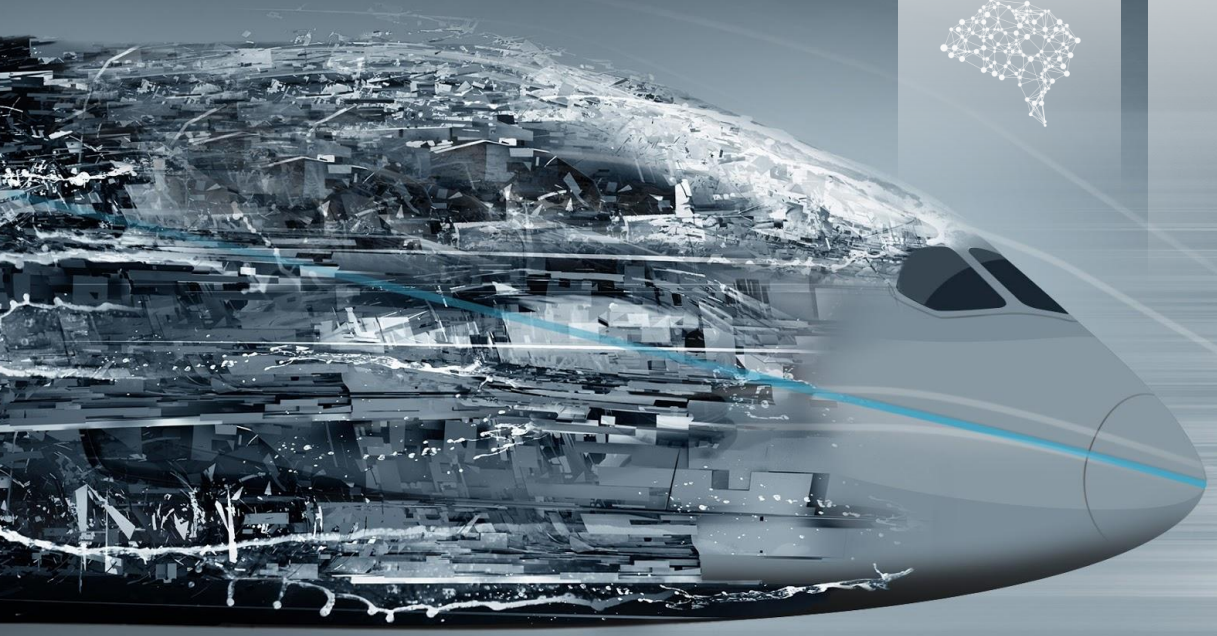


1
DIGITAL THREAD

2
CYBER SECURITY

3
MULTI DISCIPLINARY OPTIMIZATION

4
ADVANCED MANUFACTURING

rescale | Aerospace Industry Best Practices

PRODUCT DEVELOPMENT EFFICIENCY IMPROVEMENTS WITH RESCALE

TIME TO MARKET
-14 MONTHS

HIGH		LOW
19	(16.0%)	9

ENGINEER IDLE TIME
13% LESS

HIGH		LOW
20 DAYS	17 DAYS	14 DAYS

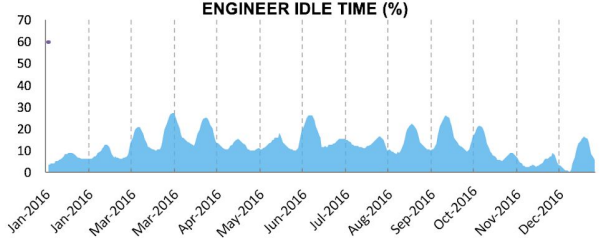
SPECIFIC FUEL
3% BETTER

HIGH		LOW
5,400	600 lb/hr	4920

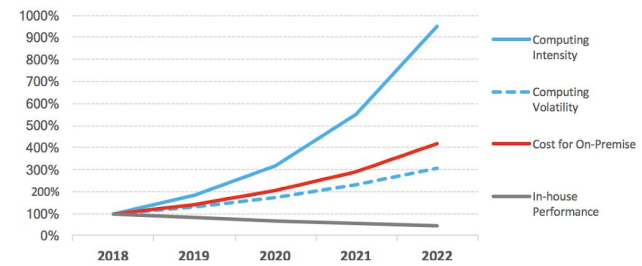
ENG. EFFICIENCY
+27%

HIGH		LOW
4.4 M	+27%	4.1 M

ENGINEER IDLE TIME (%)



