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# Nissan and Rescale on AWS: Innovation that Excites

Focus on innovative modern vehicle design and development while implementing best-in-class engineering and IT business practices for digital transformation.

NISSAN MOTOR CORPORATION

"We selected the Rescale ScaleX® Enterprise platform solution on AWS because it enables a smooth transition into a cloud environment, resulting in Nissan being able to run hundreds of simulations with on-demand agility and flexibility, without exhausting capacity, to accelerate innovation."

Seiji Kawachiya,
General Manager of Engineering and Quality
System Department, Nissan Motor Corporation
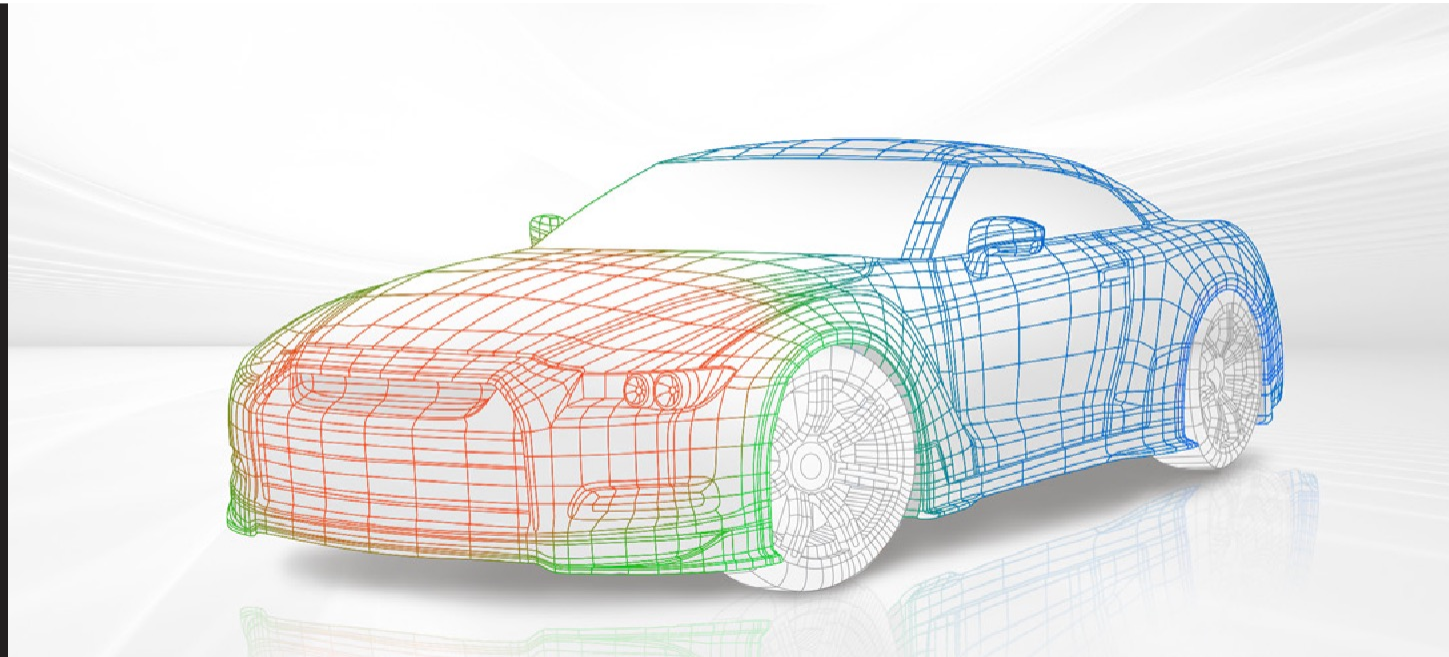
Solution

ScaleX® Enterprise (Build on AWS)

Results

18%
Cost Optimization
of Applications and Productivity

- With the latest computing resources like Amazon EC2 Hpc6a on-demand, Nissan was able to match utilization effectively and optimize the simulation performance for specific applications
- The flexibility to capture every possible opportunity for cost savings, utilization, and allocation

