rescale

Easy, Fast & Unlimited CFD Cloud

Bosung Lee (bosung@rescale.com)

Rescale solves mission critical challenges
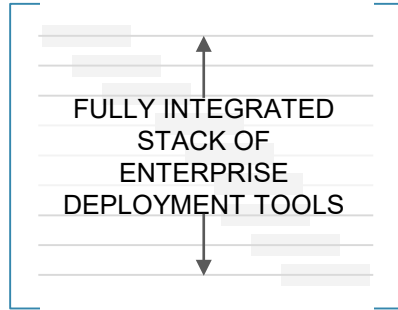
BOEING®

- 150 lbs weight reduction = $180M in savings
- 3 months development time achieved in under 24 hrs

boom

- Testing reduced from months in wind tunnel to hours of CFD
- Eliminated server capital costs
- Overcome IT market limitations
- Over 6X speedup per job
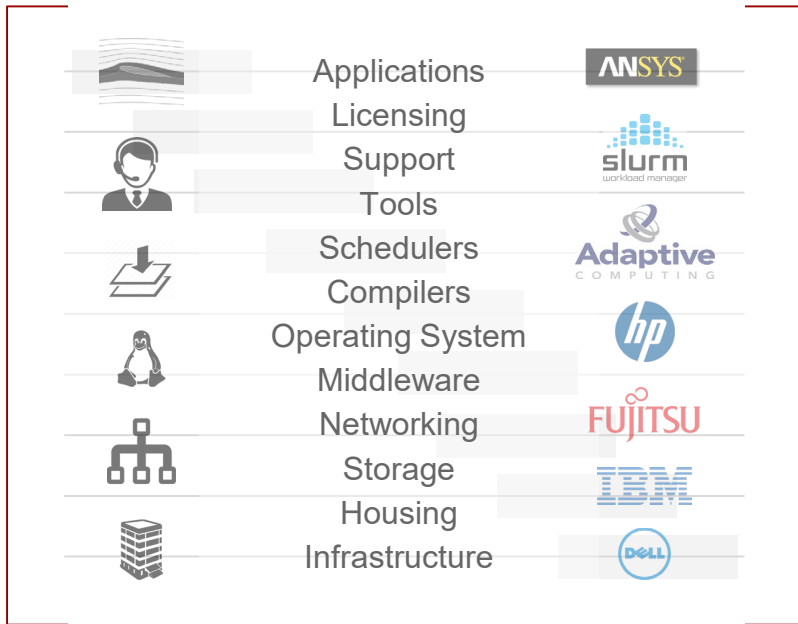
The Rescale HPC Platform experience

FULLY INTEGRATED STACK OF ENTERPRISE DEPLOYMENT TOOLS

rescale
PLATFORM

Input → Software → Post Processing → Output
Filters
Hardware Settings

Rescale ScaleX Platform

- Enterprise big compute
- Innovation acceleration
- User-first platform
- Security and admin controls

Full stack automated and delivered by Rescale

Applications
Licensing
Support
Tools
Schedulers
Compilers
Operating System
Middleware
Networking
Storage
Housing
Infrastructure

ANSYS

slurm
workload manager

Adaptive
COMPUTING

hp

FUJITSU

IBM

DELL

rescale

Expensive on-premise stack of 30+ software middleware tools and consulting services…
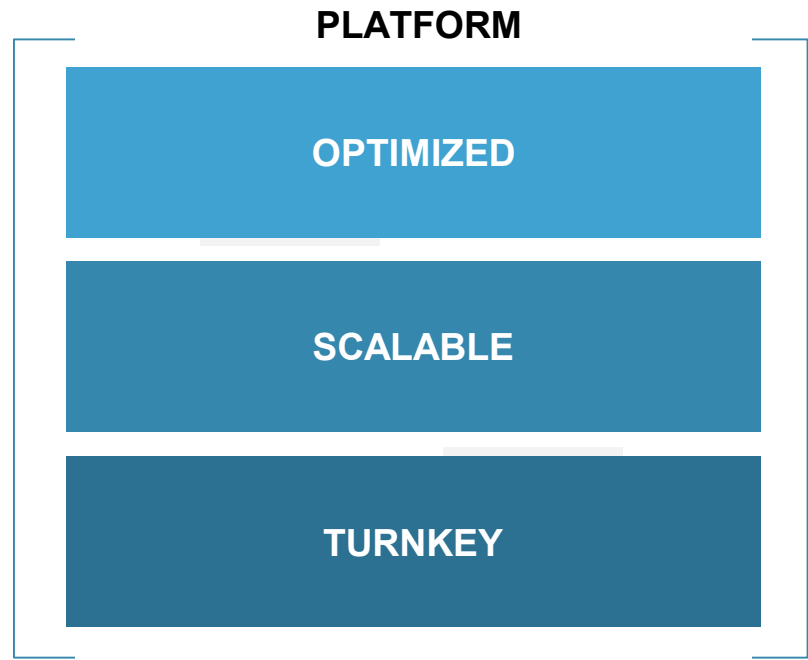
…transformed into one seamless, automated SaaS enterprise Platform
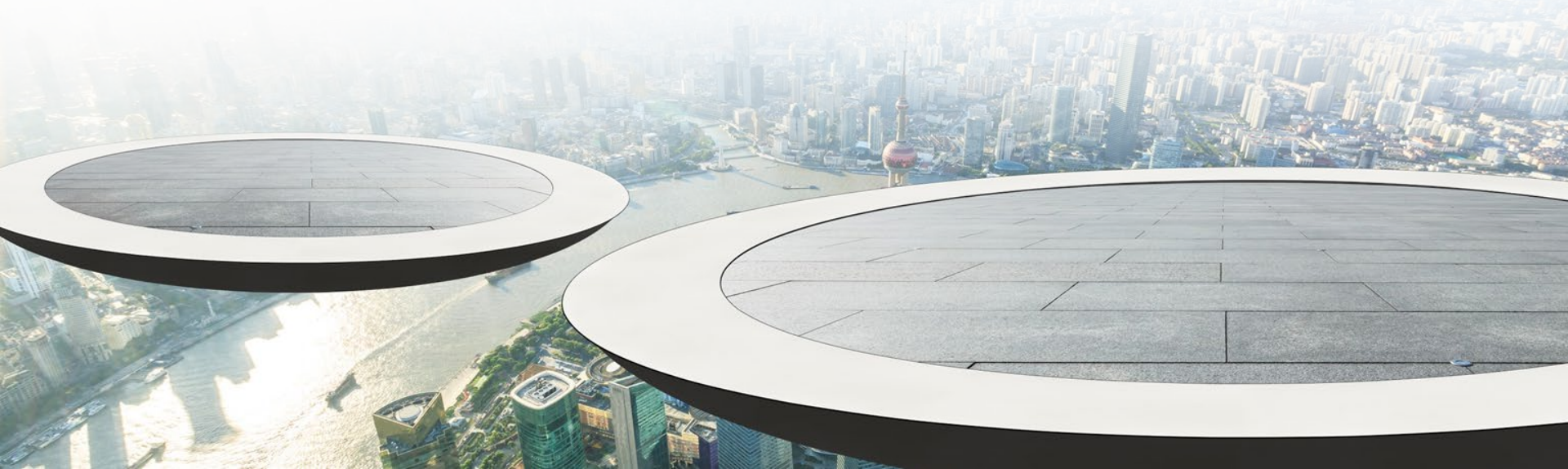
Fundamental values of the Platform HPC experience

