Fujitsu’s Server Business Strategy

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Tatsuo Tomita
Corporate Senior Vice President
President, System Products Group
Fujitsu Limited
1. Business Environment

2. Market Trends and Current Status of Fujitsu’s Server-Related Business

3. Platform Business Strategy

4. Recap
1. Business Environment
Faster Pace of Change in Social Environment

Corporate Accounting / Investor Protection
Sarbanes Oxley (SOX), Japan’s version of SOX (J-SOX), etc.

Business Continuity
BC (Business Continuity), DR (Disaster Recovery), etc.

Security
Personal Information Protection Law, ISMS/ISO-27001, Uniform governmental standards, etc.

Environmental Protection / Regulation
Basic Environment Law, Law on Promoting Green Purchasing, etc.

Corporations face higher levels of social responsibility
Environmental Issues: Green IT Initiatives

Rising Need for Green IT
- IT equipment accounts for 5% of Japan’s total power consumption
- 6-fold increase by 2025
- 12-fold increase by 2050

Also: Public/Private Initiatives in the US
- EPA* Report
  * U.S. Environmental Protection Agency
- Green Grid
- Recommended standardizations for procurement

Rising importance of green IT initiatives
Fujitsu’s Mission

Change in Social Environment
- Security / Social responsibility
- Environmental issues (Green IT)

Technological Advances
- Virtualization (free from physical constraints)
- NGN (eliminate concept of distance)

Using latest technologies to provide IT solutions for customers

Growth and profitability
Contribution to society
From centralized to decentralized, and now: to integrated (data centers)

- Increased corporate social responsibility in IT systems

**Market Trend: Mission-Critical Systems**

- Mainframe era
  - Centralized (1970-80's)
- Open Servers / PCs
  - Decentralized (1990's)
- Integrated / Data center (hereafter)

- Centralized host
- Client Server
- WEB services, SaaS/PaaS

- Higher expectations for higher server reliability
  - Multi-core
  - Virtualization technology
- Definite growth in market for mission-critical open-standard servers: CAGR 7%
Growth in market for Data Center-related services

**Japanese Market**

- ISO: Information System Outsourcing (includes customer owned data centers)
- AM: Application Management (includes customer owned data centers)
- HIS: Hosting Infrastructure Service (hosting services from vendor data centers)

**Global Market**

Source: IDC
Fujitsu’s Global Expansion of Data Centers

- Aggressive expansion of outsourcing business (currently 80 locations in 16 countries)
- Sharing know-how of each location, peer-to-peer roll out (operational framework, etc.)

Recent global outsourcing deals:
- UK HM Revenue & Customs: 230 bn yen (10 yrs)
- Reuters: 130 bn yen (10 yrs)
- Allianz: 65 bn yen (5 yrs)
- Australia: Yarra Valley Water: 1.8 bn yen (7 yrs)
Fujitsu’s Server Market Share

- **Fujitsu Group’s Market Share**
  - **Japan**: 20% 2nd (2006)
  - **Global**: 5% 5th (2006)

**Server market share (2006)**

- **Japan**:
  - Total: 674.1 bn yen
  - IBM: 20%
  - NEC: 17%
  - HP: 18%
  - Hitachi: 10%
  - Other: 15%
  - Fujitsu: 20%
  - Total: 674.1 bn yen

- **Global**:
  - Total: $51B
  - IBM: 33%
  - HP: 27%
  - Sun: 11%
  - DELL: 10%
  - Other: 14%
  - Fujitsu: 5%
  - Total: $51B

Source: IDC Japan, Japan Server Quarterly Model Analysis, Q2 2007
*Including Fujitsu Siemens Computers*

Source: IDC Worldwide Server Quarterly Tracker, Q2 2007
Status of Fujitsu’s Server Business

- Growth of server-related products after bottoming-out in FY05
- Maintaining profitability even while proportion of open-standard systems rises

Server-Related Product Sales and Income

- Sales (left axis)
- Operating income (right axis)

Sales Composition (by server type)

- Mainframe
- UNIX servers
- IA servers

(Forecast)
3. Platform Business Strategy
Fujitsu’s Platforms Strategy

- Provide Mission-Critical Systems
  - High reliability, high quality, high performance, advanced technology

- Data Center (services platform) Optimization
  - Virtualization, green initiatives, integration

- Optimization of Customers’ IT Infrastructure
  - TRIOLE
    - overall optimization throughout entire lifecycle
    - “industrialization” of IT infrastructure installation
Providing Mission-Critical Systems

Advanced Technology
- High-performance processor / ASIC
- Advanced semiconductor technology
- Autonomic/virtualization technology

Mainframes
- Mainframe technology heritage maintained only by Fujitsu and IBM
  (Overall system robustness)

Quality Control

Servers, storage systems, networks, middleware

Comprehensive offering of mission-critical systems
Case Studies in Providing Mission-Critical Systems

- **Shiga Bank, Japan** (Scheduled start of system: Jan ’08)
  - New System (online banking/back office processing) built with Mainframe and PRIMEQUEST
  - System platform for use over next 10 years
  - Back-up / recovery without interrupting operation (ETERNUS SF)

New online banking system
- **mainframe**
  - GS21 500

New back office processing system
- **PRIMEQUEST 580**
  - **Powercenter**
    - clustering
  - **Oracle 10g**
    - clustering
  - **ETERNUS 8000**
    - mirroring
Anthony Marano (US fresh produce distributor)

- Built real-time inventory management system with high-reliability PRI MEQUEST
- Superior reliability with SAN boot, system mirroring and partition functions
- High-reliability hardware obviates need for clustering, reducing operational costs
Case Studies in Providing Mission-Critical Systems

Kawasaki Heavy Industries, Ltd.