50%
Cost Reduction
for HPC Expenses

- With the pay-per-use model, Nissan could minimize the HPC cost of on-premise systems during peak usage when including the cost of electricity, operations and Human Resources
- They avoided over-provisioning and wasting resources of fixed capacity on-premise systems

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Queue
During Peak Demand

- With improved infrastructure agility - Nissan's capability to quickly deliver the right computing resources, in the right scale, and precisely when it is needed without queuing or wasting engineering labor
- With on-demand AWS resources, Nissan reduced queue time from 2-3 days to zero days

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Nissan Motor Corporation
Founded: 1933
Employees: 140,000+ (in 2017)
Headquarters: Yokohama, Japan
Vehicle Production: 5,700,000+ (in 2017)

For more information on their products, services and commitment to sustainable mobility, visit the website http://www.nissan-global.com/

About Nissan
85 Years of Innovation and Leadership

Nissan is a global full-line vehicle manufacturer that sells more than 60 models under the Nissan, INFINITI and Datsun brands. Nissan's global headquarters in Yokohama, Japan, manages operations in six regions: Asia & Oceania; Africa, the Middle East & India; China; Europe; Latin America; and North America.
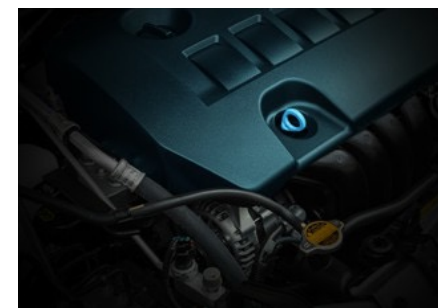
> *"The challenges we faced at Nissan revolved around managing our in-house HPC system alongside keeping up with the latest technology innovations needed to meet market demands"*
>
> Seiji Kawachiya, General Manager of Engineering and Quality System Department, Nissan Motor Corporation.

Shifting to an Agile Innovation Model

Nissan chose to shift its technical computing to Rescale to gain an agile, cloud-enabled, platform-based solution on a pay-per-use model to minimize overall cost-per-simulation, gain instantaneous agility, and continuously adopt the latest technology. This allowed Nissan to:
- Allocate the right resources at the right time
- Avoid over-provisioning and wasting resources
- Avoid under-provisioning and creating product development delays

Challenges with On-premise Computing

Like many enterprises, Nissan realized they were limited by fundamental aspects of on-premise computing, such as: limited electric power, high total cost, and data center utilization challenges (Nissan averaged 40% - 80% utilization). Nissan recognized that these inherent on-premise problems threatened its innovation, market leadership, agility, and time-to-market.

Their on-premise HPC systems also faced the following challenges:
- They were constrained by the initial hardware and software specifications. Nissan's computing investments were fixed over a 4 year cycle, until a 9 month hardware refresh.
- They were complex to operate. Nissan's HPC systems required many specialized employees, facilities, application maintenance, and security measures.
- They struggled to handle high-demand (peak) loads. Nissan's fixed HPC resources caused their engineers difficulty in allocating priority workloads to computing resources, and added risk of missing design improvement opportunities.

> *"The challenges we faced at Nissan revolved around managing our in-house HPC system alongside keeping up with the latest technology innovations needed to meet market demands"*
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> Seiji Kawachiya,
> General Manager of Engineering and Quality System Department, Nissan Motor Corporation.

