128 TECHNOLOGY

Meet Stringent IoT Performance, Security and Availability Demands: Avoid Traditional WAN and Legacy SD-WAN Cost and Complexity

Executive Overview

The Internet of Things is ushering in a new era of networked computing where intelligent applications interact with smart devices and autonomous machines to automate industrial control processes, streamline business practices and accelerate operations. Corporations and governments across the world are implementing IoT systems to boost business performance, eliminate waste and inefficiencies, and improve public health and safety. Gartner projects the enterprise IoT market to reach 5.8 billion endpoints in 2020, a 21% increase from 2019.

The Internet of Things poses unprecedented scalability, resiliency and performance challenges for network planners. IoT systems must collect, analyze and act upon massive volumes of data generated by vast numbers of internet-connected devices—quickly, securely and reliably. Traditional WAN and legacy SD-WAN solutions designed to support conventional enterprise applications and cloud services are far too costly and inefficient for large-scale IoT deployments.

The 128T Session Smart Networking solution is an advanced, service-centric networking solution that eliminates the inherent inefficiencies and cost constraints of traditional WAN and legacy SD-WAN offerings. Ideal for massively distributed IoT systems, the session-oriented software solution provides fast, secure and reliable WAN connectivity with breakthrough economics and simplicity.

> *"The enterprise and automotive IoT market will grow to 5.8 billion endpoints in 2020."*
>
> *Gartner*

Challenges

The Internet of Things has the potential to fundamentally transform virtually every industry. Intelligent endpoints—smart sensors, meters, actuators, beacons, cameras—are generating an ever-increasing variety, volume and velocity of data. By transforming this raw data into actionable insights, enterprises can streamline operations, improve productivity and accelerate the pace of business. But intelligent systems introduce complex performance, security and availability challenges for network planners and architects.

Performance

Vast numbers of IoT endpoints will generate massive volumes of diverse application data and machine-to-machine (M2M) traffic. Each IoT dataflow has unique characteristics and QoS requirements. Some data like real-time industrial control data is latency-sensitive. Other data like historical machine data used for predictive analytics is not. Network planners must find ways to prioritize and shape traffic to provide the right SLA for the right application.

In some use cases like smart energy or smart transportation systems, IoT endpoints will be deployed in remote field locations and connected over lower-speed/higher-latency WAN interfaces like satellite links or weak 4G LTE connections. Planners must ensure adequate service quality for delay-sensitive applications even over these lower-grade connections.

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[1] Includes automotive and government applications, Gartner Press Release, August 29, 2019

Security

Most IoT systems will rely on public internet connectivity. Bad actors can exploit public data networks to steal confidential information or disrupt critical IT systems and services. Planners must introduce strong security systems and practices to protect data privacy, and to defend cloud and data center infrastructure against denial of service attacks and other threats.

Availability

Many IoT systems will be used in mission-critical applications where network disruptions can hinder worker productivity or impair business performance. Some will be used in public safety and security applications (emergency services, healthcare, surveillance, etc.) where network downtime can lead to criminal activity, injury or loss of life. Planners must implement resilient IoT networks that can withstand WAN link failures or ISP outages and ensure continuous connectivity.

128 Technology IoT and IIoT Use Cases

Oil and gas – digital oilfields, connected refineries and pipelines, security and surveillance, exploration

Utilities – smart grid, security and surveillance, emissions monitoring

Industry 4.0 – smart factories, intelligent supply chain, prescriptive maintenance

Smart cities – safety and security, lighting, parking, waste management

Transportation – intelligent fleet tracking, roadways, mass transit systems, connected and autonomous vehicles

Healthcare – smart medical equipment, intelligent patient monitor, smart hospitals and campuses

Retail & wholesale – in-store analytics, connected logistics, smart inventory management

Smart buildings – automated lighting, HVAC, safety and security systems

Traditional WAN and Legacy SD-WAN Solutions Are Inherently Costly and Inefficient

Conventional wide area networking products (routers, firewalls, VPN appliances, etc.) and legacy SD-WAN solutions aren't well suited for large-scale IoT implementations. Limitations of legacy solutions include:

- **No service assurances for individual IoT dataflows.** Traditional security products and SD-WAN solutions tunnel traffic across public internet connections to protect data privacy. Most legacy solutions place all dataflows into a single overlay tunnel, which inhibits traffic classification and management. Since all flows are treated identically, there is no way to provide different service assurances for different applications.

