USER STORY

Powering National Scale Digital Payments with SONiC

Organization

A national retail payments operator in India processes hundreds of millions of transactions daily across multiple always-on data centers. It handles real-time settlements, festival-day transaction surges, and continuous fraud monitoring, all under strict security and regulatory oversight. Its mission is to deliver reliable digital payments at national scale, making resiliency, transparency, and cost control central to planning.

To sustain growth, the operator is modernizing its infrastructure to an open, scalable architecture that reduces vendor lock-in, improves observability, and strengthens security.

Overview

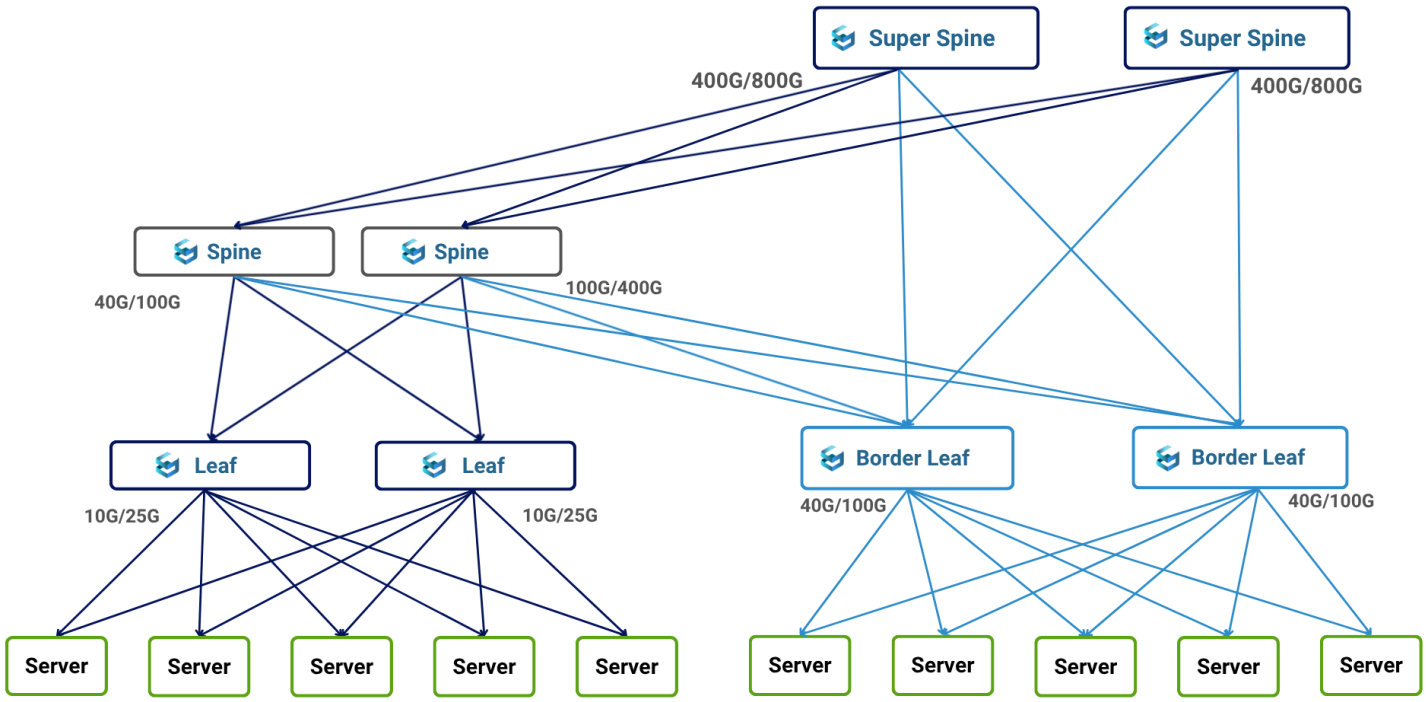
The financial technology (FinTech) sector is among the most demanding in the global economy. With hundreds of millions of transactions daily, infrastructure must deliver exceptional reliability, performance, and scalability. Legacy data center networks, often tied to proprietary OEM vendors, restricted the customer's agility and drove up costs. The customer's primary concerns were vendor lock-in, escalating TCO, limited observability, and slow, high-risk operations.