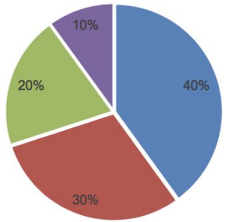
COMPUTING COST AND DEMAND FORECAST



CORPORATE INITIATIVE INVESTMENT

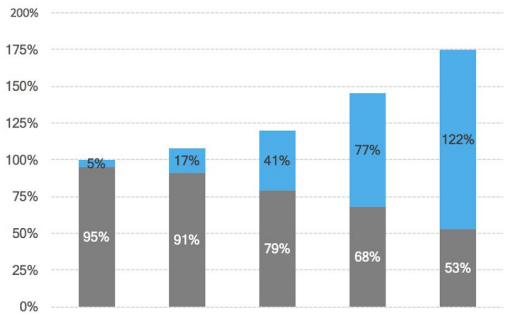
40%	DIGITAL THREAD
30%	CYBERSECURITY
20%	MULTI-DISCIPLINARY OPTIMIZATION
10%	ADVANCED MANUFACTURING

INPUT			
	50% COMBUSTION	15% HYBRID	35% ELECTRIC



RECOMMENDED COMPUTING DISTRIBUTION

Relative to Today's level



LEVEL	2018	2019	2020	2021	2022
REQUIREMENT	100%	108%	120%	145%	175%
LOCAL	95%	91%	79%	68%	53%
CLOUD	5%	17%	41%	77%	122%

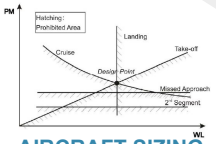
Conceptual Design ← Market Validation → **Operation**

MARKET SEGMENT

Preliminary Design ← Design for Manufacturing → **Production**

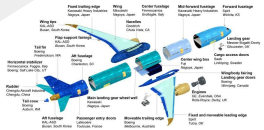
PRODUCTION

MISSION



AIRCRAFT SIZING

Virtual Validation ← Verification ← **Flight Test & Certification**

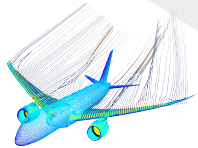


SUPPLY CHAIN

DELIVERY & SALES

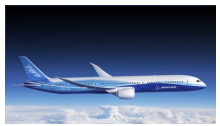
ENERGY

SYSTEM DESIGN



AERODYNAMICS

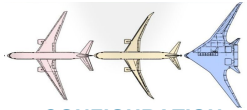
Detailed Design



FLIGHT ENVELOPE

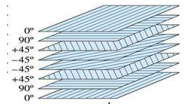
MFG ENGINEERING

MAINTENANCE & PARTS



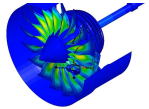
CONFIGURATION

STRUCTURES

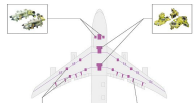


COMPOSITES LAYUP

FLUTTER



POWER PLANT



CONTROL SYSTEMS

STATIC TESTING

KEY RESCALE VALUES

1. **Product Quality**
2. **Time to Market**
3. **Lower Cost**

Legend

RESCALE CORE

RESCALE INTEGRATED

WEIGHT & BALANCE

PRODUCT DEFINITION & CREATION → INDUSTRIALIZATION

Rescale Confidential

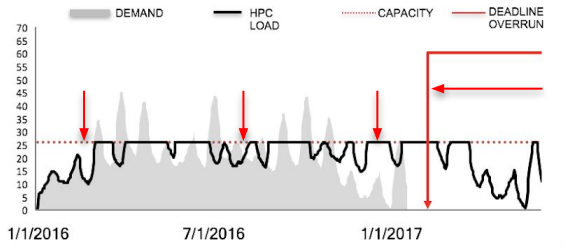
INDUSTRY INITIATIVES	AEROSPACE DOMAINS	PRIMARY DRIVERS	KEY RESCALE VALUES
DIGITAL THREAD	**Conceptual Design**	**ENGINEERING** • Simulation recommendation engine • Centralized platform • Increased simulation throughput • Faster handoff between teams • Shorter turnaround time • Minimized rework	**Improved product, performance, and quality**
CYBERSECURITY	**Preliminary Design**		**Increased development efficiency**
MULTI-DISCIPLINARY OPTIMIZATION	**Virtual Validation**		**Shortened time to market**
ADVANCED MANUFACTURING	**Detailed Design**	**IT** • Increased HW agility • Instant data insights • Support new business models • Activity-based costing • Optimize cost/value	**Leveraged benchmarks and industry best practices**
	Flight Test and Certification		
	Production		
	Operation		

