DATASHEET

TALARI SD-WAN: Key Competitive Differentiators

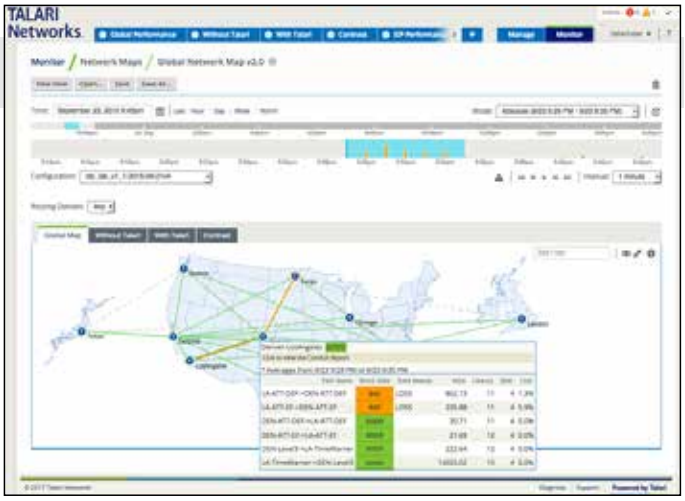
IT Resiliency Enabling Digital Business Agility

Today, virtually everything in business is becoming digitally enabled, and enterprise WANs are a driving force for this enablement. Business is conducted over distributed networks, yet, when the network is unable to respond to changing business demands and new market opportunities, transactions suffers. Enterprise WANs must rapidly evolve if companies are to succeed in today's competitive and demanding market. This requires them to be more cost-efficient, with greater agility, reliability, security, and performance, while supporting diverse cloud connectivity options.

Talari's software-defined WAN (SD-WAN) addresses these requirements and more. Talari SD-WAN helps lower costs, simplify management, secure networks and applications, and elevate network and application reliability. The Talari SD-WAN utilizes its Adaptive Private Networking (APN) WAN technology and network performance management software for failsafe connectivity. Creating a virtual network overlay, Talari takes advantage of all available WAN connections, while centralizing control of, and visibility into, the entire SD-WAN. Talari APN-enabled SD-WAN decouples network configuration from individual WAN links and hardware components, creating a software-driven, unified WAN fabric.

Talari SD-WAN elements include a central orchestration controller, Talari Aware centralized management, and edge appliances (physical or virtual) that scale to meet the needs of cloud services, data centers, branch offices and home offices.

BENEFITS AND FEATURES



Path-Probing Mechanism

Talari utilizes a 49byte UDP:2156 frame called the Talari Reliable Protocol (TRP) frame. The TRP frame is time stamped with micro-second granularity as well as sequence numbering. The time stamp is used to analyze latency, loss, jitter and congestion. The TRP probe is sent out on every path available, in the absence of WAN traffic, on 50 millisecond intervals. The telemetry gathered from TRP enables the Talari engine to make a packet-by-packet decision as to which WAN path is the most optimal to use for any given traffic type. In the presence of WAN traffic, EVERY packet is re-encapsulated with a TRP, UDP:2156 header and sent. What this translates to is EVERY data packet sent over a WAN path is now considered a TRP probe frame (100Mbps equals approximately 10,000 packets per second), equating to Talari essentially probing at a rate of 10,000 probes per second.

Unidirectional Path Measurement (BOWT)

Talari measures WAN links/paths in a unidirectional manner. The reasoning is that a path going to a given endpoint may be good in one direction however poor in the return. By using unidirectional probing, Talari determines at each endpoint how to make the routing decision based on the telemetry that it has received from every other endpoint in terms of how each path is behaving, in real time, and with respect to which path to send the next packet.

