SMARTER PERFORMANCE MADE SIMPLE

Innovation is key to addressing challenges of the future. Add to the mix a foundation of proven performance and reliability and a team that can support the increasing number of specialized needs. Combined you have the intelligence, performance and simplicity that is critical to those building the networks of tomorrow.

NEW SERVICES SHIFT TOWARDS IP/MPLS—SMARTER

Moving forward, mobile networks must support mission critical business objectives that are far beyond basic mobile connectivity. Additionally, new services such as, enterprise services, VPNs and mobile commerce services place growing demands on network capacity, security and reliability. The future demands mobile network infrastructure flexible enough to deliver these new services. As a result, IP/MPLS is rapidly extending from the mobile core into the mobile access and the cell site. This SMARTER cell site gives the operator flexibility to support new, scalable, high quality services and deal with the pending mobile network densification.

THE BEST NETWORK WINS – PERFORMANCE

The most important network KPIs (key performance indicators) include network uptime, capacity, and latency. High capacity, low latency, and highly reliable, and integrated backhaul networks will give operators a competitive advantage in ability to roll out new features and services and maximize end user experience.

In the coming years, backhaul operators need to improve response times to network events including service provisioning, synchronization, failure detection, and recovery as well as network optimization activities. With all-IP, backhaul is no longer a dumb pipe and must become integrated with other network elements for the best network performance..

OPERATIONS BECOMING THE CENTRAL FOCUS FOR LOWER TCO—SIMPLE

Based on emerging concepts such as SON and SDN, clearly the market has now focused on operations and simplification of network management. On average, mobile operators spend three times more on OPEX than CAPEX. What's more, 25 percent of OPEX budgets support network operations. For example, MTN recently announced spending on "direct network operating costs" grew 24 percent in 2013. In contrast, the importance of hardware has shrunk because of difficult upgrades and hard-to-add features.

The future demands a rush toward solutions that simplify OPEX—solutions based on software. Need to grow capacity? Need to add features? Need to monitor and maintain you network? Software delivers the answers. Visualize your network built on software as programmable as your iPhone? Hardware is important but software usability, the developer ecosystem and programmability of the device are what will reduce your costs and make your life SIMPLER.

NETWORK UPTIME
CANNOT BE OVERLOOKED

According to Infonetics, the number one criteria for selecting microwave vendors for the past two years has been product reliability. Service downtime and dropped calls are also the most critical factor for subscriber churn. Network uptime has and will continue to be perhaps the most critical aspect of network performance.

THE IMPORTANCE OF CAPACITY AND LATENCY

Capacity has always been and will continue to be a key consideration for backhaul networks. Ensuring that the backhaul network is futureproof from a capacity standpoint, LTE and LTE-A are essential to support coming releases. In addition, latency is one of the most important and often overlooked metrics for network performance. Similar to coverage and peak capacity, latency is rapidly becoming a competitive differentiator for operators. This depends on factors such as user application, RAN and backhaul technology, IP implementation and network topology. In an IP network, latency has a large effect on user experience. Real time services such as mobile gaming and video streaming drive more stringent backhaul latency requirements and will require the lowest latency for optimal user experience. New LTE features will demand very strict latency performance from the transport network.

NEW SERVICE ENABLEMENT IS KEY

Operators are in the business of making money. The ability to turn up new services fast from existing network equipment will be a critical aspect of the future mobile backhaul network. Enterprise services, for example, represent a significant opportunity for mobile operators to grow their revenue beyond the traditional consumer base, increasing their ARPU by utilizing their presence, brand, network assets and organizational infrastructure they already have in place. Transport solutions that enable new services to be deployed simpler will be critical to network evolution.

SECURITY THREATS WILL DRIVE NEW REQUIREMENTS

With broadband communication everywhere, mobile backhaul security has never been more important. Security incidents can result in severe consequences for mobile operators including subscriber churn. The potential negative publicity could turn profits into losses. According to Opinion Matters, 75 percent of smartphone users would change mobile providers if a security breach occurred.

