FUJITSU

shaping tomorrow with you

Leveraging expertise for more economic value from HPC

November 2014

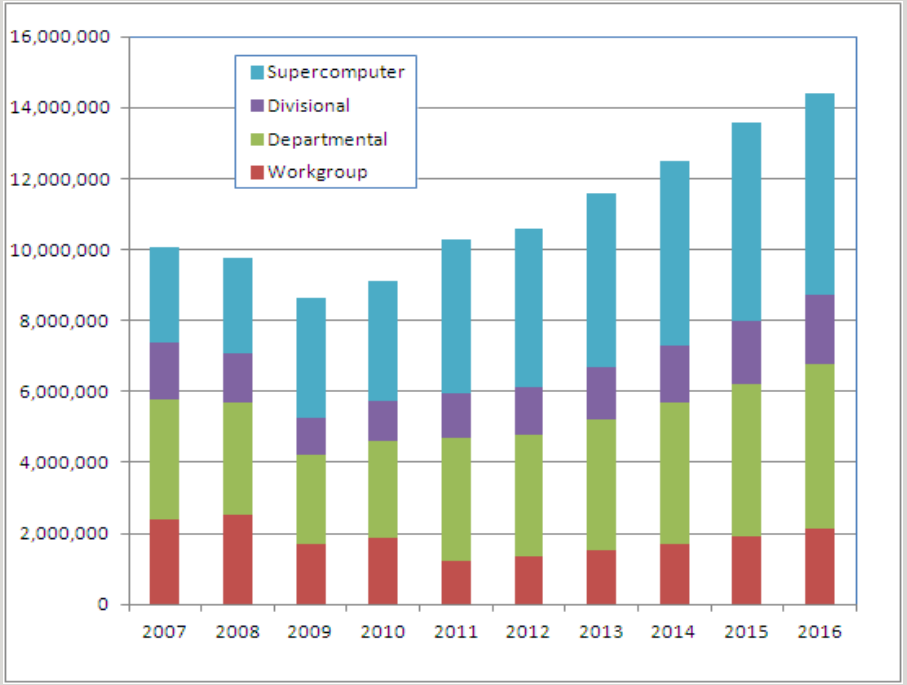
Trends in volume HPC market

FUJITSU

Volume HPC business is over 50% of market.

Now the fastest growing segment.

HPC Revenue $billion



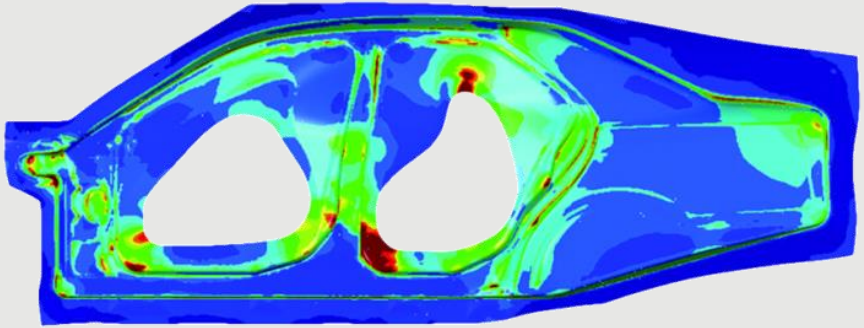
Source: IDC, 2013

Productivity gap

FUJITSU

High performance computing in digital manufacturing

Only 8% of manufacturers with under 100 employees are using HPC.



Small manufacturers need lower cost, lower risk, and more expertise.

Source: Intersect360 Research

Observations from case studies

- Simple to use from desktop
- Reuse of standardised methods
- Service/appliance view of application+server
- Network transparency
- Scalable processes
- Model setup