Intelligent Path Selection

Talari sends packets on the best path based on microsecond timestamp information. The overlay endpoint is making these decisions in real time on a packet-by-packet basis. This means that every packet sent will be placed on the best performing link at that specific moment in time. Packet(s) 1-5 may be placed on MPLS; however, because of a spike in jitter, the next packet(s) could potentially be placed on an Internet path, or LTE path and so forth. As soon as the jitter/loss/latency/congestion condition subsides, Talari will return the packet stream to the MPLS path – if MPLS happens to be the better-performing path in that case.

Packet vs Flow/Session/Application Intelligence

By making decisions on a packet-by-packet basis, Talari ensures that every packet is given the best possible chance for survival over the WAN, and thus ensuring that the end-users Quality of Experience (QoE) is in no way impacted by any changes in the underlying transport. Given that the underlying transport can change from millisecond to millisecond, so too can the path by which the Talari overlay will choose to transport packets.

This is NOT possible with session, flow or application-based path selection methods, which are a very static way of preforming path selection because a user experience will suffer along with the underlying transport until it fails altogether. Session and Flow methods have a better “survival rate” for that application; however, application pinning will put all VoIP traffic, for example, on MPLS until it fails. At the point of failure is when VoIP will then use an alternative path. That equates to all VoIP calls failing, phones having to re-register and users hitting redial.

Path Selection Time

Path Selection Time can also be called fast re-route time, given that Talari has microsecond granular telemetry, in that a packet stream can be “re-routed” in under 200 milliseconds or 2.5 times latency in the event of a WAN-path failure. For example, if latency is 50ms, Talari will potentially re-route the packet flow in approximately 125-150ms, in contrast to other more popular probing mechanisms like ICMP, IPSLA or BFD whereby the path failure detection time can range from 3-9 seconds depending on the probing interval.

Reliable Packet Delivery

Part of the TRP encapsulation header is a sequence ID, which compares to the TCP sequence ID. Sequence ID gives Talari the intelligence to determine if a packet has been lost in transport and to re-transmit the lost packet. This method is called Negative Acknowledgment or NACK, which requires no additional processing or

BENEFITS AND FEATURES

bandwidth overhead compared to other less effective methods like Forward Error Correction (FEC), whereby parity data are constantly being generated and transported to mitigate the effect of packet loss. The problems with FEC can be exacerbated by steady or increased packet loss.

Packet Duplication

By default, Talari will duplicate all packets marked with a DSCP (quality) value of EF. The assumption is that this is VoIP traffic and should be considered mission critical. This feature can be extended to ANY application in ANY queue or class with the simple click of a check box.

Automatic Bandwidth Detection

Talari dynamically determines the bandwidth of commodity-based Internet circuits such as Cable, DSL, LTE and others. This bandwidth-detection mechanism automatically updates the running configuration and notifies all other sites of the exact ingress and egress bandwidth for a given site. The bandwidth detection feature can be scheduled to run as frequently as every hour and maintains an historical table of what the bandwidth test results were. Bandwidth detection NON-INTRUSIVLY determines exact bandwidth using three 20ms bursts of up to 100 frames.

Last-Mile Inbound QoS

Talari's overlay intelligence ensures that congestion on the last mile will never happen. Because every Talari node in the overlay is aware of every other Talari node, each endpoint device performs ingress traffic shaping by telling any given sender to subordinate when there is higher priority traffic that requires the available ingress bandwidth. This dynamic, multi-source ingress QoS technique is applied to ALL conduit traffic automatically.

Dynamic Link Aggregation

SD-WANs logically bundle the bandwidth of all WAN paths into a single logical WAN interface. All QoS and shaping controls are bound to that logical interface. Talari bundles MPLS, Metro-E, Dedicated Internet Access (DIA), Cable, DSL Microwave, WiMAX, LTE, VSAT (low and high orbit) – all into a single logical interface. Talari then determines based on our patented algorithm how to best send the packet to the optimal path.