> *"The alternative options that were available outside of Rescale such as building our own solution or extending our on-premise environment were inadequate and did not meet the full demand of what Nissan required."*
>
> Dai Matsubara, Assistant Manager of Engineering and Quality System Department. at Nissan, System Director of Nissan HPC.
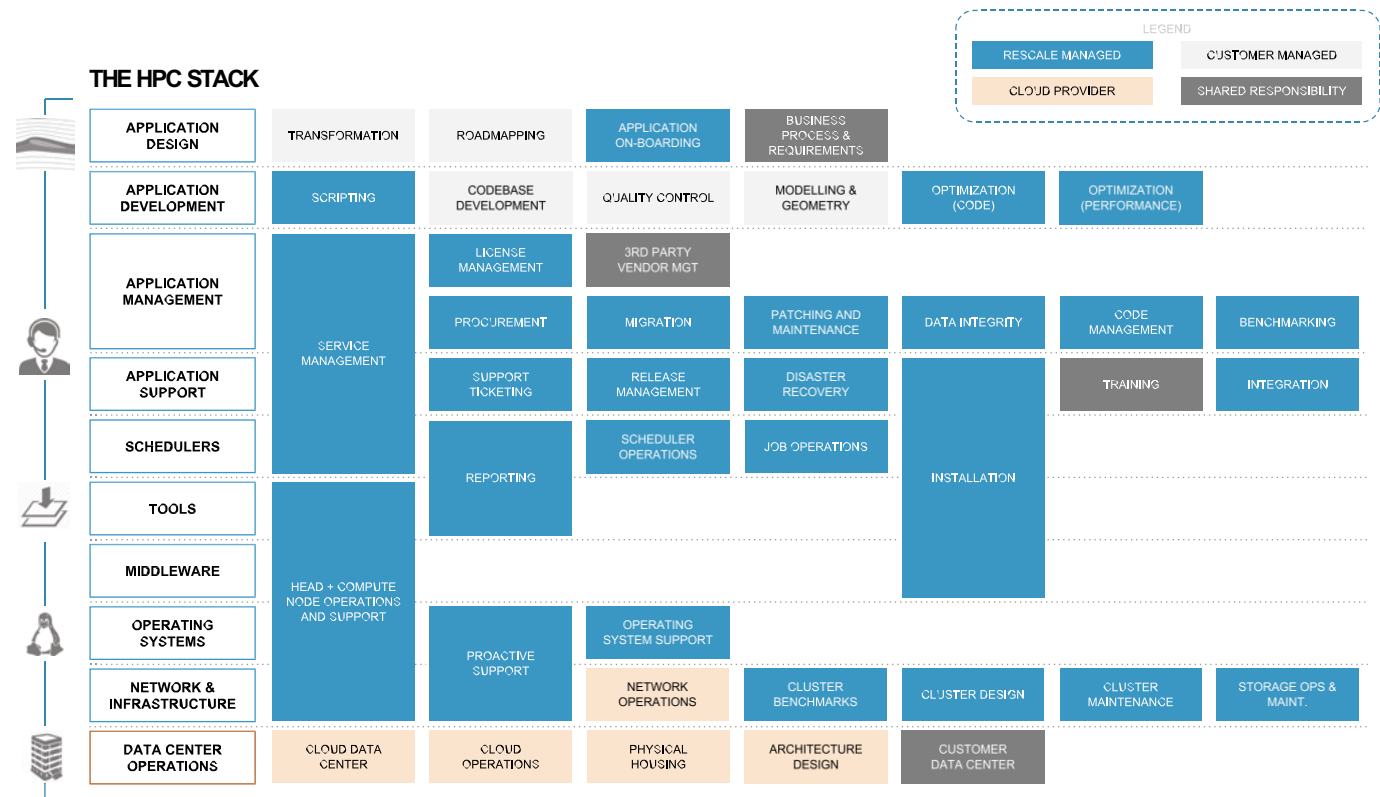
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Committing to Rescale

To address these challenges, Nissan chose Rescale's ScaleX Enterprise platform because it provides diverse and scalable HPC resources on a pay-per-use model, and an efficient global administration infrastructure. Nissan also valued that the Rescale solution provided:
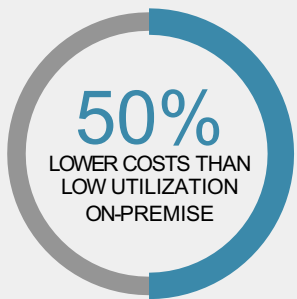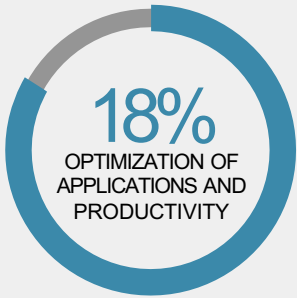
- The ability to instantly scale a diverse range of the latest hardware and applications
- Controls for administering simulation users, projects, software, hardware, and budgets
- A single solution that supports Nissan's journey to the cloud, starting with hybrid

The Rescale Solution

Rescale's managed HPC platform on AWS converted Nissan's complex stack of software, hardware, and infrastructure into a single, unified solution that remains agile in the fast-moving technology environment. Nissan's engineers are able to access the latest technology and AWS EC2 instance selection through a single, unified solution and at virtually unlimited scale.