Mid-Market doesn't only need performance

FUJITSU

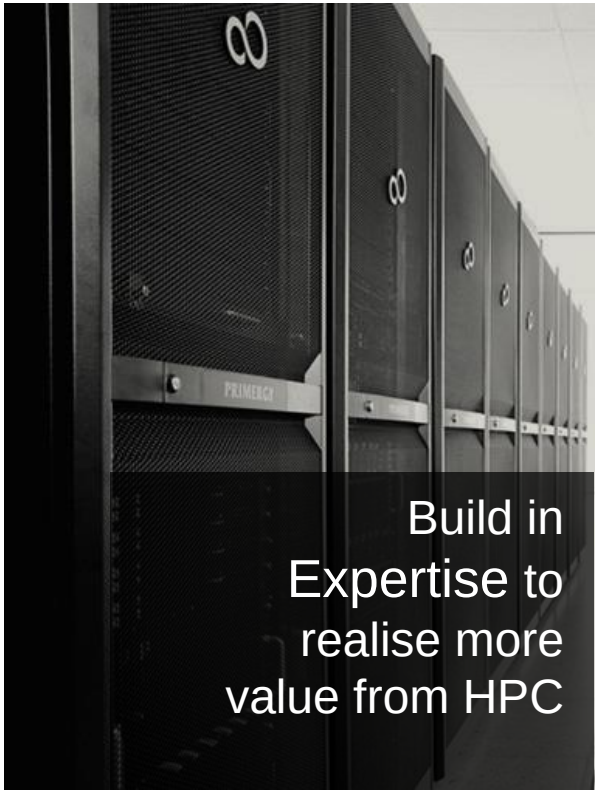
Barriers to HPC expansion (Rank out of 20)
Lack of knowledge, staff (2)
Ease of use issues (3)
Programming with hybrid environments (7)

Key server selection criteria (Rank out of 20)
Fit with existing servers and applications (2)
Ease of use (3)
Application integration and use (6)

" More attention will be paid to the software stack "

" Seek evidence of technical benefits for users simulation workload "

Fujitsu’s solution



Simplicity: HPC Gateway web desktop

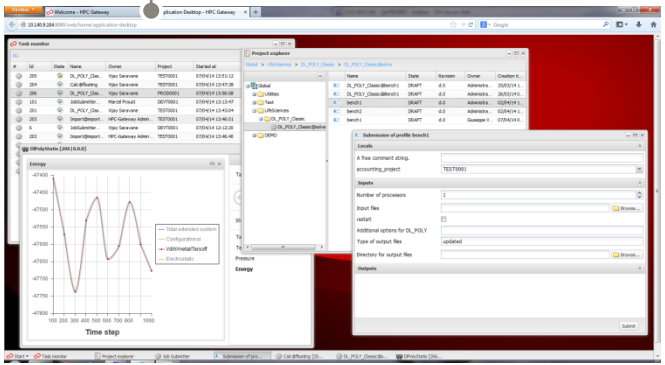
FUJITSU

Structure and encode automated processes as transferable methods

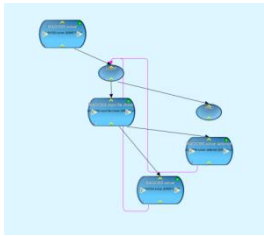
Deploy best practice and expert processes to non-experts and new users

Simplified HPC usage, optimised project throughput

HPC Gateway web desktop



HPC Server



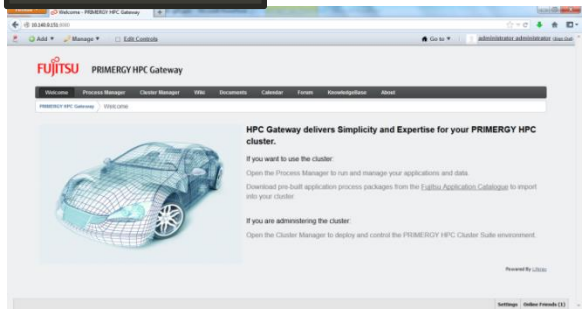
Expertise: Gateway Application Catalogue

Download pre-built packages from Fujitsu Application Catalogue site

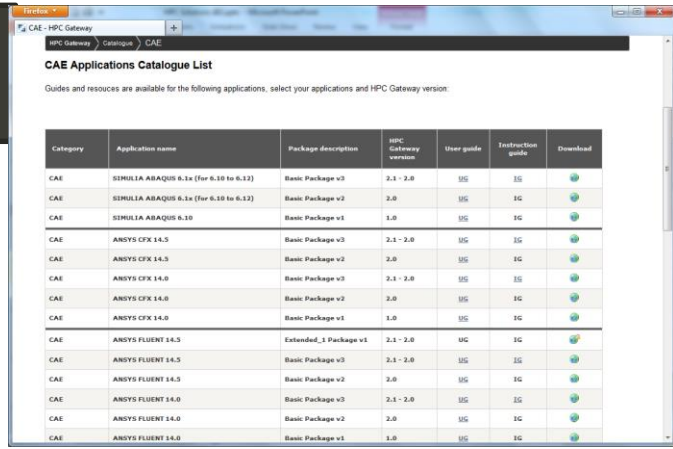
Import robust and best-practice expertise into local HPC Gateway system