- **No visibility into sessions or application data.** Because all dataflows are encapsulated into a single overlay tunnel, network administrators cannot monitor or troubleshoot individual applications or sessions.

- **Poor bandwidth utilization.** Legacy networking solutions use inefficient, high-overhead VPN tunneling protocols like IPsec that squander bandwidth and impair application performance. Tunneling is especially detrimental when IoT traffic is transported over lower-capacity or lossy WAN connections like satellite links.

- **Costly, inefficient redundancy mechanisms.** Most legacy VPN appliances and SD-WAN solutions rely on hot-standby tunnels for failover. Backup tunnels are always nailed up, but rarely used—an expensive and wasteful approach.

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[3] SD-WAN to SD-Branch: The Evolution at the Edge of the Enterprise Network, IDC, 2020

128T Session Smart Networking Delivers Fast, Secure and Reliable Connectivity

The 128T Session Smart Networking solution is an advanced, service-centric networking solution that takes software-defined routing to a new level. Ideal for large-scale IoT implementations, the 128 Technology solution provides fast, secure, reliable WAN connectivity with unmatched economics and simplicity. The solution eliminates the inherent inefficiencies and cost constraints of legacy network appliances and SD-WAN solutions, and meets stringent IoT performance, security and availability requirements.

Things
(Sensors, Actuators, Meters, Cameras)

Business Applications, AI/ML, Analytics
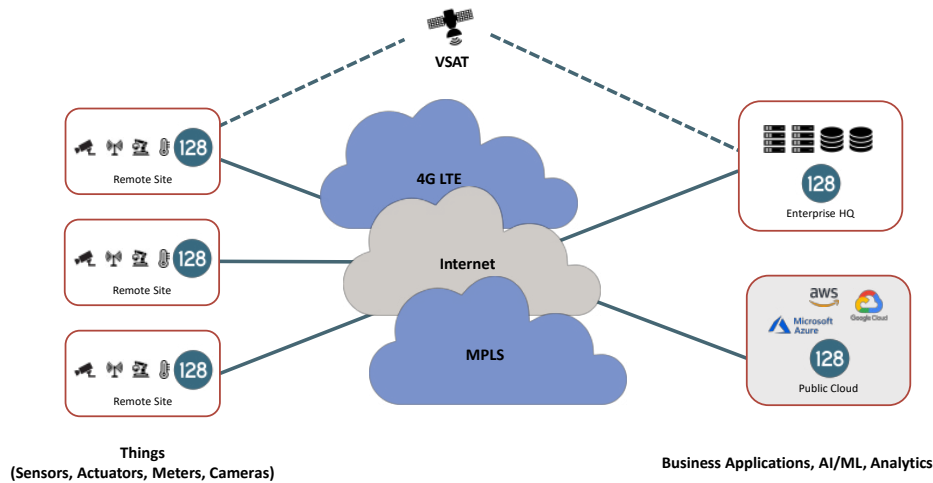
Performance

128T Session Smart Networking supports a variety of session optimization and intelligent routing features to ensure high performance and service quality for diverse IoT dataflows. Fine-grained QoS controls let network administrators efficiently shape and prioritize traffic to enforce different SLAs for different IoT data streams. Innovative application-aware routing intelligently steers traffic based on administratively defined policies and real-time network conditions, automatically selecting the right network path for the right application at the right time. A unique lossless application delivery capability optimizes WAN bandwidth utilization, helping improve performance over lower-quality connections like satellite links, while eliminating the need for special-purpose WAN optimization appliances.

Security

The 128 Technology solution protects IoT systems against data leakage and malicious attacks. Inherent security capabilities include deny-all (zero trust) routing, Layer 3/4 DoS/DDoS protection, payload encryption, and NAT and VPN functionality. 128 Technology's pioneering Secure Vector Routing approach provides strong data security over public internet connections, without the overhead of traditional encryption protocols like IPsec. (Secure Vector Routing reduces protocol overhead by over 30% when compared to IPsec.) The tunnel-free architecture also gives network administrators full visibility into individual dataflows, so they can efficiently monitor end-to-end sessions, track KPIs and troubleshoot problems.