Rescale Confidential

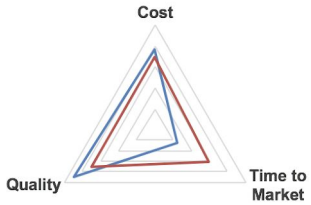
1 → 2 → 3

Your Cluster: Limited Resources

+ HIGH UTILIZATION - SCHEDULE DELAYS



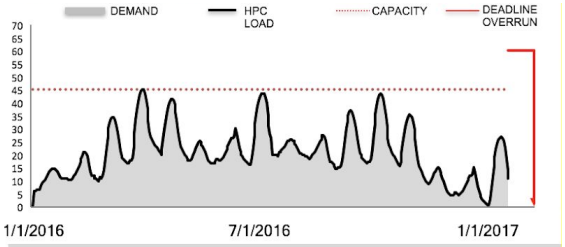
ON-PREMISE Metrics



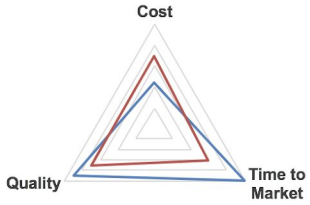
(HIGHER IS BETTER)

Ideal World with Unlimited Resources

+ ON-SCHEDULE - HIGH COST - LOW UTILIZATION



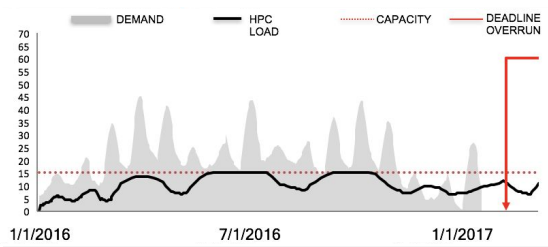
ON-PREMISE Metrics



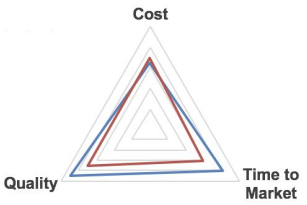
(HIGHER IS BETTER)

Cloud-Enabled Transformation

+ LESS DELAY + COST EFFICIENT + AGILE



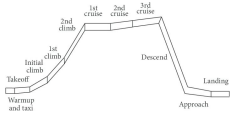
ON-PREMISE Metrics

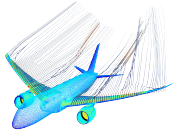


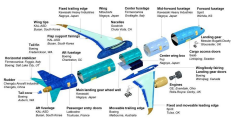
(HIGHER IS BETTER)

Rescale Confidential

Engineering Lifecycle



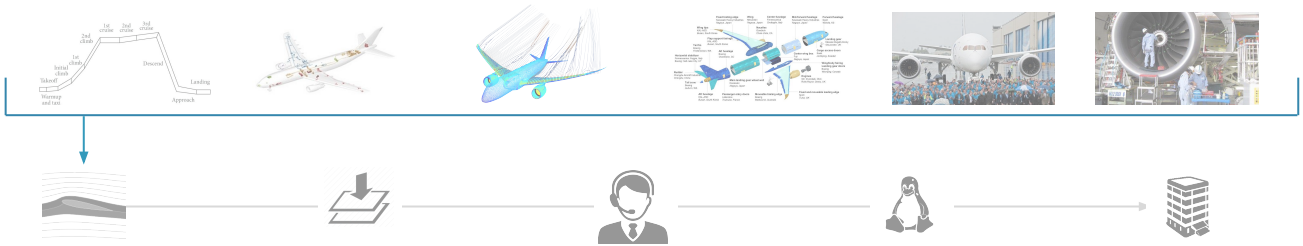




	Aircraft Design	Test & Validation	Manufacturing & Operations	Next Generation Technology
HORIZON 1	Accelerate design optimization cycles that have high-fidelity CAE and MDO	Enable Digital Twin workflows	Facilitate design for composite manufacturing with FEA and process simulation	On-Demand Multiscale and Multiphysics for advanced analysis
HORIZON 2	Real-time informed design decisions with surrogate based analysis	Refine Digital Twin models with flight test data	Digital Twin execution for Predictive Maintenance	Predictive maintenance
HORIZON 3	Global & multidisciplinary simulation collaboration	Enable Model-Based systems engineering workflows	Support Blockchain decentralized traceability	High-fidelity system level multidisciplinary optimization

