extend its element management capabilities to the devices, under the management of a ProVision server. Your existing investment in ProVision NMS system is preserved.

BRINGING REMOTE NETWORK MANAGEMENT TO PROVISION MANAGED DEVICES

The ProVision NMS system was built on the traditional client-server architecture. Network operators access the ProVision NMS system via a client application installed on a PC.

Through EM Integration For ProVision Module, customers can now manage devices under the management of a connected ProVision server through any compatible web browser. No client application is required to access ProVision Plus. This simplifies the deployment process and increases cost effectiveness. No longer constrained by the latency and bandwidth between ProVision server and ProVision client, network operators can now rely on the capabilities of Aviat’s powerful network management system anywhere, including in the field.

ENHANCED REPORTING

The flexible, sophisticated reporting engine of ProVision Plus supports unified reporting across devices, including those directly managed by ProVision Plus and those managed via ProVision.

NORTH BOUND INTERFACE

Through ProVision Plus’ optional NBI Module, data on devices managed by a ProVision server are available through the NBI, providing a unified and modern NBI interface to manage CTR 8000 series, Eclipse series, and WTM 4000 series.

SPECIFICATIONS

Prerequisites:	The EM Integration For ProVision Module requires and works in conjunction with an Aviat ProVision server with a compatible software version. The ProVision server must be configured to manage the devices.
Devices supported:	CTR 8000 series, Eclipse series, and other selected devices

PROVISION PLUS SERVICE MANAGER: IP/MPLS FAULT MODULE: OVERVIEW

The IP/MPLS Fault Module is part of the ProVision Plus Service Management capabilities and supports traffic-engineered IP/MPLS networks, LDP-signaled IP/MPLS networks, and hybrids.

This Product Module is a key component of Aviat's IP/MPLS solution strategy, and leverages the enormous power of Aviat's CTR converged microwave router platform to realize significant improvements in efficiency, usability, and flexibility of operator networks.

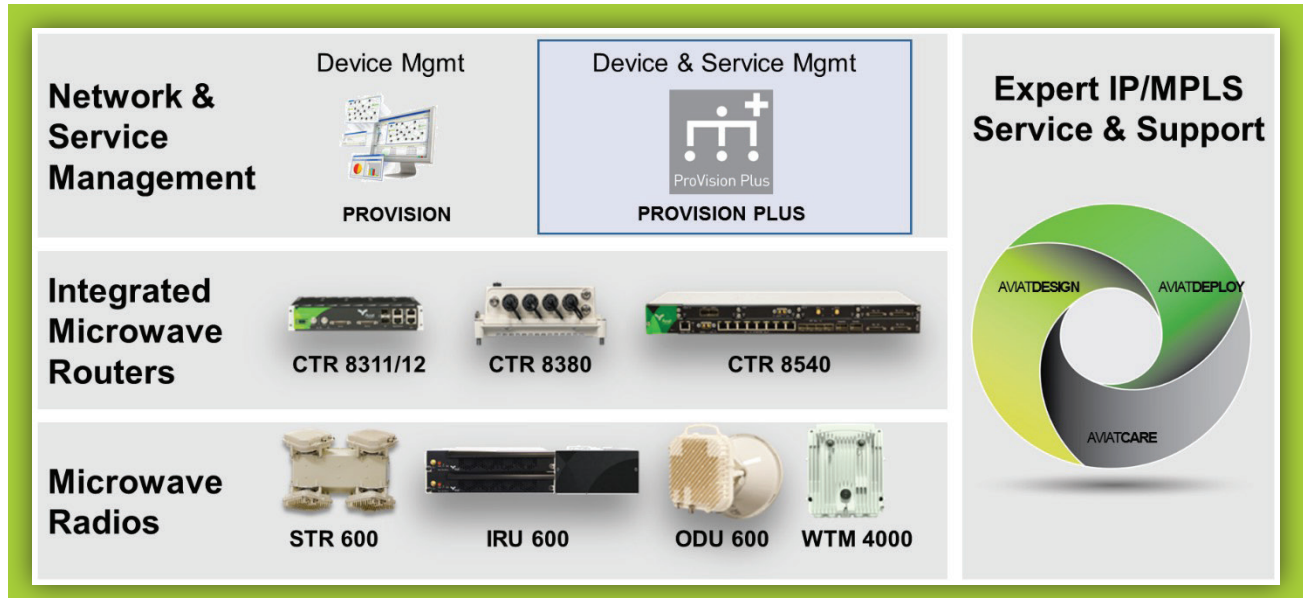


Figure 3 Aviat Networks' IP/MPLS Product Portfolio

KEY BENEFITS

- Lower operational expenses
- Reduced skills required from network operators
- Increased network operator productivity
- Rapid deployment of IP/MPLS services
- Faster time to revenue
- Improved network and service quality and uptime
- Enhanced ability to comply with SLAs

SERVICE CENTRIC

The IP/MPLS Fault Module provides a complete end-to-end and network centric view of IP/MPLS networks. IP/MPLS Fault Module collates information from every device. It then models and presents end-to-end IP/MPLS services such as LSPs, TE-Links, TE-Tunnels, pseudowires, VPLS, VPWS, and L3VPN.

By enabling network operators to effectively plan, manage and troubleshoot IP/MPLS networks at a very high level of abstraction, the IP/MPLS Fault Module greatly

reduces the skills required, increases operator productivity, improves network and service quality and uptime, and ultimately enables noticeable reduction of OpEx and faster time to revenue.