QoS Turbo

Talari boosts both ingress and egress traffic according to the bandwidth available on the logical interface. The logical interface is monitored in real time for changes in quality, congestion, loss and jitter, and outbound traffic is shaped accordingly. If there is no traffic utilizing higher priority traffic classes, Talari will repeat mark up for the lower priority traffic to take advantage of the available bandwidth in the higher queues. Conversely, if there is higher priority traffice, generally EF (Expedited Forwrding) traffic, that requires more bandwidth than what is defined in the legacy EF queue, Talari will mark down the EF traffic to take advantage of the bandwidth available for the traffic required. Talari ensures that the quality of traffic classification remains intact all while using lower priority queues.

Dynamic Mesh

Talari's Dynamic Conduit service can be leveraged to build a dynamic full mesh when required. Traffic must exceed a user-defined bandwidth or packet per-second threshold. A typical packet flows via the hub site and then is directed to the destination until the threshold is exceeded. Upon exceeding the threshold, a "point-to-point" conduit is established, and the packet stream between the two sites is moved over to the dynamic conduit, until the packet stream is completed OR the stream falls below the threshold specified. The dynamic conduit can also remain in an up state for a specified period after the packet stream is completed.

WAN Optimization

With GA of Talari APN V7.0, WAN Optimization is now a free, integrated component that further reduces bandwidth requirements, and includes such features as Data De-Duplication, Compression, Congestion awareness and TCP termination of HTTP, NFS, CIFS and FTP.

VRF and Routing

Talari supports full multi-tenancy using VRF/Route Domains. Each Talari overlay supports up to 16 unique VRFs/Route Domains for unparalleled security. Talari also supports today's most prevalent routing protocols, such as eBGP, iBGP and OSPF to learn routes. As of APN version 7.0, Talari now performs the CE router function by peering eBGP with the provider's PE router, thus removing the necessity for one additional branch office device.

SD-WAN FEATURE COMPARISON MATRIX

	Feature	Cisco IWAN	Viptela	Riverbed	Silver Peak	VeloCloud	Talari
WAN Reliability	Path Probing Method	IPSLA/PFR	BFD	ICMP	Per Packet	Per Packet	Per Packet
	Real-Time Unidirectional Path Measurement - One-Way Time	No	No	No	✓	✓	✓
	Intelligent Path Selection	No	No	No	✓	✓	✓
	Packet vs Session Intelligence	Session/Flow-Based	Session/Flow-Based	App-ID	App-ID (unintelligent per-packet round robin)	Packet Based	Packet Based
	Session Recovery	Sessions Drop (Up to 2 Sec)	No Data	Up to 3 Sec	Up to a Sec	No Data	Up to 200ms
	Reliable Packet Delivery	No	No	Latency Only	FEC Only	FEC Only	✓
	Packet Duplication	FEC via WAAS	No	No	✓	✓	User Defined per Application
	Automatic Bandwidth Detection	No	No	No	No	✓	✓
	Carrier Agnostic	✓	✓	✓	✓	No	✓
Application	Last Mile Inbound QoS	Partial	No	No	No	Partial	✓
	Dynamic Link Aggregation	No	No	No	No	No	✓
	End-to-End BW Reservation	No	No	No	No	No	✓
	Dynamic Mesh	Yes via DMVPN	Full Mesh Only	No	No	✓	✓
	WAN-Op (Data Reduction)	Yes via WAAS	No	✓	✓	No	✓
	VRF and Routing	✓	✓	No	✓	✓	✓
Company	Product Maturity	iWAN - 4 Years	3 Years	SDWAN - 1 Year	SDWAN - 3 Years	3 Years	10 Years
	Net Promoter Score (NPS)						94
	Service Chaining	Yes (router modules)	No	No	No	No	✓

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About Talari

Talari Networks, innovator of the most reliable SD-WAN technology, engineers the branch office and edge network for maximum business impact, delivering superior application performance and network resiliency, while unlocking the benefits of seamless cloud connectivity services. Incorporating years of innovation into seven generations of product, Talari is deployed across thousands of sites in over 40 countries.

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