

Industry Challenges

- Exploding growth in data and cloud computing exert extreme pressures on hyperscale datacenters and networking providers to innovate faster and cost-effectively deliver breakthrough performance, scalability, and reliability.
- Deploying complex applications on thousands of servers and networks at scale is expensive, time-consuming, and labor-intensive.

Scala Computing Benefits

- Hyperscale datacenters can cost-effectively emulate and simulate real-time performance before deploying elaborate infrastructure.
- Networking providers can reduce time-to-market and deliver the best operating performance for complex hyperscale environments.

Deploying hyperscale datacenters is highly challenging

Leading cloud computing and social media companies deploy massive, hyperscale datacenters with hundreds of thousands of servers, networking gear, and storage devices running tens of thousands of applications and delivering services to clients.

Deploying these datacenters is expensive, arduous, and fraught with trial and error, and unforeseen changes can have disastrous ripple effects on the business. Moreover, it is tough to forecast production environment performance at scale accurately, and current approaches to building small physical labs or running sub-scale simulations just don't cut it.

What is needed are accurate predictive simulation solutions that enable users to model datacenters and networks at scale.

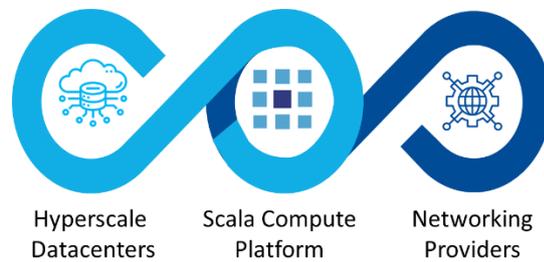


Figure 1: Scala Compute Platform anchors the loop between hyperscale datacenters and networking providers

Unmatched multi-actor cloud-based solutions for datacenter simulation and emulation

Scala Compute Platform (SCP) is the only high-performance solution to run highly accurate discrete event-driven network simulations at scale for datacenter operators and networking equipment manufacturers. It comes with a highly collaborative ecosystem and provides simplified, on-demand access to scalable, secure compute clusters on the cloud.

SCP's scalable, high-performance cloud-based solution allows users to scale simulations up to 1000-times the number of endpoints than previously possible while improving simulation performance 10-fold. Users can evaluate traffic and performance on varying workloads to tune their networking models to optimize infrastructure and designs. SCP includes a full suite of post-processing analytical tools for actionable insights.

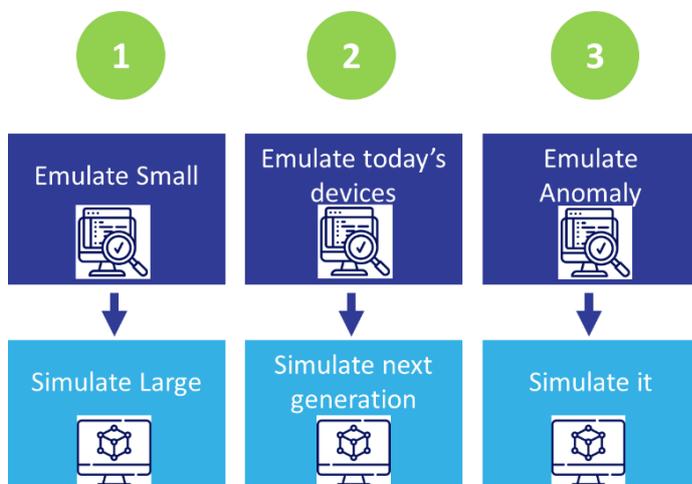


Figure 2: Emulation and simulation tools with unparalleled capability

Emulation and simulation tools (Figure 2) are part of SCP. These tools can model large-scale networks that are not practical to build until deployment. They also help simulate next-generation devices for features such as links speed and capacities not yet available and provide the engineer with unparalleled observability of the root causes of production network performance anomalies.

These emulation and simulation tools are used in tandem to iteratively calibrate the network simulation models and prove model fidelity.

Fostering a vibrant ecosystem with the Consortium for Multi-Party Network Simulation (MPNS)

In November 2019, Scala Computing, and a major hyperscale social media firm and a leading networking provider, founded the industry's first consortium to enable collaboration for network simulation on the Scala Compute Platform. Since then, several hyperscale and networking solution providers have joined this growing MPNS consortium. Members of the consortium can securely share models while protecting their intellectual property.

The high-level solution architecture (Figure 3) that supports the MPNS consortium has a Scala Development Environment and the Scala Compute Platform. The Development Environment allows users to build various models such as Workloads (traffic generation and topologies) and networking equipment with associated networking stack. SCP lets users modify topologies, traffic, stack, network hardware, etc., with automatic topology validation/debugging. These models can be shared in the MPNS consortium.

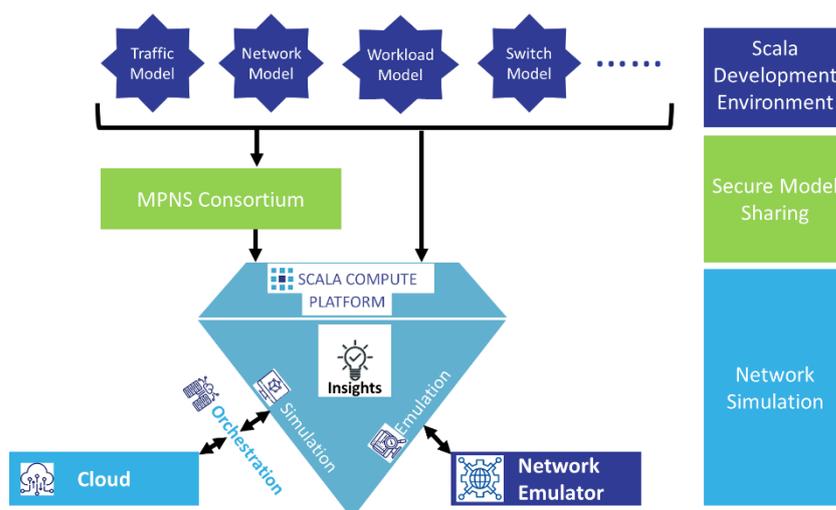


Figure 3: High-level architecture supporting the MPNS consortium

Then a heuristics engine that is part of the orchestration layer, provisions an optimized compute environment on the cloud based on simulation parameters. These simulations are optimized for massive parallelization, enabling data center scale simulation with hundreds of thousands of endpoints while runtimes are reduced from weeks to days and days to hours. Lastly, a data analytics engine processes 100s of gigabytes of data in real-time, providing insights on latency, goodput, etc., and offers embedded performance benchmarking.

Benefits of the Scala Compute Platform:

- Obtain the highest accuracy insights about existing system networks
- Predict performance of networks/components not yet available
- Debug and optimize massively parallel deep learning models at scale
- Optimize network configurations and data center deployments
- Enhance queue management techniques and behavior of network forwarding strategies
- Accelerate application development & continually improve infrastructure procurement/deployment lifecycle
- Network providers can embed data-center scale simulations into their product development and deployment lifecycle, from chip design to customer-specific implementations, using this as an effective sales and benchmarking tool.

About Scala Computing

Scala Computing is an industry-leading cloud computing software firm that helps organizations deploy, manage, visualize, and optimize complex workloads. Our highly skilled team has received many prestigious awards for working with clients to solve extreme challenges in the world's most scale-intensive and complex environments. The Scala Compute Platform is the industry's first datacenter scale end-to-end, secure, High-Performance Computing network simulation solution that enables enterprises to radically reduce the costs, risks, and time to deploy applications on specialized infrastructure.