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PLATFORM

OPTIMIZED

SCALABLE

TURNKEY

Platforms multiply freedom and productivity

Rescale leverages platform philosophy to deliver innovation acceleration, on demand

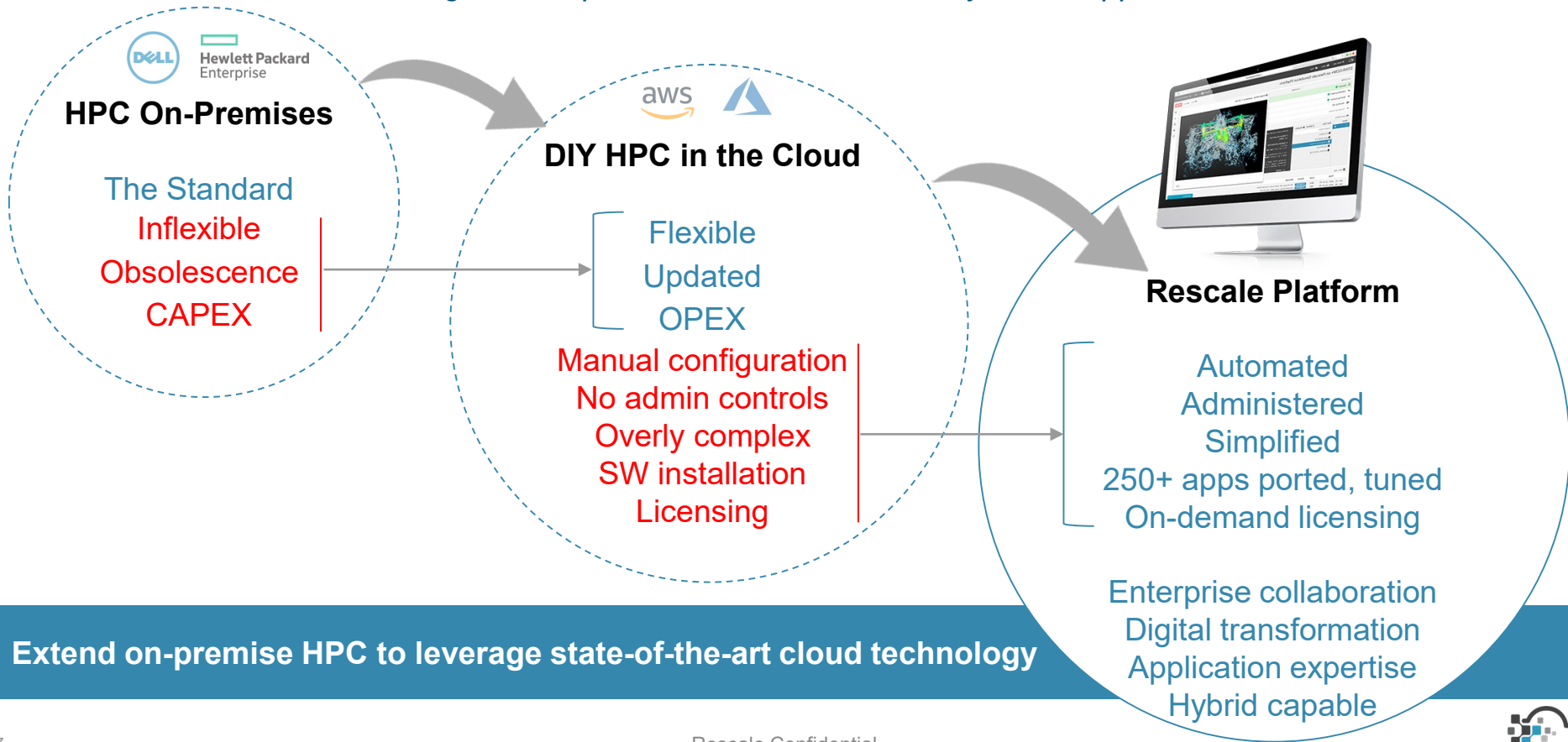| **Optimized per Job**	**Limitless Scale**	**Turnkey Administration**
A platform provides millions of combinations of workflows	Grow simulation/job sizes and actual team productivity fast	Platform connects applications, data, licenses, MPI, & versioning