Rescale Confidential

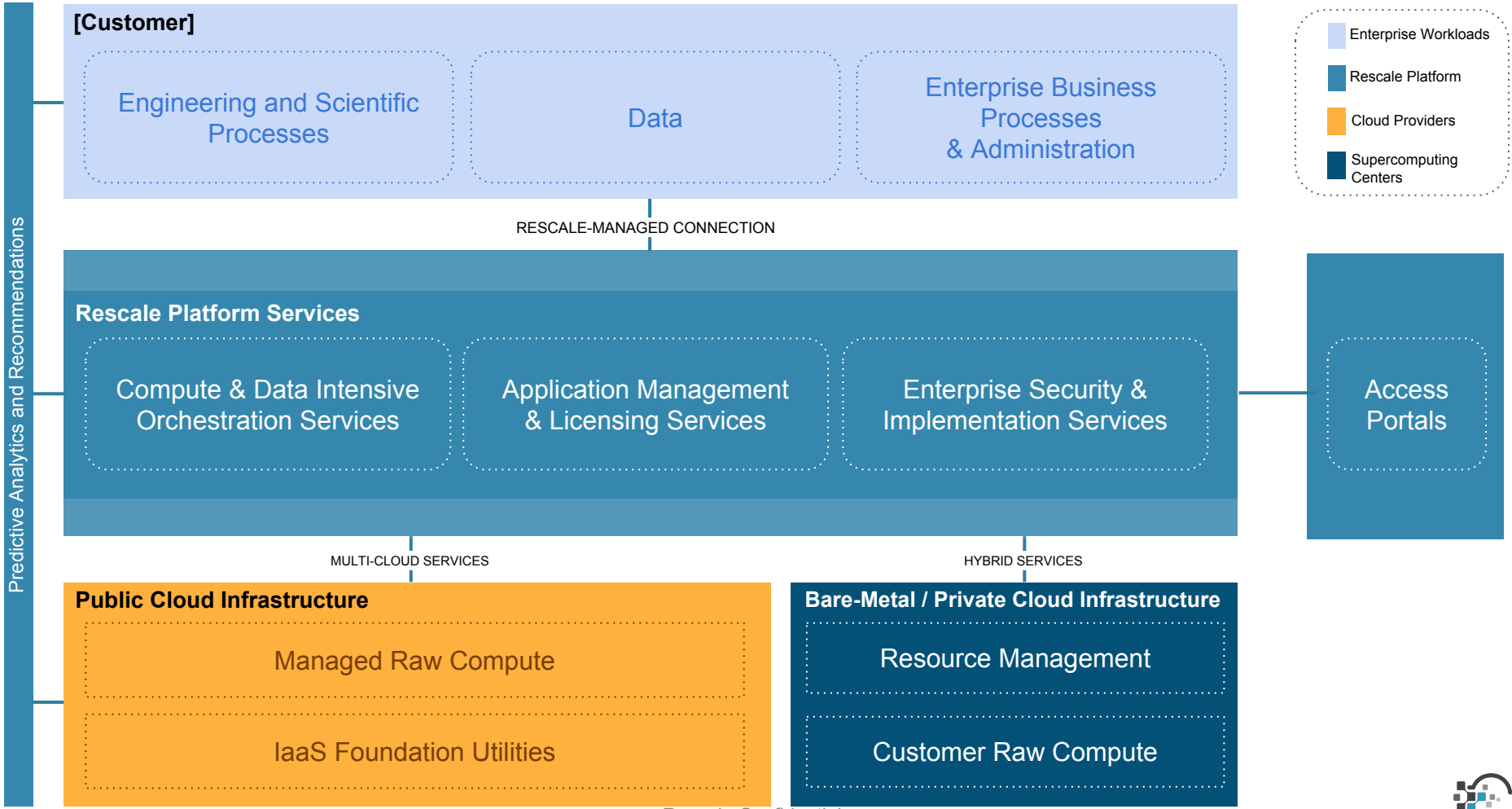
IT Solutions Mapping



	User & App Support	System Architecture	Compliance & IP Protection
HORIZON 1	Turnkey application deployment & maintenance	HPC-Centric Disaster Recovery	Turnkey ITAR, GDPR compliance in the cloud
HORIZON 2	Agile implementation of new engineering methods	Maximize utilization by consolidating resources	Advanced data export control
HORIZON 3	End-to-end simulation traceability with PLM integration	Internal cost management with ERP integration	Extend private networking to cloud