Availability

128T Session Smart Networking is designed to provide continuous connectivity without requiring expensive hot-standby tunnels like conventional WAN or SD-WAN solutions. In the event of a link failure or network outage, the 128 Technology solution seamlessly redirects traffic over an alternative path without disrupting sessions or impairing application performance. The solution also supports a server load balancing capability that steers application traffic to distinct resources in geographically distributed data centers or availability zones to enable business continuity and disaster recovery.

100% Software-Based Solution Eliminates Cost and Complexity

128 Technology's solution is fully software-based for ultimate flexibility and economics. The software runs on any commercial off-the-shelf or white box server platform, including ruggedized platforms for harsh environments. 128T Session Smart Networking slashes cost and complexity, eliminating the middlebox and VNF sprawl that plague legacy WAN and SD-WAN solutions. Unlike with a traditional service function chaining approach, the 128 Technology solution performs multiple logical network functions (router, stateful firewall, WAN optimizer, etc.) in a single VNF, significantly reducing CPU and memory requirements. As a result the 128 Technology software can run on far less expensive servers than legacy SD-WAN solutions. Better still, the 128 Technology solution supports zero-touch provisioning for plug-and-play installation at remote sites and field locations.

128T Session Smart Networking Outperforms Traditional Solutions

128T Session Smart Networking provides high performance, security and resiliency for any IoT implementation, while avoiding the cost and complexity of traditional WAN and SD-WAN solutions. The table below summarizes some of the important advantages 128 Technology offers over alternative solutions for key IoT networking requirements.

Requirement	Traditional WAN and Legacy SD-WAN	128T Session Smart Networking
Protect data privacy	Tunnel overlays safeguard data privacy, but limit visibility and control.	Secure Vector Routing protects data privacy, while enabling granular traffic management and visibility.
Optimize performance of low-speed WAN links	High-overhead tunneling protocols squander bandwidth and impair the performance of delay-sensitive applications.	Secure Vector Routing minimizes protocol overhead. Lossless application delivery optimizes bandwidth utilization and boosts application performance.
Enforce application-specific SLAs	Tunnel overlays inhibit traffic management and prevent application-specific SLAs.	Fine-grained traffic management and application-aware routing enable application-specific, policy-based SLAs.
Ensure continuous connectivity	Idle hot-standby tunnels are costly and inefficient.	Multi-path session migration provides cost-effective protection against link failures and ISP outages. Server load balancing provides BC/DR for critical applications.
Simple and affordable deployment	Special-purpose middleboxes or dedicated VNFs add cost and complexity.	128 Technology consolidates all network functions onto a single VNF for ultimate simplicity and economics.

SUMMARY

The Internet of Things introduces unprecedented scalability, availability and security challenges for network architects. Extraordinary numbers of connected devices will generate massive volumes of diverse data that must be transported in an efficient, reliable and safe manner. Traditional WAN and legacy SD-WAN solutions, conceived to support conventional business applications and cloud-based services, aren't well suited for large-scale IoT implementations.

128T Session Smart Networking takes software-defined, distributed routing to the next level, satisfying demanding IoT performance, resiliency and security requirements. A tunnel-free architecture, combined with intelligent service-based routing provides end-to-end visibility and granular control over individual IoT dataflows, enabling application-specific SLAs with ultimate efficiency.

The 128 Technology solution ensures highly secure and reliable connectivity for massively distributed IoT systems without the cost or performance overhead of traditional VPN tunneling schemes. Integral bandwidth optimization capabilities boost the utilization of lower-quality WAN links improving connectivity to remote, poorly-served locations. And persistent multi-path routing ensures continuous connectivity in the event of link or network failures.

To learn how 128T Session Smart Networking can help your organization streamline branch office networking, accelerate digital transformation and improve business results, contact 128 Technology today.

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ABOUT 128 TECHNOLOGY

At 128 Technology we help our customers radically reinvent their digital futures based on a new model for virtual networking called Session Smart™. Session-smart networking enables enterprise customers and service providers to create a service-centric fabric that's more simple, agile, and secure, delivering better performance at a lower cost. Whether your enterprise is moving your business to the cloud, modernizing the WAN edge, seeking more reliable unified communications or pursuing an industrial internet of things (IIoT) initiative, session smart networking re-aligns networks with digital transformation initiatives.