Rescale enables transformative benefits

Rescale addresses the challenges of on-premise HPC and the Do-it-yourself approach to cloud HPC

HPC On-Premises

The Standard
Inflexible
Obsolescence
CAPEX

DIY HPC in the Cloud

Flexible
Updated
OPEX

Manual configuration
No admin controls
Overly complex
SW installation
Licensing

Rescale Platform

Automated
Administered
Simplified
250+ apps ported, tuned
On-demand licensing

Enterprise collaboration
Digital transformation
Application expertise
Hybrid capable

Extend on-premise HPC to leverage state-of-the-art cloud technology

Rescale Platform implementation strategies

Choose what is right for you, right now

Cloud Native

- Elastic scaling on demand
- Turnkey
- Zero IT footprint

On-premise HPC

- Submit jobs on-premise
- Administration portal
- Analysis and reporting

Hybrid: Cloud & On-premise

- Extend to cloud on demand
- Seamless transitioning between architectures
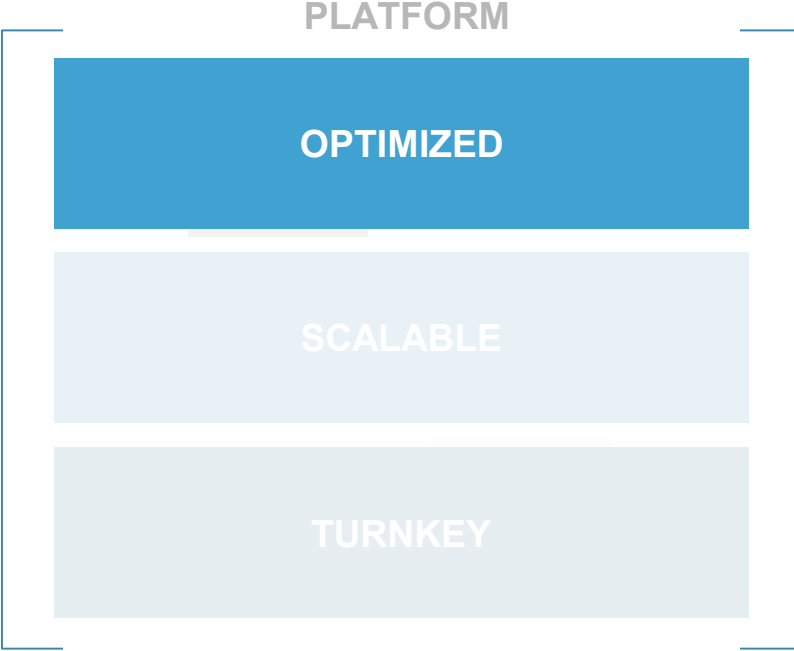- Disaster recovery

+

Advantages of both
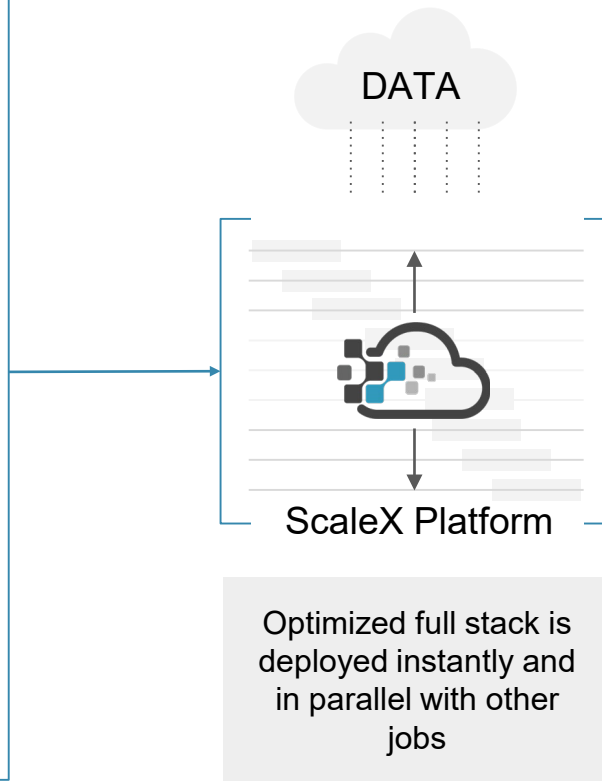
Fundamental values of the Platform HPC experience