Security risks expose all operators to potentially significant network and user damages. If networks include wireless links standardized network security protocols such as FIPS 140-2 Level 2 and FIPS 197 are mandatory.

THE AVIAT ADVANTAGE
SMARTER PERFORMANCE MADE SIMPLE

To address the future network demands, Aviat has developed a portfolio of products uniquely designed to enable network operators to build the lowest total cost of ownership (TCO), highest performing networks. Aviat's portfolio of hardware and software products and services enable the future IP/MPLS transport networks to be massively scalable, more secure and high performance.

SMARTER MICROWAVE SWITCHES AND ROUTERS

Enabling operators to prepare for the all-IP future, the Eclipse™ Packet Node Intelligent Node Unit incorporates a carrier-grade Ethernet switch. This highly modular and scalable indoor unit delivers a unique combination of high capacity hybrid or all-packet transport and Carrier Ethernet/IP networking enabling operators to prepare for the all-IP future.

Taking a technological leap forward, Aviat's CTR microwave routers combine the industry's most powerful microwave platform with a full-featured router. Take advantage of the power of microwave transport, Layer 2 Carrier Ethernet and Layer 3 IP/MPLS routing—all in one box.

Aviat's microwave routers are the industry's most compact multi-service and multi-layer microwave hubs. They support any transport interface—copper, fiber, or wireless—for small cell, Wi-Fi, CRAN architectures and 2G/3G/LTE macrocells, along with range of IP/MPLS based enterprise services.

For example, CTR 8540 has twice the GE port density and 50 percent more radio ports per rack unit compared to any other microwave platform. It is the only microwave platform with Power over Ethernet (PoE) and IF/Coax interfaces that support all radio units. It is the most powerful microwave product on the market. And it's a router!

Aviat's microwave routers enable new IP-based services right from your existing transport infrastructure. So you'll have fewer boxes to buy, deploy and maintain, which means less overhead and easier management. Because the router and microwave is all in one device and the router is media aware, your network will perform better. And if you are not ready for IP/MPLS—enjoy the peace of mind knowing you have invested in a device that supports your needs today and tomorrow!

	ECLIPSE	CTR 8300 or CTR 8380	CTR 8400	CTR 8500	CTR 8600
DESCRIPTION	Hybrid TDM+Carrier Ethernet Microwave Switch	Ultra-Compact Microwave Router; All Outdoor Microwave Router	Transport Microwave Router	Access Microwave Router	Resilient Microwave Router
GENERAL SERVICES	Native E1/T1, STM1/OC3, Carrier Ethernet, Ethernet OAM	Pseudowire, Carrier Ethernet, Ethernet OAM	Pseudowire, Carrier Ethernet, Ethernet OAM	Pseudowire, Carrier Ethernet, Ethernet OAM	Pseudowire, Carrier Ethernet, Ethernet OAM
L3 SERVICES	None	IP/MPLS: IPv4/IPv6, VPLS, LDP, RSVP-TE, RIP/OSPF/BGP	IP/MPLS: IPv4/IPv6, VPLS, LDP, RSVP-TE, RIP/OSPF/BGP	IP/MPLS: IPv4/IPv6, VPLS, LDP, RSVP-TE, RIP/OSPF/BGP	IP/MPLS: IPv4/IPv6, VPLS, LDP, RSVP-TE, RIP/OSPF/BGP
TIMING	SynchE, 1588v2	SynchE, 1588v2	SynchE, 1588v2, Stratum-3	SynchE, 1588v2, Stratum-3	SynchE, 1588v2, Stratum-3
PORT DENSITY	Up to 80xE1/T1, 5x GigE	4x GigE, 16x E1/T1; 4x GigE	12x GigE; 16x E1/T1	12x GigE; 16x E1/T1	12x GigE, 32xT1/E1
SWITCHING FABRIC	5 Gbit/s	5 Gbit/s	24 Gbit/s	10 Gbit/s	10 Gbit/s
RADIO FEATURES	Radio networking: 6-way nodal IF, 1+0/1+1/2+0 XPIC, SD and FD; L1LA, 256QAM ACM	Radio networking: 2-way nodal IF, 1+0/1+1/2+0 XPIC, SD and FD; L1LA, 1024QAM ACM'	Integrated nodal system with WTM 3000 portfolio of radios	Radio networking: 8-way nodal IF, 1+0/1+1/2+0 XPIC, SD and FD; L1LA, 1024QAM ACM	Integrated nodal system with WTM 3000 portfolio of radios
MECHANICAL	1/2, 1 and 2RU options	1RU, ½ rack width, PoE; IPx6 - rated outdoor chassis	1RU, extended operating temp	1RU, 4 module slots, PoE	2RU, 7 module slots
APPLICATIONS	Access, Pre-Aggregation, Aggregation	Access/Network Edge	Access, Pre-Aggregation, Aggregation	Access, Pre-Aggregation, Aggregation	Pre-Aggregation, Aggregation