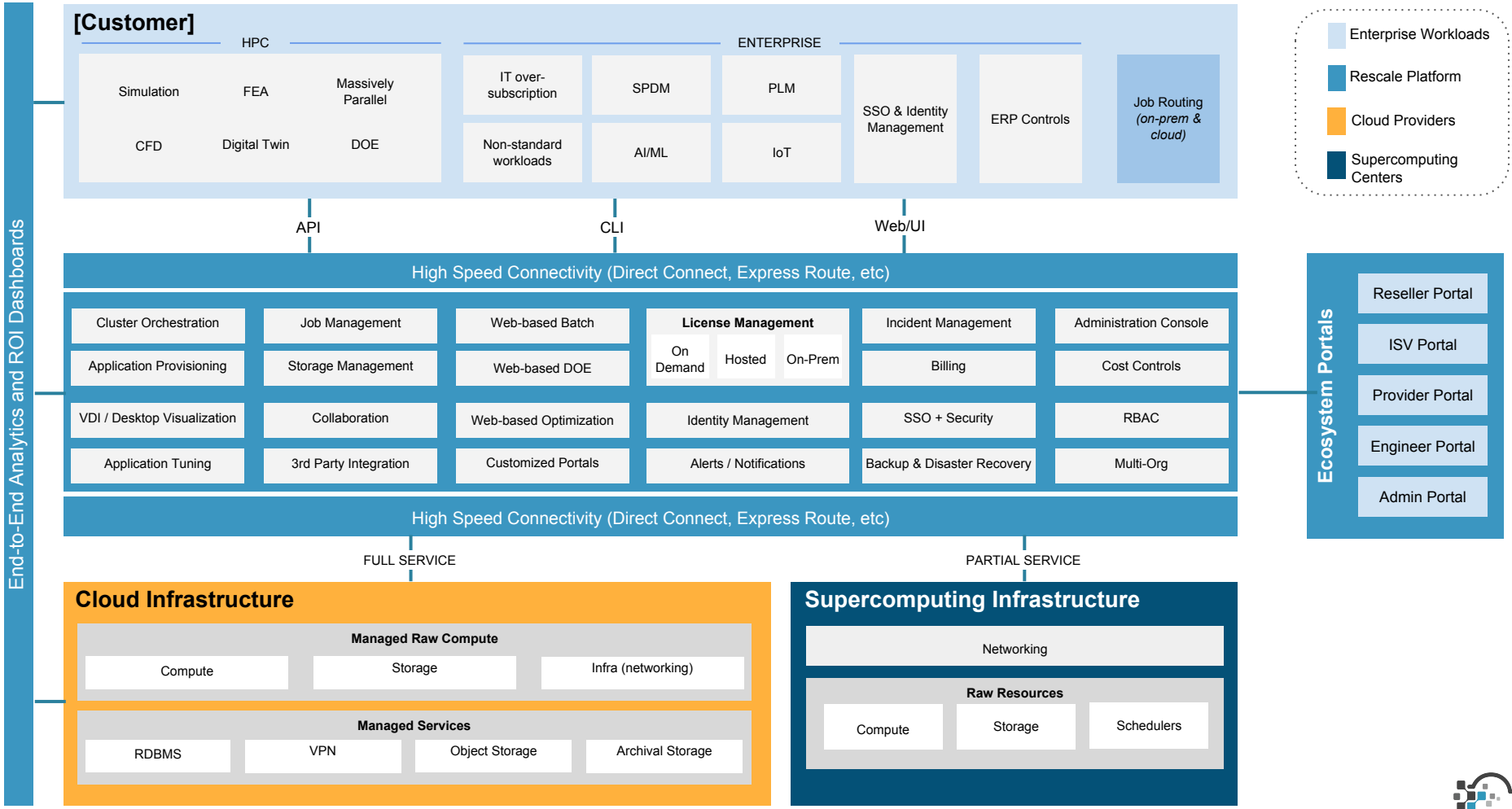
Rescale Confidential

Rescale Reference Architecture - Level 1



Rescale Confidential

Rescale Reference Architecture - Level 2



Rescale Confidential

Rescale-Managed On-premise Installations

LEGEND

RESCALE INTEGRATED

RESCALE MANAGED

APPLICATION DESIGN	TRANSFORMATION	ROADMAPPING	SOLUTION IMAGING	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.	
PHYSICAL HOUSING	DATA CENTER OPERATIONS	POD OPERATIONS	POD HOUSING	ARCHITECTURE DC DESIGN				

Rescale Confidential

Rescale-Managed Cloud and Hybrid Installations

LEGEND

RESCALE MANAGED

APPLICATION DESIGN	TRANSFORMATION	ROADMAPPING	SOLUTION IMAGING	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.	
PHYSICAL HOUSING	DATA CENTER OPERATIONS	POD OPERATIONS	POD HOUSING	ARCHITECTURE DC DESIGN				

Rescale Confidential

www.rescale.com

info@rescale.com | Copyright Rescale, Inc | 33 New Montgomery St,, Suite 950, San Francisco, CA 94105