PLATFORM

OPTIMIZED
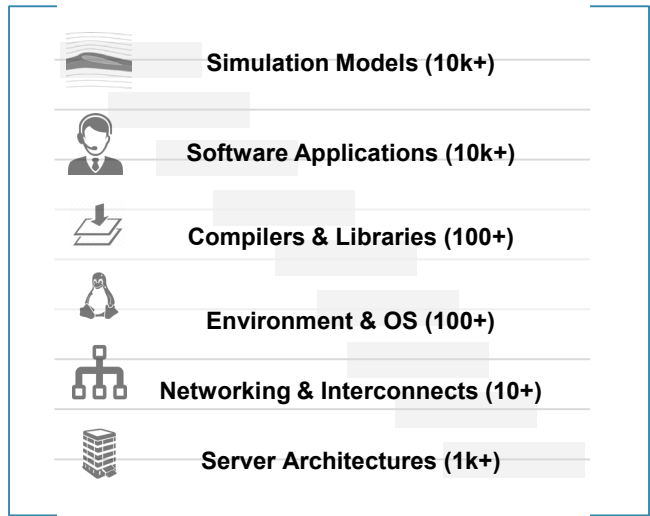
SCALABLE

TURNKEY

Rescale delivers a complete, optimized stack

Operate consistently on the best workflow-specific infrastructure with no transition loss

DATA

ScaleX Platform

Optimized full stack is deployed instantly and in parallel with other jobs

Rescale delivers best practices

Technology Choices

- Simulation Models (10k+)
- Software Applications (10k+)
- Compilers & Libraries (100+)
- Environment & OS (100+)
- Networking & Interconnects (10+)
- Server Architectures (1k+)

= virtually unlimited combinations

ScaleX Platform

Business Optimization

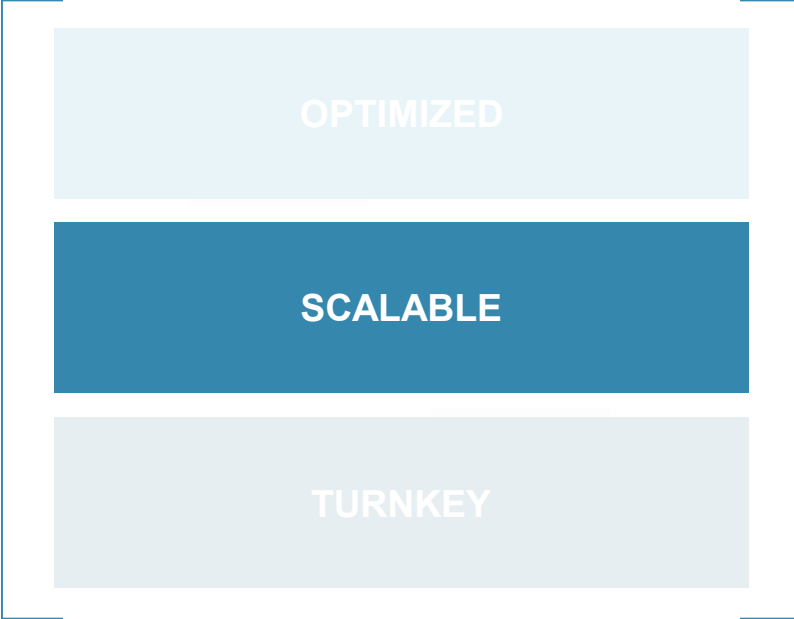Licensing

Hardware performance & costs

Workflows
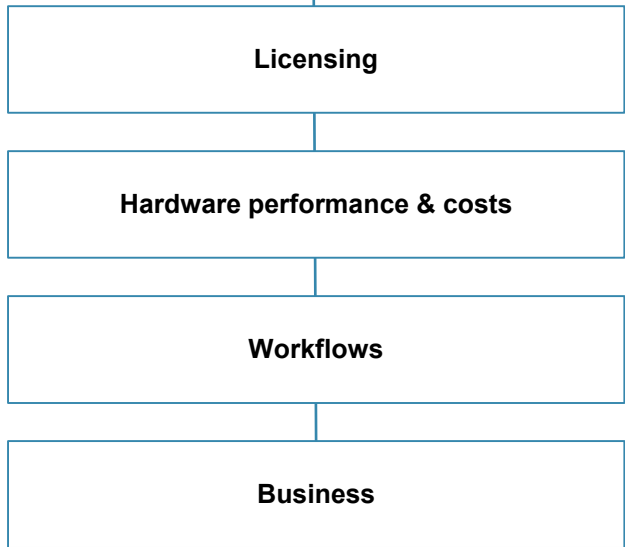
Business

Automatic full stack technology selection and tuning for optimal business performance

Fundamental values of the Platform HPC experience

PLATFORM

OPTIMIZED

SCALABLE

TURNKEY

Limited available resources forces queuing

Resources available on demand, and optimized for specific compute task

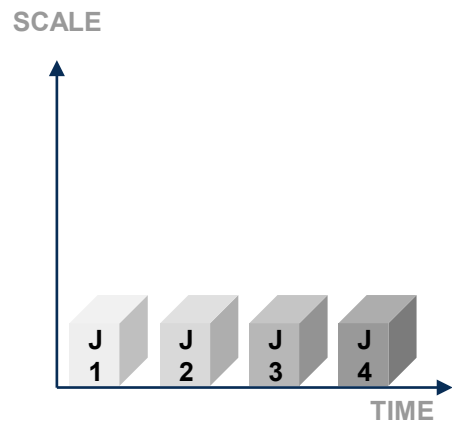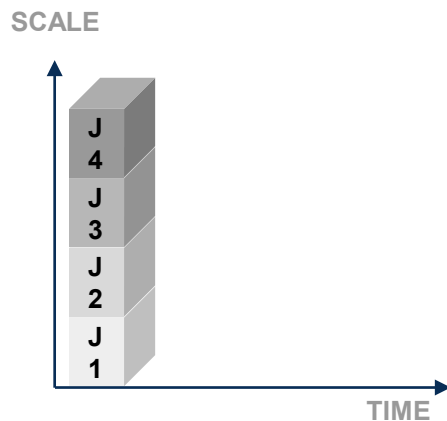# Scalability: faster results, shorter turnaround time