THE HPC STACK

LEGEND

| RESCALE MANAGED | CUSTOMER MANAGED |
| CLOUD PROVIDER | SHARED RESPONSIBILITY |

APPLICATION DESIGN	TRANSFORMATION	ROADMAPPING	APPLICATION ON-BOARDING	BUSINESS PROCESS & REQUIREMENTS			
APPLICATION DEVELOPMENT	SCRIPTING	CODEBASE DEVELOPMENT	QUALITY CONTROL	MODELLING & GEOMETRY	OPTIMIZATION (CODE)	OPTIMIZATION (PERFORMANCE)	
APPLICATION MANAGEMENT	SERVICE MANAGEMENT	LICENSE MANAGEMENT	3RD PARTY VENDOR MGT				
		PROCUREMENT	MIGRATION	PATCHING AND MAINTENANCE	DATA INTEGRITY	CODE MANAGEMENT	BENCHMARKING
APPLICATION SUPPORT		SUPPORT TICKETING	RELEASE MANAGEMENT	DISASTER RECOVERY	INSTALLATION	TRAINING	INTEGRATION
SCHEDULERS		REPORTING	SCHEDULER OPERATIONS	JOB OPERATIONS			
TOOLS	HEAD + COMPUTE NODE OPERATIONS AND SUPPORT						
MIDDLEWARE							
OPERATING SYSTEMS		PROACTIVE SUPPORT	OPERATING SYSTEM SUPPORT				
NETWORK & INFRASTRUCTURE			NETWORK OPERATIONS	CLUSTER BENCHMARKS	CLUSTER DESIGN	CLUSTER MAINTENANCE	STORAGE OPS & MAINT.
DATA CENTER OPERATIONS	CLOUD DATA CENTER	CLOUD OPERATIONS	PHYSICAL HOUSING	ARCHITECTURE DESIGN	CUSTOMER DATA CENTER		

The Rescale-Managed platform architecture encapsulates many services, software and infrastructure layers.

Nissan Case Study)

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18%
OPTIMIZATION OF
APPLICATIONS AND
PRODUCTIVITY

30%
EXPECTED
TOTAL COST
OPTIMIZATION

50%
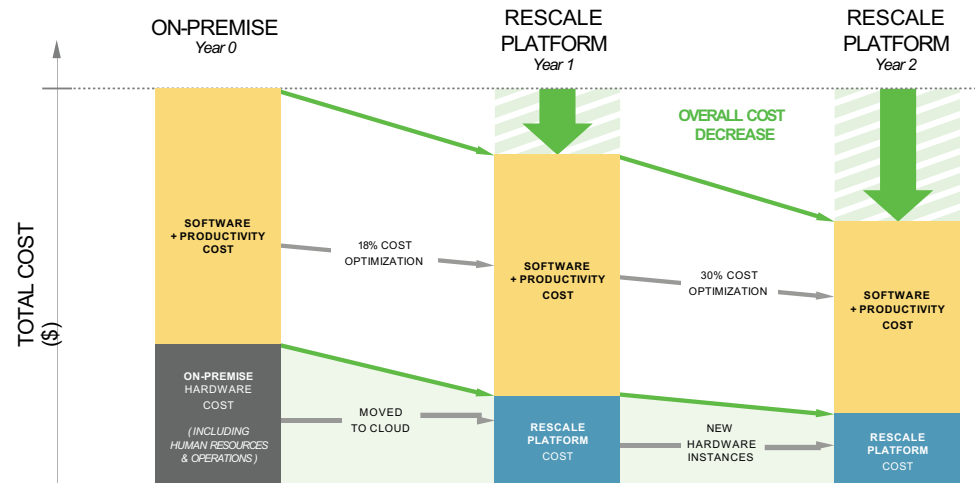LOWER COSTS THAN
LOW UTILIZATION
ON-PREMISE

Hardware cost savings include electricity and operations by 50% when on-premise utilization is under 30%.