HIGH PERFORMANCE RADIOS

Aviat's portfolio of compact, highly reliable microwave and millimeter wave radios meets all your diverse mounting, capacity and protection requirements. Aviat radios deliver exceptional RF performance across multiple frequency bands supporting advanced features such as ACM, XPIC and header compression. Our units are smaller for easier deployment, simpler to install and operate and smarter for your network with the right features for Tx power, IP transport and reliability when you need it. From the mission critical performance of the IRU 600 all-indoor radio, to the form factor of the industry's smallest and lightest millimeter wave WTM 3300 radio, and the smallest and lightest split-mount trunking solution STR 600, Aviat's radio solutions lower cost and maximize network performance.

All networks are exposed to security risks that can escalate very quickly to cause significant damage to network operators and users. Strong Security offers a much higher degree of microwave communications security and is integrated and embedded into the radio platform—not an add-on box such as some competing solutions.

Aviat microwave networking solutions deliver Strong Security using standardized security protocols based on FIPS 140-2 Level 2 and FIPS 197. Implementing these two standards, management and payload transmission are encrypted over an Eclipse microwave radio link. Eclipse microwave radio security offers operators the added peace of mind that both the management and payload are secure across any microwave link.

	ODU 600	IRU 600	STR 600	WTM 6000	WTM 3100	WTM 3200	WTM 3300
KEY FEATURES	High performance outdoor RF unit	All-indoor RF unit, Highest power, exceptional reliability	Ultra-high capacity split-mount trunking	Long haul, backbone trunking for STM-1 and IP	All-outdoor, compact, Carrier Ethernet/IP radio	All-outdoor, compact, Carrier Ethernet/IP radio	Super compact E-Band radio with embedded antenna
ARCHITECTURE	Split-mount	All-indoor	Split-mount	All-indoor	All-outdoor	All-outdoor	All-outdoor
MARKETS	ETSI/ANSI	ANSI	ETSI/ANSI	ETSI/ANSI	ETSI	ETSI/ANSI	ETSI/ANSI
FREQUENCY RANGE	5-42 GHz (NTIA incl.)	5.8–11 GHz (NTIA incl.)	5–11 GHz	4-13 GHz (NTIA incl.)	7-38 GHz	6-38 GHz	70-90 GHz
MODULATION	QPSK-1024QAM	QPSK-1024QAM	QPSK-1024QAM	QPSK-512QAM	QPSK-256QAM	QPSK-1024QAM	QPSK-64QAM
CHANNELS	7 - 60 MHz	10 - 60 MHz	7 - 60 MHz	28 - 40 MHz	3.5 - 56 MHz	7 - 60 MHz	250 MHz
CAPACITY	1 GBIT/S (2+0)	3 GBIT/S (8+0)	4 GBIT/S (8+0)	5 GBIT/S (16+0)	360 MBIT/S (1+0)	1 GBIT/S (2+0)	1 GBIT/S (1+0)
APPLICATIONS	High power performance and reliability for mobile backhaul and broadband networks	Ultra-high power performance, mission critical reliability	Long haul trunking applications where indoor space and power is restricted	Long haul, ultra-high reliability trunking for backbone network applications	Zero-footprint urban broadband, enterprise and mobile backhaul	Zero-footprint urban broadband and mobile backhaul	Urban backhaul Small Cell backhaul Fixed line access Enterprise LAN