Incorporate relevant and productive HPC methods into business project workflow

User site



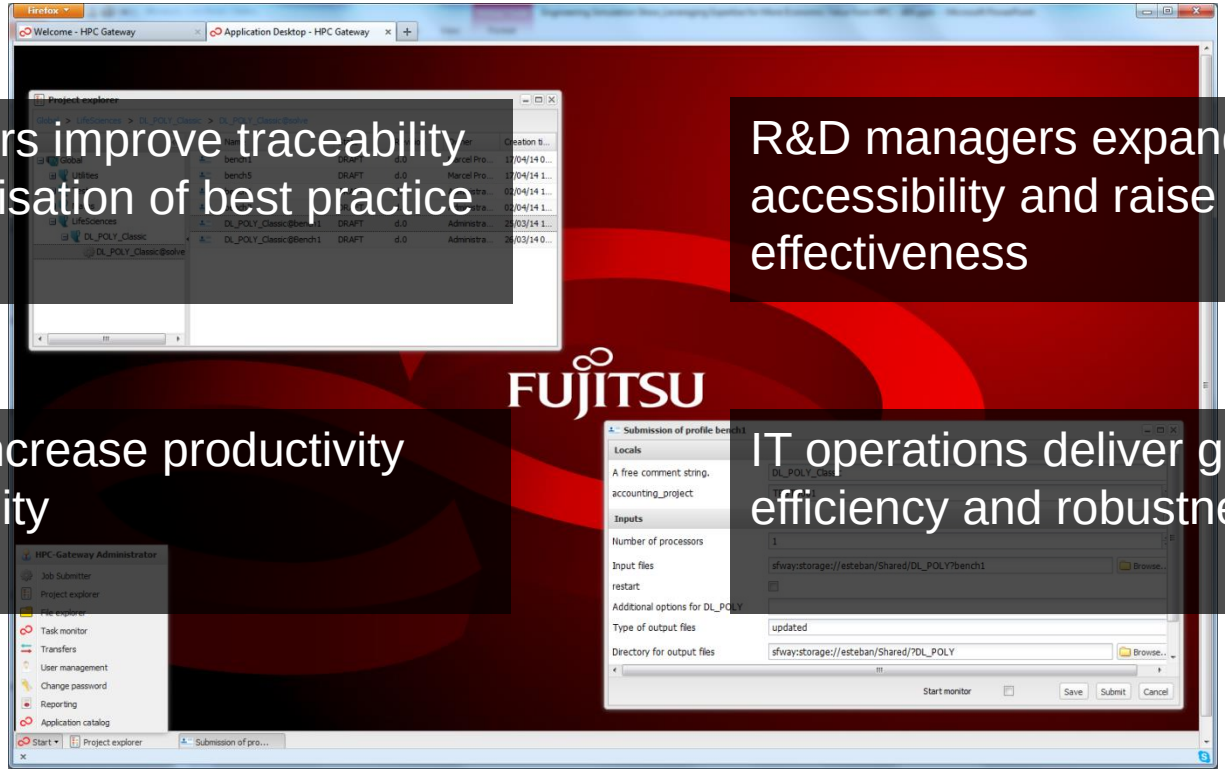
Fujitsu site



Intuitive and integrated HPC access

FUJITSU

Consolidated web desktop – secure, robust and extendable



Expert users improve traceability and formalisation of best practice

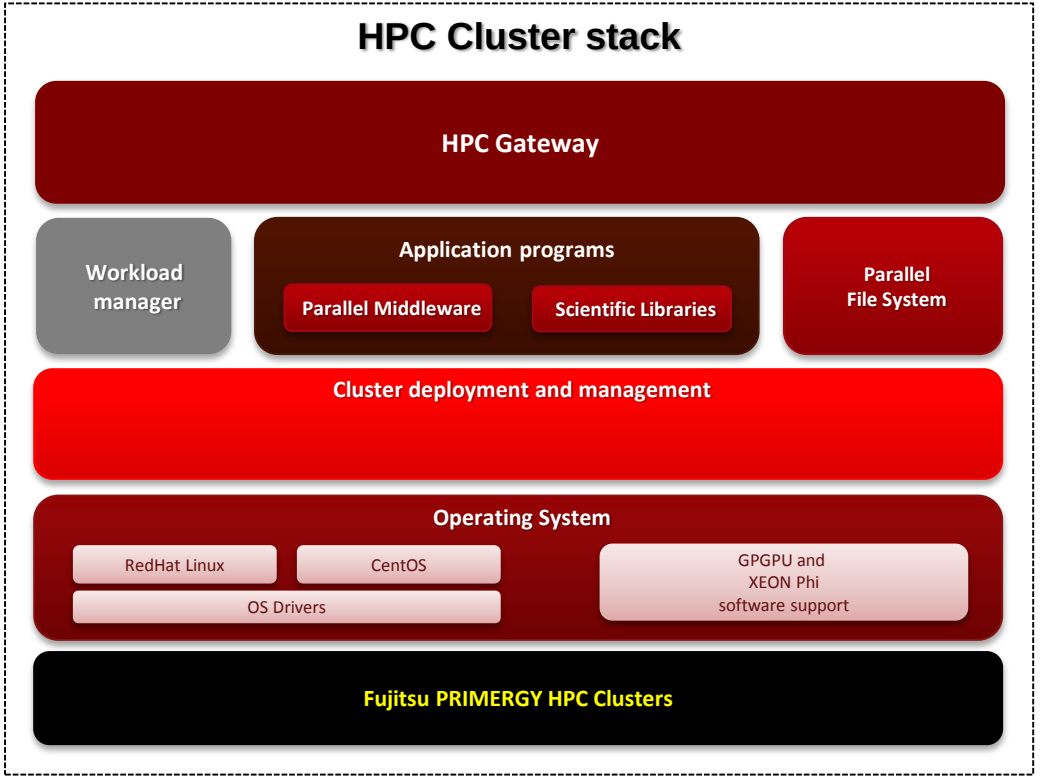
R&D managers expand HPC accessibility and raise team effectiveness

All users increase productivity and reliability

IT operations deliver greater efficiency and robustness

Fujitsu PRIMERGY HPC Cluster Stack

- Comprehensive software stack for managing Fujitsu PRIMERGY HPC clusters
  - Easy-to-use cluster management
  - Popular workload managers
  - General HPC Open Source Software
  - Highly scalable parallel file system
  - Graphical end-user interface
- Alliance with leading ISVs
- Fully validated HPC solution
- HPC Gateway basics
  - Simplifies the usage of HPC applications for end-users