Agile Engineering and IT Business Impacts

Within 4 months, Nissan's global engineering division was concurrently running hundreds of jobs per day on the Rescale platform. They experienced the following results:

- Completely eliminated all queuing time, which was previously an average of 2 - 3 days
- An 18% cost optimization of applications and productivity due to better matching the hardware to specific workflows. Nissan expects a further cost optimization of 15% with next generation hardware, bringing the combined cost and productivity improvement to more than 30%
- 50% cost reduction on HPC operating expenses

With 3 - 4 times higher software cost than hardware, shifting to better optimized hardware and agile scalability allowed Nissan to achieve more with the same licenses and improve their workflow efficiency.

Hardware cost savings include electricity and operations by 50% when on-premise utilization is under 30%.

Assessing the Complete Cost of HPC in the Cloud

Nissan carried out in-depth cost assessments when considering alternatives and was able to combine many different views (IT costs, engineering costs, products, and safety risks). With the latest hardware and unlimited computing resources on demand capacity, they reduced time to market for their newest innovations.

Nissan leased on-premise HPC systems at a fixed rate over the life of the hardware. This made on-premise hardware appear less expensive than cloud for Year 1. However the overall cost of an agile cloud platform solution became substantially lower.
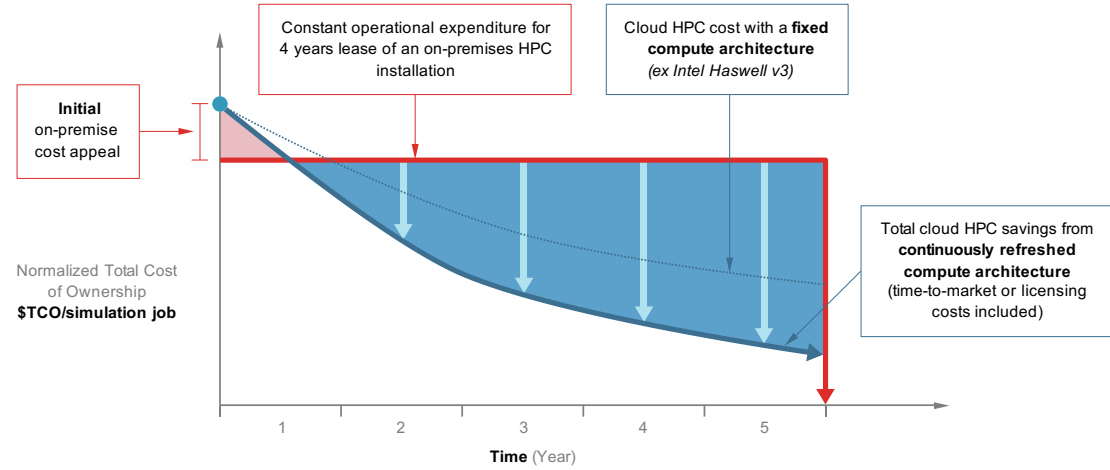
Nissan Case Study

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Summary

18% Cost Optimization
of Applications & Productivity

50% Cost Reduction
for HPC Expenses

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0 Queue
During Peak Engineering Demand

Nissan expects that the total cost-per-simulation (hardware and software) of cloud resources will decrease over time when compared to a fixed on-premise infrastructure. This occurs when new technology improvements are released and computing performance increases.

Conclusion

Nissan recognized that its ability to remain agile and innovate faster was their key competitive differentiator in the automotive markets. They saw it was a strategic imperative to deliver their global engineering team with platform HPC resources to increase overall operational efficiency. Nissan chose the Rescale ScaleX Enterprise platform built on AWS, which successfully delivered improved ROI across these business drivers:

- An 18% cost optimization of applications and productivity, achieved by using optimized resources for each application and the agility to instantly scale resources to match computing demands.
- One unifying platform solution for long-term sustainable product quality and innovation enabling rapid new technology adoption.
- Faster product development, achieved through improved infrastructure agility and turnkey global deployment and administration, together provide zero queue time during peak engineering demand.

For more detailed information, please contact sales@rescale.com.