On-premise HPC

Jobs queued

SCALE

J1 J2 J3 J4

TIME

HPC in the Cloud

Concurrent submission

SCALE

J4
J3
J2
J1

TIME

Optimized compute resources

SCALE

J8
J7
J6
J5

J4
J3
J2
J1

J12
J11
J10
J9

J12
J11
J10
J9

TIME

ARCHITECTURE 1
ARCHITECTURE 2
ARCHITECTURE 3
ARCHITECTURE 4
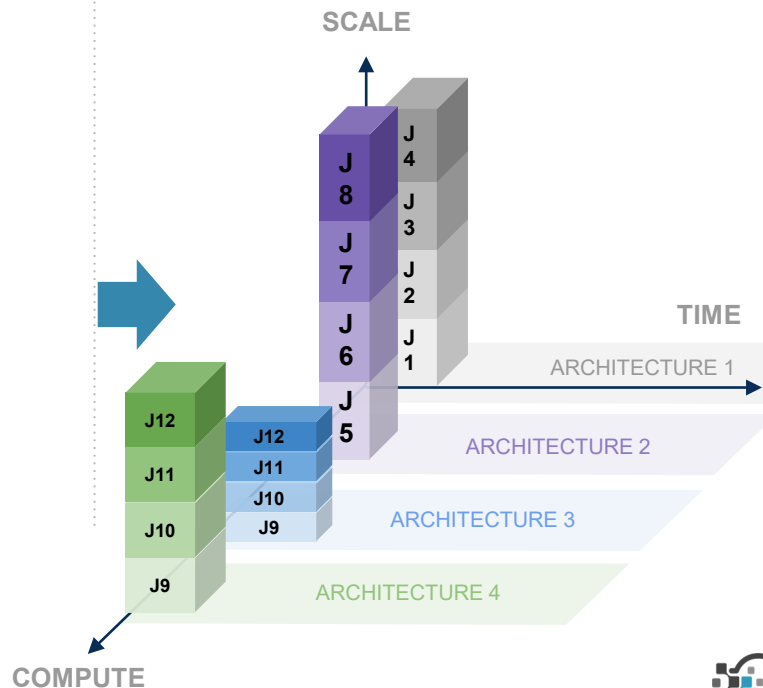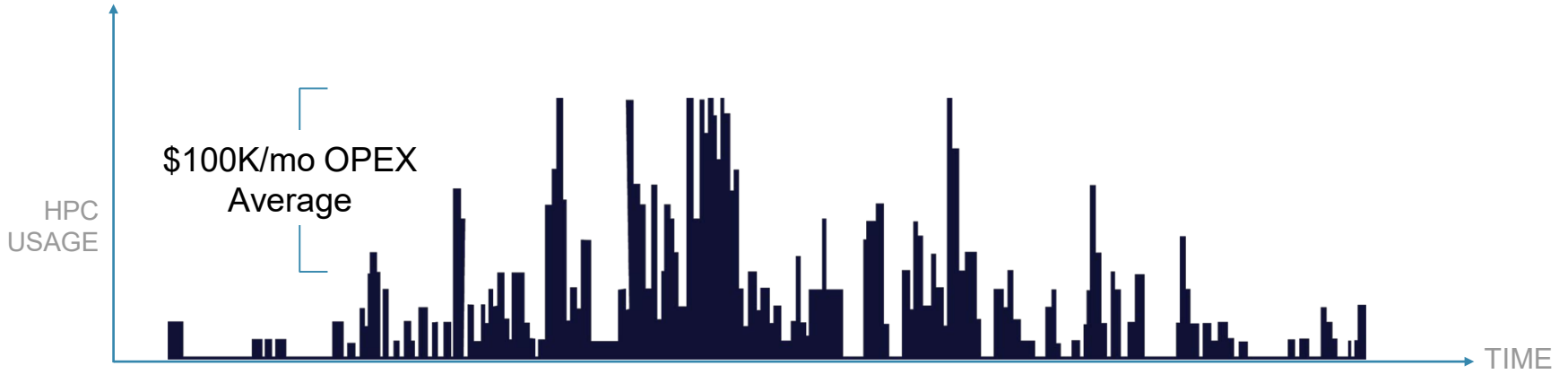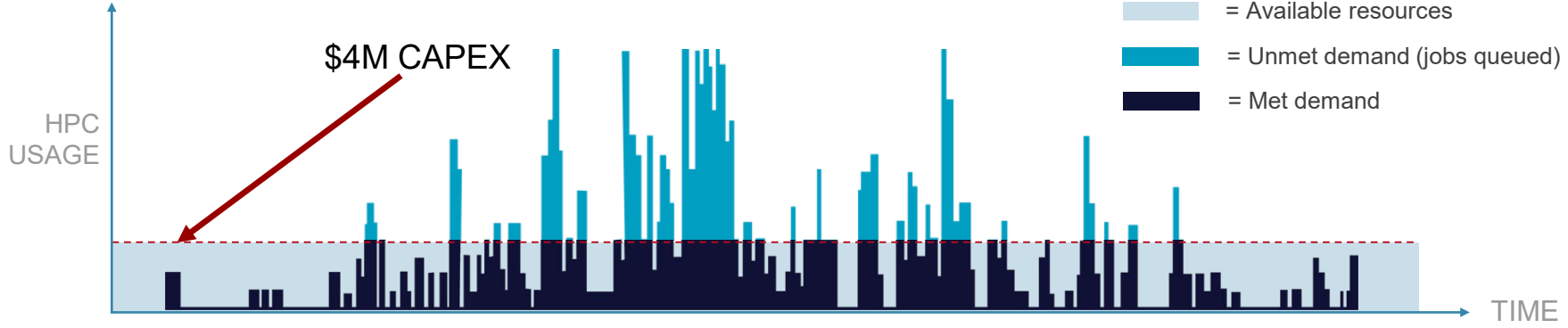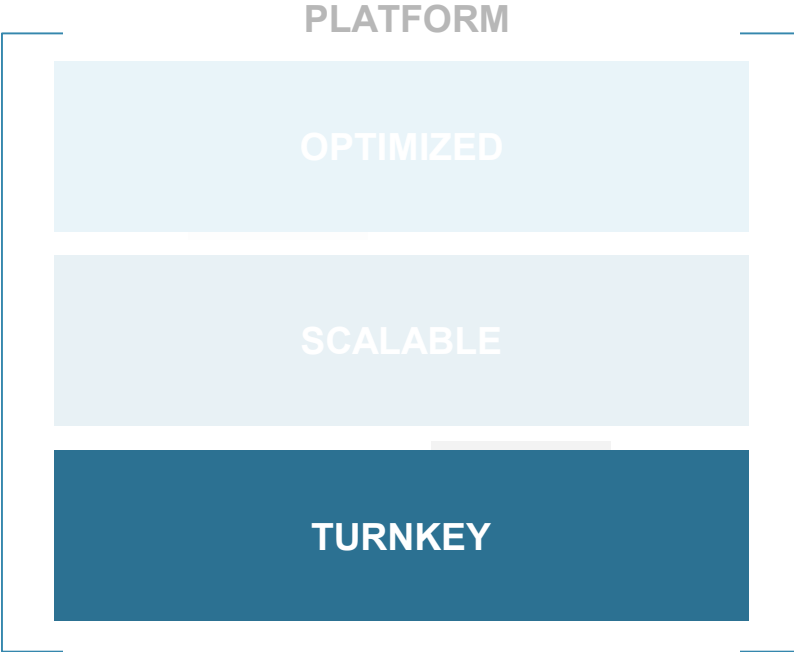
COMPUTE