  - Enables sharing of expertise and results between team members
  - Can be used from remote locations
- Interface to HCS
  - File explorer for user and system disk areas
  - Job control through workload manager
  - Service view of applications



Value Dimensions

FUJITSU

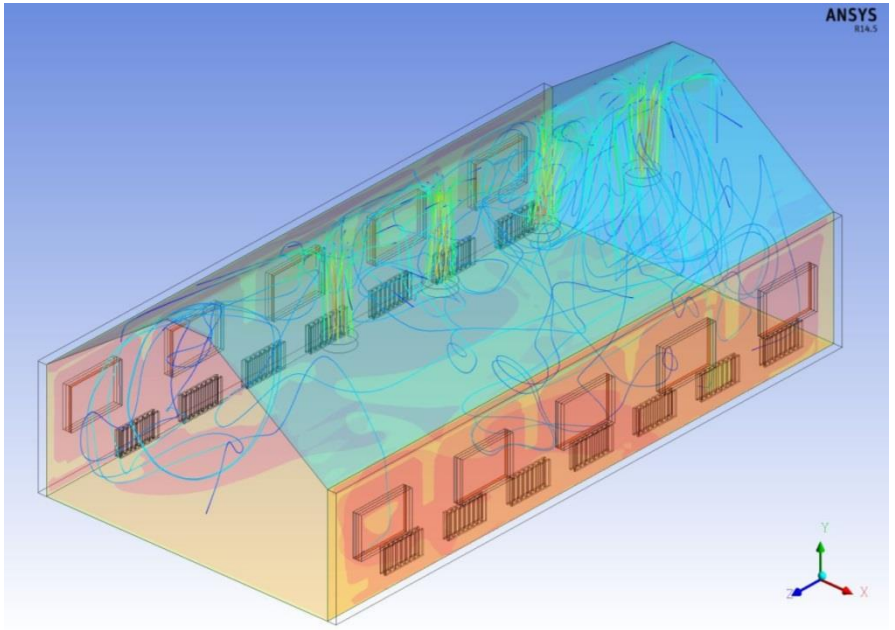
Simplicity	Expertise
Ease application use	Application integration
Wider HPC access	Business relevance
No entry hurdle	Operational robustness
Productivity maximised	Workload effectiveness

Industrialise HPC application **methods** for individual and team**.**

Solution Development – Built Environment

Addresses the challenges for different organisations in the Contruction Industry today. It is designed to fit workloads that extend the use of simulation, with outcomes that directly help the customers business. The solution makes HPC more accessible and usable, and is assembled from an optimal combination of hardware and software components.