Having already embraced open tooling at the server and application layers (e.g., containers, orchestration, automation), the customer saw that extending this open, programmable approach to networking was the natural next step. Their goals were to:

- Eliminate reliance on a single vendor.
- Integrate seamlessly with server, container, and orchestration platforms.
- Build a resilient fabric that supports both physical and virtual services.

At the same time, scaling the network to meet rapid transaction growth had become a bottleneck. Upgrades and debugging were time-consuming, while visibility gaps made real-time monitoring difficult. These needs pointed to a modern alternative.

PalC Networks partnered with the customer to transition and deploy SONiC, an open source network operating system that brings flexibility, cost efficiency, and cloud-scale design to white-box switching . SONiC was chosen for its production maturity and an active community that accelerates feature delivery and support. Its broad ecosystem, spanning multiple merchant ASICs, ODM platforms, and open tooling via SAI, FRR, and gNMI, reduces supply-chain risk and enables a vendor-neutral EVPN-VXLAN and automation stack aligned with the customer's operating model.



Deployment

The deployment uses a dual-vendor white-box mix supporting 100/400/800G ports and scales to 300+ switches. It follows a three-tier Clos architecture:

- **Leaf layer:** Server connectivity at 10/25G uplinking to spines at 40/100G.
- **Spine layer:** Aggregation at 100/400G.
- **Super-spine layer:** Pod interconnection at up to 800G.
- **Border leaves:** External connectivity at 40/100G.

Transitioning to an open NOS introduced typical change-management hurdles: skill gaps in the operations team, multi-vendor integration concerns, and initial tooling gaps across automation, observability, and lifecycle management. Resiliency under failure, such as firmware rollback, required clear processes, especially in a business environment with near-zero tolerance for downtime.

PalC implemented a phased transition to minimize risk while maintaining continuity. Key components of the deployment included:

- **Underlay/overlay:** An IPv4 underlay with a roadmap to IPv6 supports an Ethernet VPN (EVPN) over Virtual Extensible LAN (VXLAN) overlay that serves containerized workloads alongside firewalls and load balancers.
- **Automation:** Zero-Touch Provisioning (ZTP), continuous integration/continuous delivery (CI/CD) pipelines, and version-controlled configurations enable safe, frequent change.
- **Observability:** gRPC Network Management Interface (gNMI)→Prometheus→Grafana for real-time metrics and dashboards, with OpenSearch for logs and audits, providing a single pane of glass for operations.
- **Lifecycle management:** standardized image management and documented rollback procedures.

PalC also trained and enabled operations engineers, reducing dependency on a small group of senior staff. Compliance and interoperability were validated, ensuring SONiC could meet the customer's strict financial-sector requirements.

Benefits

By deploying SONiC, the payments operator achieved:

- **Cost Savings:** 30–40% reduction in TCO through white-box adoption and open source software SONiC.
- **Agility:** Faster service onboarding and reduced recovery times during outages.
- **Vendor Independence:** Freedom from commercial and technical constraints of proprietary ecosystems.
- **Future-Readiness:** IPv6-capable, EVPN-VXLAN design supporting growth and evolving workloads.
- **Enhanced Operations:** Proactive monitoring and auditing, changing day-2 operations from reactive troubleshooting to measurable, data-driven practice.

Lessons Learned and Future Plans

Insights

- Early enablement of operations teams with training and runbooks is critical.
- Standardized automation (ZTP, CI/CD, version-controlled configs) ensures consistency.
- Normalized telemetry pipelines (gNMI → Prometheus/Grafana) provide a unified view for day-2 operations.

Future plans

- Complete IPv6 rollout across both underlay and overlay.
- Extend SONiC adoption to new workloads and data centers.
- Continue contributing operational feedback to the open-source community.

Join SONiC

Become a SONiC member to collaborate, learn and shape the future of the Open Network Operating System.

sonicfoundation.dev/join-sonic