SIMPLE OPERATIONS

END-TO-END NETWORK MANAGEMENT SOLUTION

ProVision is a network management system that simplifies operations for network operators. A powerful combination of EMS/NMS, operations reduction features and analytics capabilities, ProVision enables backhaul networks to be simpler, smarter and more secure. Unlike traditional EMS or NMS products that are proprietary and inflexible, ProVision is an open programmable platform purpose built for backhaul.

ProVision is incredibly SIMPLE because it allows you to manage your network from anywhere at any time, with full visibility across all layers from a single network map. It offers comprehensive FCAPS (Fault, Configuration, Accounting, Provisioning and Security) capabilities with integrated management of Aviat and many non-Aviat elements typically found in access and backhaul networks. The Provision feature set includes:

Multi-Access - Any task, anywhere, anytime via ProVision Mobile (supporting both Android and Apple iOS), Server and Portal applications

Multi-Layer – New innovative Carrier Ethernet and router management tools across layers 1, 2, and 3 of your network. From a single map you can drill down to any layer for rapid root cause analysis saving time and expense—few platforms can match this without multiple management systems.

Multi-Device – AA management data warehouse system that supports more than 100 types of devices today including microwave radios, switches, routers, generators and controllers, power devices and sensors, doors and intrusion sensors, rectifiers/chargers, air conditioning and cooling systems.

Multi-Function – Comprehensive FCAPS nodal/element, network and service management features

BY YOUR SIDE SERVICES AND SUPPORT

Further simplifying operations is Aviat's service and support capabilities. Aviat Networks' portfolio of services can help you get the most from your infrastructure investment. At Aviat Networks we have been entrusted with planning, building, supporting and enhancing more Microwave networks than any other company. This fact sets Aviat Networks apart from the rest of the industry.

Our Services portfolio includes state-of-the-art expertise in engineering and design, network deployment and implementation, and integration, testing and commissioning. We continue to support the performance of your unit and network after deployment with equipment support, training, and Network Managed Services.

With our global footprint of full time resources and key partners we have the capability to bring a complete transmission solution to our customers wherever the need arises. Our Global Field Support and Global Support Services organizations have been delivering multi-vendor, multi-protocol network solutions for nearly 50 years, led by our best-in-class global resources and strong local expertise.

PUTTING IT ALL TOGETHER THE SMART WAY

AVIAT SMART MICROWAVE NODES
NODAL MICROWAVE WITH THE INDUSTRY'S ONLY MICROWAVE ROUTER

Introducing Aviat's unique development in nodal microwave—a single split mount nodal system with virtualized high performance radio nodes and integrated IP/MPLS routing capability. Combining any Aviat radio (IRU 600, ODU600, STR 600, WTM3200, WTM3300, etc) with any Aviat CTR router/switch (CTR 8500, 8300, 8400, 8600) is requsite to building smart microwave nodes. Regardless of the number of radios or whether the radios are IF or Ethernet connected, the Aviat smart nodal microwave approach behaves as one system with one IP address and one configuration—just like a traditional split mount nodal microwave radio—simplifying operations and lowering costs.

The Aviat smart microwave nodal solution includes:

Nodal Microwave
Management, configuration and upgrades are easy because of the single-system configuraton of smart microwave nodes. This is in stark contrast to outdoor radios which are independent managed entities having separate IP address and QoS configurations for each device. These solutions highly complicate operations especially at nodal sites.