Workload	A production model representing the HVAC workloads for different types of customer was solved on a Fujitsu HPC PRIMERGY Cluster to find the optimal combinations of node count, processor type and interconnect.
Model setup	Geometry based on a large meeting room or office floorplan. Radiators and fans are placed within the building, and a variable external load was applied.
Mesh	Cells: 7,897,612 Nodes: 9,679,421
Physics	Transient simulation with explicit time stepping for 12 hours. Full solar load model.



Built Environment organisations

Architect, Bureau

- Small to medium businesses, mostly local
- Graphical design workstations, potentially no HPC data centre
- Contracted to constructors, local/state government

Constructor

- Large organizations, potentially multinational
- HPC can be distributed among departments
- Constructing offices, stadia, airports, stations, retail

Business drivers

Organisation	Independent architect bureaux	Large construction firms
Challenges	Shorten time prior to submitting construction project. Prove your model is better than competitors. Authorities require simulation throughout the design chain.	Increase reliability of the building design, robustness under all conditions. Increased building safety: fire/smoke containment, reduce insurance risk. Tighter and more wide-ranging certification parameters.
Desired outcomes	Prove engineering feasibility of the design through simulation. Reduce costs in the design through parametric analysis. Produce more complete design report, including post-processed animation.	Enable practical what-if and DOE analysis – e.g. 1000 jobs (3 parameters x 10 positions) – in few hours rather than several weeks. Detect and resolve failures or sub-standard performance through finer detail and robust design. Optimise efficiency of the environment – HVAC noise, natural ventilation, energy costs

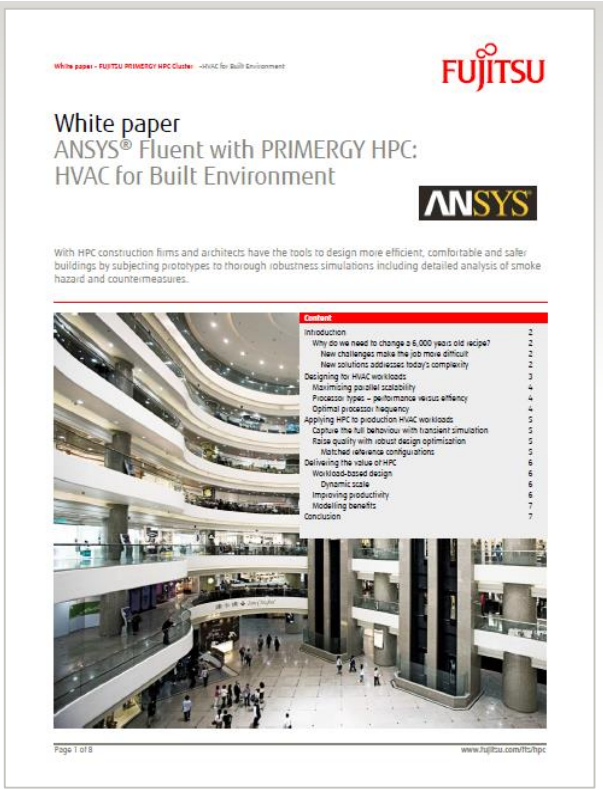
Sector-tuned solution

Components selected for optimal price-performance matched to real models and sector workload

Productive user environment combining best practice integration of desktop and web toolsets

Standardized methods and simplified experience to help even new HPC users to run large simulation workloads

Factory-installation and downloadable business components for fast-start application usage and lifecycle efficiency



White paper - FUJITSU PRIMERGY HPC Cluster - HVAC for Built Environment

FUJITSU

White paper
ANSYS® Fluent with PRIMERGY HPC:
HVAC for Built Environment

ANSYS

With HPC construction firms and architects have the tools to design more efficient, comfortable and safer buildings by subjecting prototypes to thorough robustness simulations including detailed analysis of smoke hazard and countermeasures.