Tier 1 automotive: HPC usage versus demand

CAPEX replaced with lower monthly OPEX while increasing compute capacity and flexibility

- = Available resources
- = Unmet demand (jobs queued)
- = Met demand

$4M CAPEX

HPC USAGE

TIME

$100K/mo OPEX Average

HPC USAGE

TIME

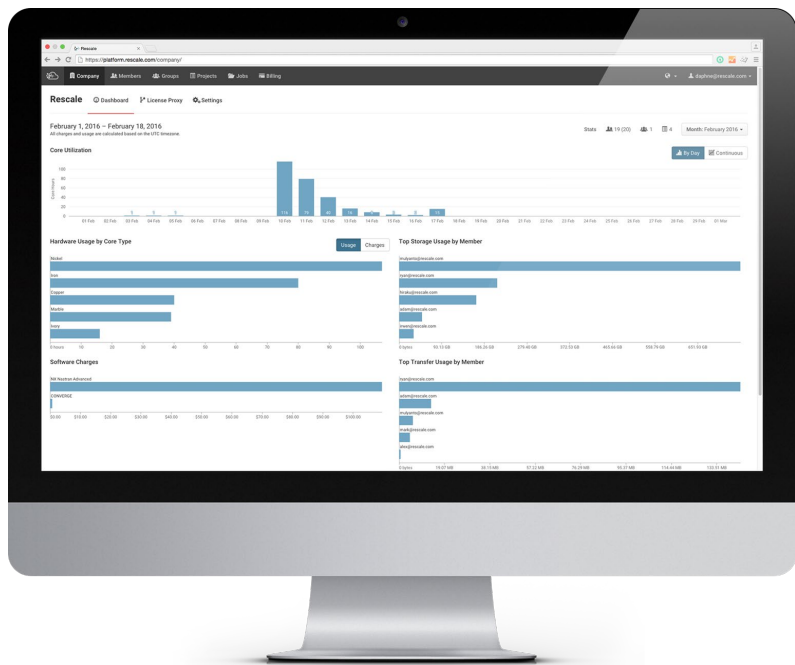# Fundamental values of the Platform HPC experience

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OPTIMIZED

SCALABLE

TURNKEY

Enterprise administration: broad control sets, management, reporting and integration

