Shortest Path Bridging: Versatile, simple and reliable

802.1aq Shortest Path Bridging (SPB) is an IEEE networking standard focused primarily on addressing the shortcomings of the aging Spanning Tree Protocol (STP).

Unlike STP, by enabling multiple active paths, SPB delivers more rapid convergence (from Rapid STP's 2-3 seconds to SPB's 100ms), fault tolerance, redundancy and shortest path determination.

Furthermore, SPB is more than just an STP evolution. SPB addresses a multitude of network problems. It has been compared to Multiprotocol Label Switching (MPLS) in the Campus/Metro Area Network (MAN), but SPB is simpler to deploy and manage than MPLS, which requires a "stack" of protocols. SPB relies on a single protocol to move information efficiently within the network.

SPB follows industry standards, ensuring compatibility with other technologies, and it combines physical hardware with virtual services, giving organizations the best of both worlds in terms of performance and flexibility. Overall, SPB streamlines networking, making it efficient, secure and adaptable to any organization's needs.

SPB is a foundational technology at Alcatel-Lucent Enterprise, refined through years of investment and adaptation to market needs. Its proven reliability across diverse customers and industries sets it apart.

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Benefits

Shortest Path Bridging (SPB) is a networking technology that brings several benefits to businesses and organizations.

Scalability
SPB is highly scalable, meaning it can easily handle growing amounts of data and devices without slowing down. This is perfect for organizations that want to expand their operations without worrying about their network performance.

Security
Security lies within the network. Implementing SPB is the most effective method for establishing secure micro and macro network segmentation, a crucial element in constructing your Zero Trust Network Architecture (ZTNA). SPB ensures security by using a containerized approach, with separate compartments for different types of information, to prevent unauthorized access. This gives SPB the ability to support multi-tenancy securely and cost-effectively. It is also perfect for IoT integration, utilizing role-based access within the SPB network to onboard IoT devices securely and manage their network behavior.

Simplicity
SPB's simplicity is a standout feature. It takes the complexity out of networking by automating the setup and configuration of connections between devices. This significantly reduces errors, minimizes downtime and optimizes time spent on repetitive tasks. It also enables hassle-free reconfiguration as changes in the SPB network need only be applied where services are added, modified or deleted. This adaptability allows organizations to maintain a dynamic and responsive network that can rearrange itself to fit organizations' requirements. This means less time spent on technical setup and modifications and more time focusing on value-added work.

Reliability
SPB's self-healing capabilities enhance network availability. Its fast convergence time ensures that if there's a problem in the network, it recovers quickly. This reliability is crucial for organizations that can't afford any downtime.

Where to implement SPB

Instead of implementing different solutions for the following applications, organizations can simplify operations by using SPB for all three.

Campus LAN
In the Campus LAN, SPB is a perfect replacement for STP as it offers multiple load-balancing paths with optimal throughput, latency and built-in network redundancy. It can also solve the multi-tenancy problem, when multiple internal or external entities connected to the same network require isolation from one another. This same multi-tenancy capability enables efficient and secure micro and macro segmentation, making it ideal for IoT deployments and bringing organizations closer to achieving a ZTNA.

Data center
In the data center, SPB is a great solution both within the data center as well as to interconnect to other data centers. SPB provides any-to-any fabric connectivity over lower latency paths. It is also ideal for transforming data centers into private cloud environments quickly and easily.

Metro Area Networks
In Metro Area Networks (MANs), SPB enables Layer 2 and 3 services similar to MPLS but is much simpler and cheaper to operate. It provides multi-tenancy in multiple sites connected across the MAN.

SPB in action

SPB is a versatile solution for various settings, including large campuses and verticals (military, universities, transportation, airports, energy, utilities, healthcare and smart cities) and mid-size to large data centers.

Sample vertical use cases

Education

- Large campus / multi-site VPN, multi-tenancy
- STP replacement
- IoT containment

Healthcare

- Large hospital/Multi-site VPN
- STP replacement
- IoT containment (biomed devices

Hospitality

- Large resort / casino
- Multi-tenancy (gaming, CCTV, etc.)
- IoT containment (door lock etc)

Government

- Large government facilties, STP replacement
- Multi-site VPNs for schools, hospitals andgovernment agencies
- Smart cities

Transportation

- VPN/syste, isolation (Rail/ITS)
- Multi-tenancy (airport)
- IoT containment

Energy & Utilities

- STP replacement
- IoT containment
- VPNs, system isolation

Service Providers

- Large government facilities, MANs
- Multi-site VPNs
- Smart cities

Select customer case studies

Nevada Department of Transport

The Nevada Department of Transportation (NDOT) is responsible for the planning, construction, operation and maintenance of the 5400 miles of highway and over 1000 bridges that make up Nevada's state highway system. SPB allowed the IT team to create a scalable network while cutting the time it takes to roll out new devices, services and applications.

"The new solution makes it simpler to provide the best services throughout the 25 billion miles travelled by our road users annually, providing the right information for safe travel and ultimately reducing the time spent on the road. ALE went above and beyond throughout the entire process."

Gary Molnar,
ITS Network Manager
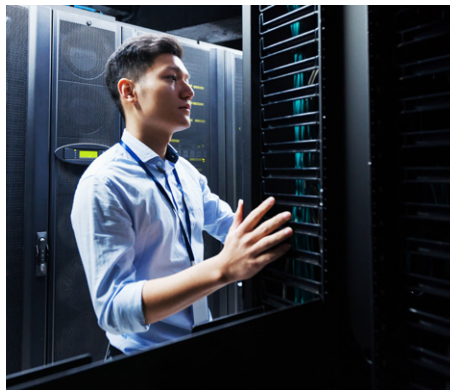
IDC Frontier

IDC Frontier, a 100%-owned subsidiary of Yahoo Japan Corporation, has nine data centers located throughout Japan with headquarters in Tokyo and a sales office in Osaka. IDC Frontier provides their customers with data center and cloud computing services. SPB provided them with the scalability required to serve their growing customer base and the level of resiliency that ensures their SLAs.

"At first we felt unsure if the Alcatel-Lucent Enterprise products we chose were right because it was new technology for us, and it also had to cover a geographically wide area of over 1000km between Kitakyushu City and Shirakawa City.; however, that concern evaporated when we realized the competitive edge of SPB technology and the stability of the OmniSwitch 6900 after performing a field test in our actual network."

Mr. Tokuda, Network Group,
Platform Engineering Department,
Customer Service Division of IDC Frontier

University of Technology Sydney

The University of Technology Sydney (UTS), renowned for its technical course offering, was founded in 1988. With more than 35,000 students and 3,500 employees, as well as academics, the campus consists of 10 buildings on its main site with additional facilities across Sydney. SPB ensures that if there is a problem in one building, it does not affect another building. ALE infrastructure enables a move towards more virtual networking. It provides a scalable architecture to support more than 90% of the day-to-day activities UTS needs to run.

"Alcatel-Lucent Enterprise have helped us modernize our network infrastructure over the years, they have been a reliable partner on our growth journey. The guest experience for on-campus users was very critical for us, and operationally, we have reduced the time taken for providing guest access from hours to minutes, and the best part is, we don't have to go out and test it every time because we know that it works!"

Graham Redwood, Network Manager,
University of Technology Sydney

To learn more, visit our Shortest Path Bridging web page.

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