Content

Introduction 2
Why do we need to change a 6,000 years old recipe? 2
New challenges make the job more difficult 2
New solutions addressed today's complexity 2
Designing for HVAC workloads 3
Maximizing parallel scalability 4
Processor types – performance versus efficiency 4
Optimal processor frequency 4
Applying HPC to production HVAC workloads 5
Capture the full behaviour with transient simulation 5
Raise quality with robust design optimization 5
Matched reference configurations 5
Delivering the value of HPC 6
Workload-based design 6
Dynamic scale 6
Improving productivity 6
Modelling benefits 7
Conclusion 7

Page 1 of 8

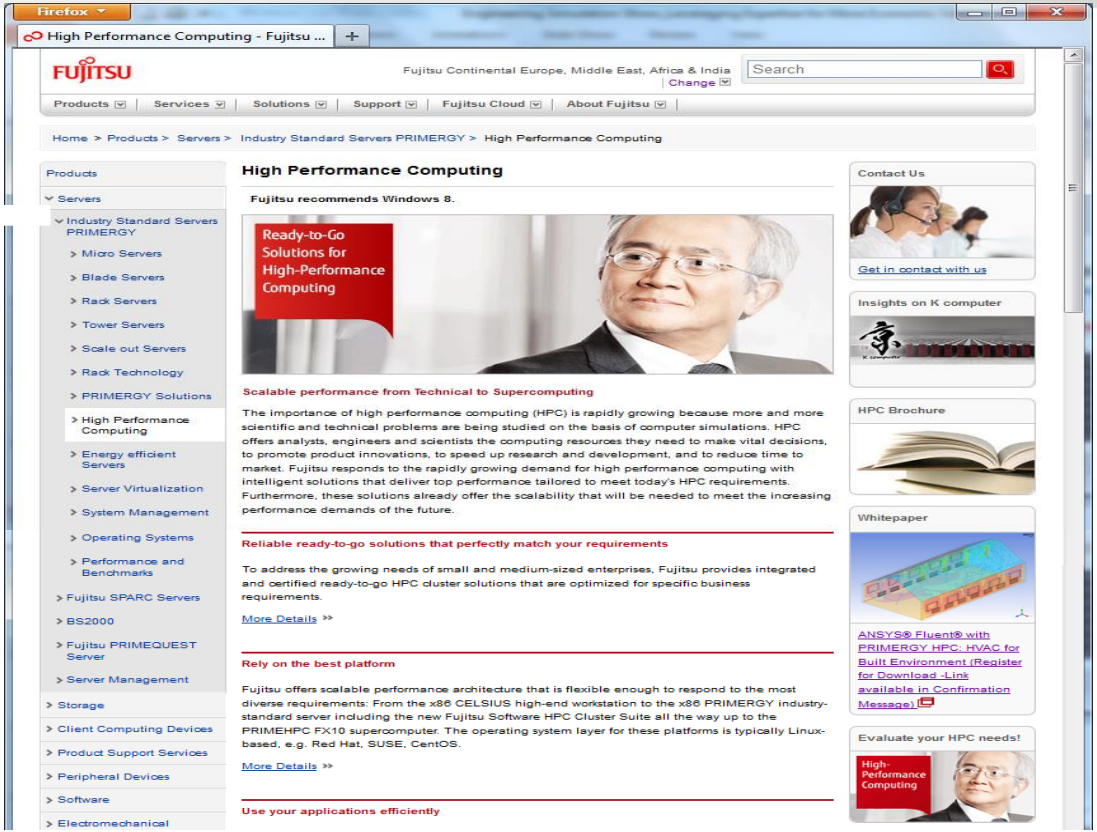
www.fujitsu.com/ftc/hpc

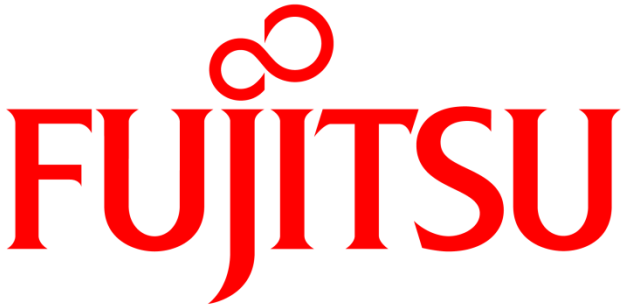
Summary

FUJITSU

Strong SME ambition exists	■ Recognize the gains, though approaching cautiously ■ Looking for new service capabilities to enhance their value proposition
Many factors involved in SME engagement with HPC	■ Greater or lesser modeling expertise, at least when scale increases ■ Often limited IT/HPC process expertise
Solution combines applications with accessibility	■ Ease of everything – lower risk ■ Industrialised expertise – systematic deployment, standardised methods

Where to try this





shaping tomorrow with you