Integrated Microwave Router
Because of Aviat's CTR microwave router Integrated L2 and L3 intelligence, smart nodes reduce the number of boxes to buy, deploy, and maintain. This results in faster and more efficient service delivery and new revenue opportunities right from the transport network. In addition, the system is media aware all the way to Layer 3 so the routing protocols understand what's happening over microwave links for better performing networks.
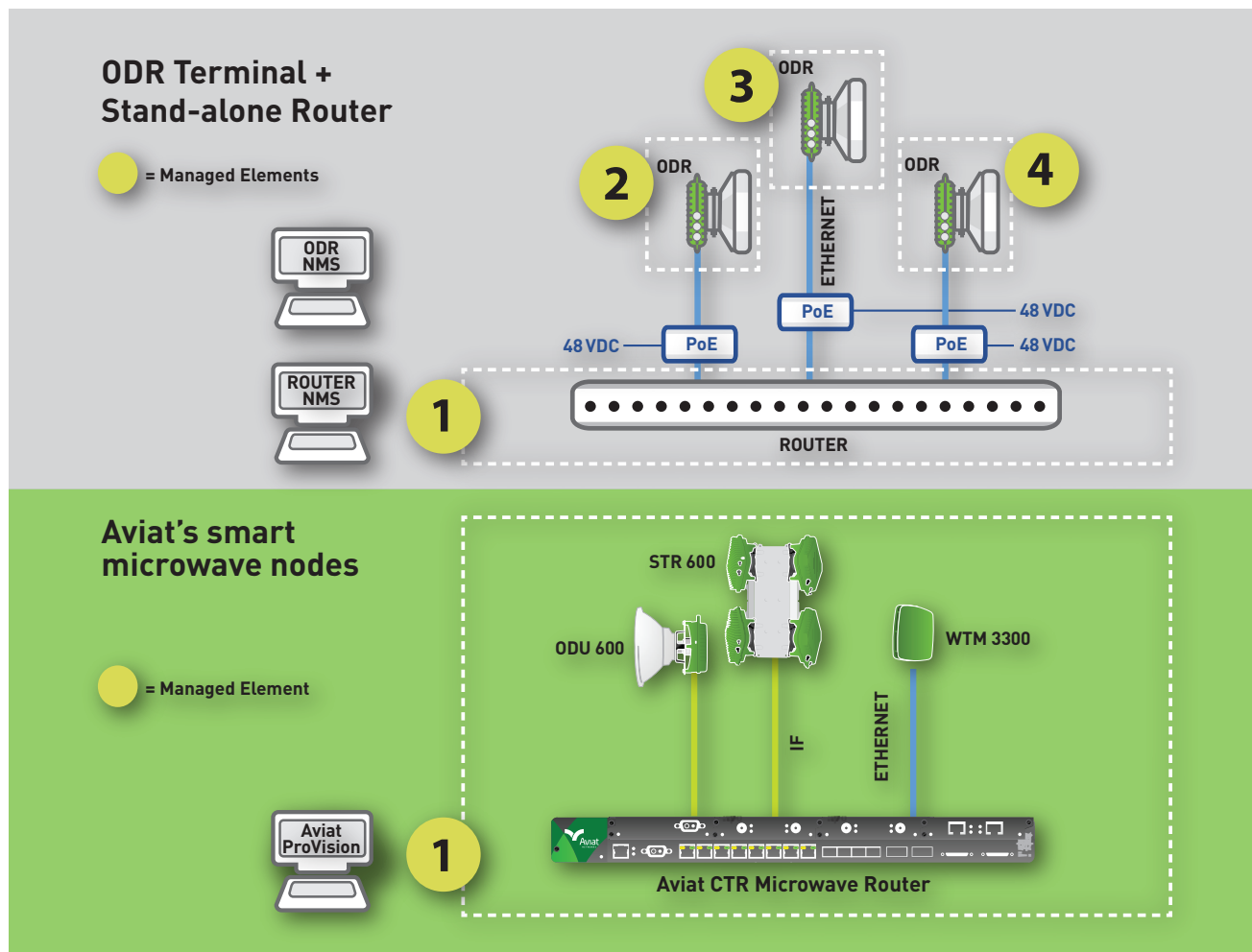
|		SPLIT-MOUNT OR OUTDOOR RADIOS + STAND-ALONE ROUTER	AVIAT'S SMART MICROWAVE NODES
SMARTER	MEDIA AWARENESS	**POOR** Microwave not integrated with L3	**EXCELLENT** Adaptive media awareness - common protocol across all devices
	SERVICES	**POOR** Separate devices required	**EXCELLENT** Implementing with fewer boxes, integrated
PERFORMANCE	CAPACITY	**EXCELLENT** Double header available today (but tower climb to add channel 50% of the time)	**EXCELLENT** Meets today's needs and evolves to future
	RELIABILITY	**POOR** 50 minutes more downtime per site per year. Unproven MTBF (double header)	**EXCELLENT** No PoE injectors, no single point to failure. Electronics inside—lower MTTR
MADE SIMPLE	OPERATIONS	**COMPLEX** Many separate devices to manage: multiple management platforms, complex power management, complex demarcations	**SIMPLE** Single virtualized device (1 QoS policy for entire node). Single EMS
	TCO	**HIGH** More boxes, complex operations, lower reliability. 40% higher TCO	**SIMPLE** Fewer boxes, simpler, more reliable