Global turnkey IT administration

Easy-to-use SaaS interface for IT & engineering managers

Key Enterprise Features

|	
Role-based Access	Manage users Manage roles Manage groups Manage projects
Platform	HW access, regions, and pricing SW access, licenses, and pricing Platform features access Data retention and sharing settings
Security	Restricted access by IP address range Password complexity rules Multi-factor authentication (MFA) User audit logs & notification rules
Cost Management	Budget by level Reports by application type Payment methods and history License usage optimizer
Connect	On-premise compute and storage PDM/SLM integration VPN Single sign-on (SSO)

Rescale's global HPC infrastructure network

Over 100 data centers worldwide

USA

ITAR

Europe

Asia

LATAM
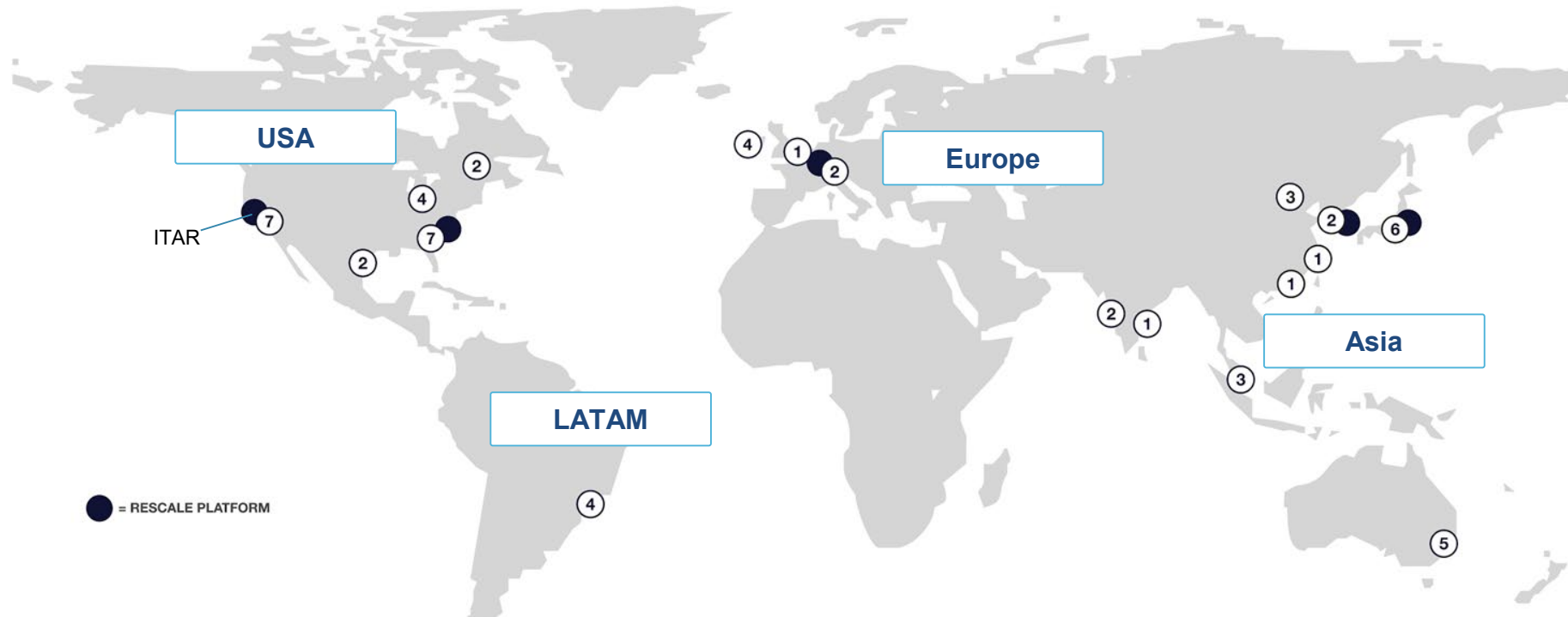
● = RESCALE PLATFORM

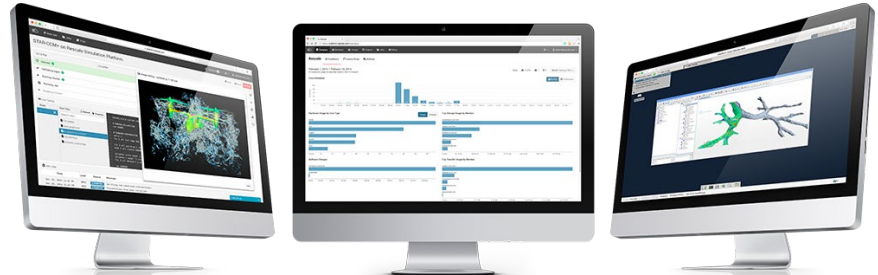**Turnkey deployment to the fastest local HPC infrastructure**

Absolute enterprise security, delivered end-to-end

Rescale delivers best-in-class security layer across entire platform

> **Rescale is compliant with the strictest industry security standards**

- Full administrative management and IT dashboard provide comprehensive controls and visibility

- Software defined security policy implementation tools to enforce proper IP handling

- Encryption in transfer with high-grade TLS and multi-layered encryption at rest with 256-bit AES

AICPA SOC	CSA cloud security alliance℠	ITAR	HIPAA	FR FedRAMP
SOC 2 Type 2 Attested	CSA Registered	ITAR Compliant *	HIPAA Certified *	FedRAMP

* Not available in all geographical regions.