AUTOMATIC IP/MPLS NETWORK TOPOLOGY CONSTRUCTION

The IP/MPLS Fault Module dynamically discovers the topology of the IP/MPLS network by combining information from every device in the network. From this information, it intelligently reconstructs an accurate, up-to-date network topology for every supported IP/MPLS layer, including LSPs, TE-Links, TE-tunnels, pseudowires, and VPNs. LDP-signaled LSPs and traffic-engineered tunnel paths are dynamically updated in near-real-time.

Instead of relying on out of date and inaccurate network design documents, network operators can now work from up-to-date automatically generated topology. Instead of extracting relevant information from multiple devices and tediously collating the information, the full picture of the network becomes always available at the network operator's fingertips.

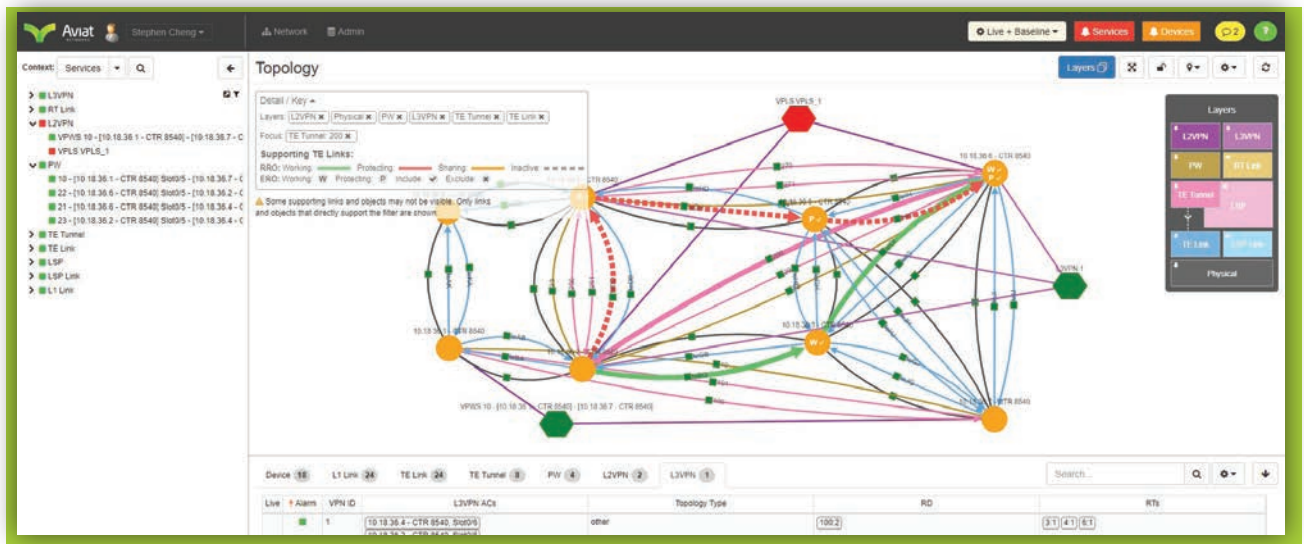


Figure 4 Multi-layer IP/MPLS visualization

MULTI-LAYER TOPOLOGICAL VISUALIZATION

Through its unique and intuitive user interface, the IP/MPLS Fault Module simultaneously visualizes multiple layers of the IP/MPLS network. When a service is selected on the topology view, the lower-layer services that support it are automatically highlighted. Through this and other mechanisms users can easily navigate and discover the relationship between the layers.

Tamed by IP/MPLS Fault Module, the flexibility and complexity of IP/MPLS technology helps you quickly and reliably deliver complex customer services.

RAPID IP/MPLS TROUBLESHOOTING

Device events from one or more devices are analyzed, normalized, and automatically correlated as service alarms for each end-to-end service, such as LSPs, TE-Links, TE-Tunnels, pseudowires, and VPNs. The service alarm state for each service is prominently displayed on the topology view and the data panels to facilitate troubleshooting.

Intuitive multi-layer topological navigation capability combines with service alarms to enable rapid visual root cause analysis. When the user selects an alarmed service in the topology view, the lower-layer services are highlighted. By iteratively selecting on a lower-layer supporting service with an alarmed state, the user can quickly identify the root cause.

Loopback and link trace testing of LSPs, TE-Tunnels, and VPNs can be directly initiated via the graphical interface.

IMPACT ANALYSIS

For planning a robust network and for evaluating the potential side-effects of a preventive maintenance task, engineers often need to determine which customers and higher-layer services could be potentially impacted if an underlying service such as RF link or TE-Link becomes unavailable.

Utilizing its knowledge of the complete network, The IP/MPLS Fault Module provides a powerful yet simple-to-use visual impact analysis capability. Complex questions—such as which VPNs would be affected if a L1-Link goes down—can be answered in a few clicks.

SPECIFICATIONS

Prerequisites:	For a device to be managed by the IP/MPLS Fault Module, it must be managed by EM Fault & Performance Module or alternatively EM Integration For ProVision Module as appropriate
Devices supported:	CTR 8000 series with IP/MPLS software options
IP/MPLS capabilities supported:	TE-Links, LDP-signaled LSPs, TE-Tunnels, 1:1 Tunnel Protection, Pseudowires, L2VPNs (VPWS and VPLS), L3VPN

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