Single Management Interface - Nodal Management

Regardless of the number of radios and router/switches within an Aviat smart microwave nodal location, all assets can be managed with a single IP address. This single user interface is a radical departure from other solutions that require separate management solutions for the radio, L2 switch and routers. Aviat's smart nodal microwave is an integrated solution for seamless operation and lower TCO.

Aviat's smart nodal microwave—proven advantages of nodal microwave combined with Aviat's unique integrated microwave router featuring support for both IF-connected ODUs and Ethernet-connected ODRs with built-in PoE.

Zero Footprint

For locations where indoor space is not available, Aviat offers a zero footprint smart microwave nodal solution - the outdoor CTR 8380 microwave router, in an IPx6 rated chassis, with the outdoor ODU 600.

As the network densifies, today's edge sites will be tomorrow's nodal sites. With zero footprint smart microwave nodes not only do you get all the benefits of an outdoor package but you also future proof yourself for pending network expansion.
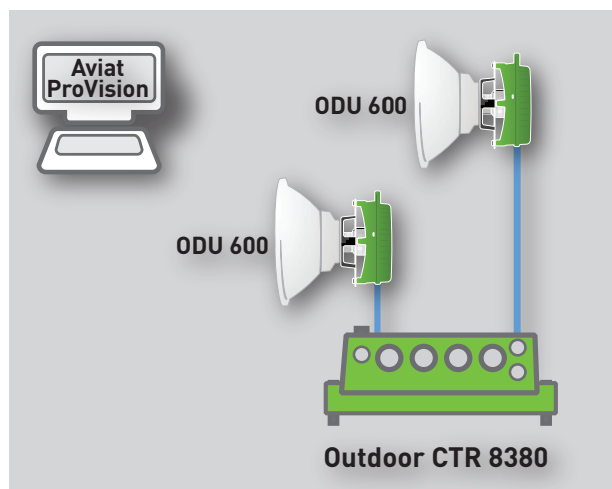
Aviat microwave nodal approach featuring the industry's only microwave router—SMARTER (service flexibility, media aware), PERFORMANCE (high capacity, best reliability), MADE SIMPLE (deployment and operations simplicity and lowest total cost of ownership).

ISO 9001 - ISO 14001
TL9000
BUREAU VERITAS
Certification