Rescale Confidential

One Platform, All Codes

1. Licenses
On-demand licensing in the cloud or use your existing license.

2. Software
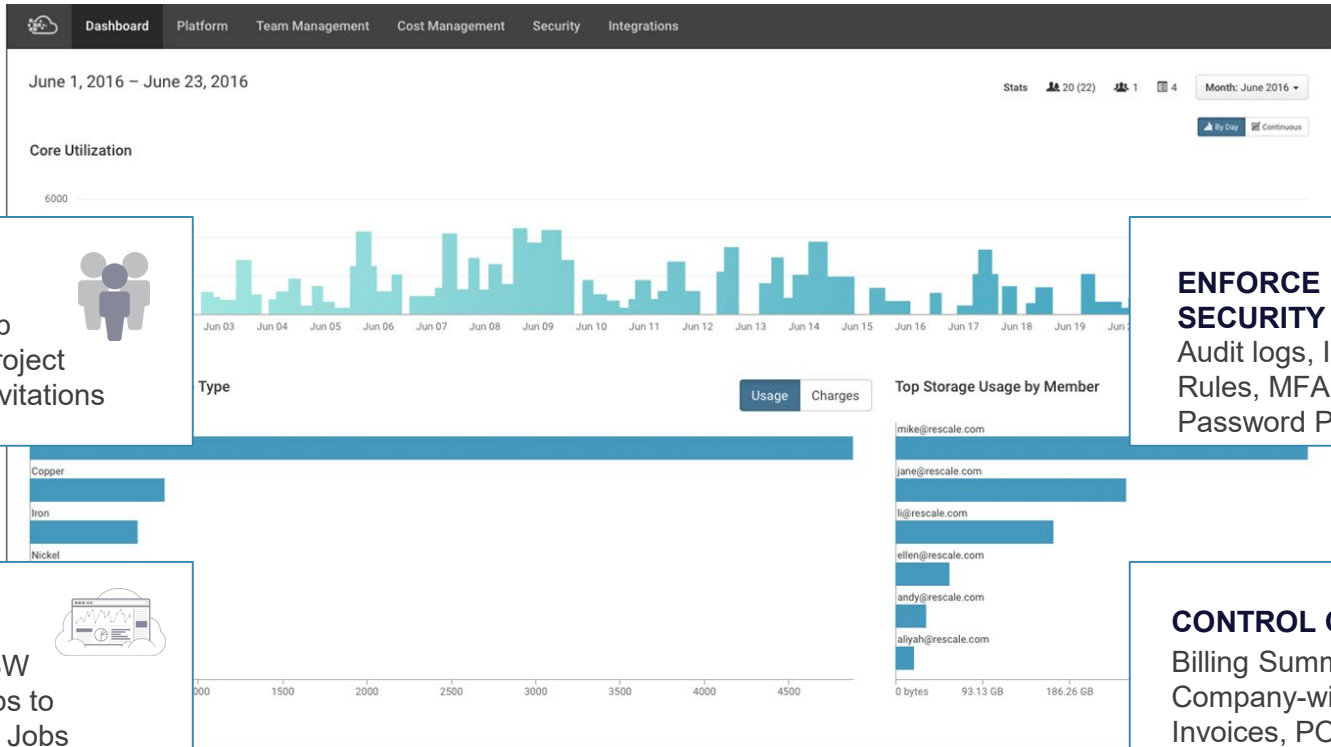Wide package selection with new versions added regularly.

3. Workflow
Easy workflow for pre- & post-processing. View results online with the GUI app.

4. Support
Best-in-class support from experts through instant chat, email, phone.

Enterprise-level Policy Enforcement

BUILD TEAMS
Member & Group Management, Project Management, Invitations

MANAGE JOBS
Approve HW & SW Options, Link Jobs to Projects, Review Jobs

ENFORCE SECURITY
Audit logs, IP Access Rules, MFA, SSO, Password Policies

CONTROL COSTS
Billing Summaries, Company-wide Budgets, Invoices, POs, Deposits

Optimized Scalable Turnkey

Advanced Rocket Design & Development

- Product development speedup of over 24X
- Instant 1,000+ CPU clusters simulating design performance

Real-time Formula 1 Simulations

- 3,000+ simulations in under 45s / lap
- Real-time sensor data inform strategy and performance

Vahana's autonomous vehicle design & simulation

- Product development speedup of over 3X
- Faster time to market

Scalability keeps American Axle on schedule

- On-demand licensing and instant scaling for Star-CCM CFD analyses
- Flexible compute resources enable tight deadlines to be consistently met

Rescale at a Glance

FOUNDED	**2011**
LOCATED	**SAN FRANCISCO (+ LONDON, MUNICH, TOKYO, SEOUL, SINGAPORE)**
DELIVERS	**ENTERPRISE BIG COMPUTE PLATFORM**

FUNDED

Sam Altman, Jeff Bezos, Richard Branson, Paul Graham, Peter Thiel

JumpCapital · ITV ITOCHU TECHNOLOGY VENTURES · TWO ROADS GROUP

TRANSLINK CAPITAL · Microsoft · Data Collective

ENDORSED

Gartner® · Goldman Sachs · IDC Analyze the Future · McKinsey&Company

ADDRESSES
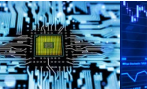
Aerospace **Automotive** **Industrials** **Life Sciences** **Universities** **Oil & Gas** **Semiconductor** **Financial Services**