- High-reliability system built with SPARC Enterprise to meet growing demands in production
- High reliability through redundancy of key modules inside chassis
- Reduced operational load through combination of integrated storage and integrated back-up

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High-reliability system built with SPARC Enterprise to meet growing demands in production.

High reliability through redundancy of key modules inside chassis.

Reduced operational load through combination of integrated storage and integrated back-up.
Case Studies in Providing Mission-Critical Systems

**SHI NSEGAE Information & Communication Co. LTD** (Korean online shopping mall)

- High-availability system to support 24/7 online shopping system
- Solaris used for its wealth of applications and high-level security
- Partitioning functions enable flexible system scalability

*RAC: Real Application Clusters*
Optimization of each component

Develop holistic architecture, optimizing across the platform

Middleware

OS

VM (virtualization layer)

servers
storage
network

data center facility

low power / cooling

design / verification

installation / operation
Optimization for Data Centers: Virtualization Technology

- Separation of application layer and physical layer
  - Operation with independent life cycles
    - Enables applications and infrastructure to grow independently

- Effective use of IT resources
  - Enables operational flexibility, high availability, minimizing power and space

* ITIL: IT Infrastructure Library

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**Application layer**

**IT infrastructure**

**network pool**

**storage pool**

**server pool**

**virtualization resources**

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Operation/maintenance using ITIL*
Optimization for Data Centers: Blade Servers

- Use of low power consumption technology
  - Low-power CPU
  - Semiconductor disk (SSD) also planned

- Suitable for variety of settings
  - 100V power supply (planned)
  - Compatibility with high-performance server blades (current equipment)

Reduces power consumption by approx. 3.6 kW/chassis.
Reduces electricity costs by approx. 1.9 million yen across 5 yrs.
Initiatives to conserve power and space

- Reduced power consumption enabled by disk to disk back-ups using MAID\(^1\) technology
- 1-chip RAID controller
  - 60% reduction in # of parts
  - 40% reduction in power
  - Lower failure rate
- Compact footprint
  - 50% reduction in space
  - 30% reduction in weight

Security

- Enables disk encryption within storage system
  (uses highly-secure 128bit AES\(^2\) method)

\(^1\) MAID: Massive Arrays of Inactive Disks (Power up/down of HDDs linked with back-up operations)
\(^2\) AES: Advanced Encryption Standard (Next-generation encryption standard of US government)
**ITIL-based operation with Systemwalker**

- Enables clarification and visualization of task status
- Enables unified management of system configuration components
- Enables visualization of relationships and dependencies between “tasks” and “configuration components”

**New configuration of operational tasks with Systemwalker**

**Formalization and visualization with 5 processes of ITIL**

- Incident Management
- Problem Management
- Configuration Management
- Release Management
- Repair Management

**Unified management of configuration components**

<table>
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<th>CMDB (Configuration management DB)</th>
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<td>Incident</td>
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Refer to the diagram for a visual representation of the processes and configurations.
**IT Infrastructure Optimization: Revolution of System Proposals**

- Overall optimization throughout entire life cycle through shared vision of the future
- Clarifies position of immediate initiatives and future steps to consider

### 6 optimization levels

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**Target**

- **0**: Execution through front-line decision
- **1**: Manage through rules for each server
- **2**: Deploy back-up server
- **3**: Reduce time needed for back-ups
- **4**: Back-ups w/out stopping work
- **5**: Disaster preparedness/countermeasures

### Approx. 9,000 discussions extracted

- Server consolidation
- File server consolidation
- Network optimization
- **Back-up management**
- Security management

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Linking “industrialization” of infrastructure installations and operational services

SE task process

SDEM (development standards)

Making visible approx. 400 work steps / processes

Improvement cycle

Fujitsu FSAS

SE task process

SDEM (development standards)

Making visible approx. 400 work steps / processes

Improvement cycle

Fujitsu FSAS

IT Infrastructure Optimization: use of Infrastructure SE Facilities

Linking “industrialization” of infrastructure installations and operational services

SE task process

SDEM (development standards)

Making visible approx. 400 work steps / processes

Improvement cycle

Fujitsu FSAS

IT Infrastructure Optimization: use of Infrastructure SE Facilities
Fujitsu’s offerings for Mainframe/UNIX*/x86/IPF markets

**Japan Market**
Average growth rate('06-'10): **-2.3%**

**Global Market**
Average growth rate('06-'10): **+2.5%**

*RISC-based

Source: IDC Japan, Japan Quarterly Server Forecast CY2007Q2
Mainframes (GS21)

- Delivers ultra-high reliability for large-scale social infrastructure systems, protection of/ respect for customer assets
  - New company to be established (November 07) for long-term support of GS software
- Integrating with open systems using SOA gateway for mainframe (Service-Oriented Architecture)
- Global market expansion through joint development/manufacturing collaboration with Sun
- Brings Fujitsu’s expertise for high performance and reliability into the largest UNIX market, Solaris
- Introduces leading edge processors to the market with strengths of Fujitsu semiconductors

UNIX (SPARC Enterprise)

- Global market expansion through joint development/manufacturing collaboration with Sun
- Brings Fujitsu’s expertise for high performance and reliability into the largest UNIX market, Solaris
- Introduces leading edge processors to the market with strengths of Fujitsu semiconductors
Mission-Critical IA Server

- Provides mainframe reliability in an open-standard platform
  - Employs 64bit Intel Itanium2
  - Linux/Windows standard distribution
- Data center optimization
  - Flexible partitioning
  - Handles scale out, scale up of operations
- Max. 5 million-gate LSI
- Ultra-high-speed system bus developed by Fujitsu MTL*
- Dual Sync. System Architecture

* Mori/ Muta Transceiver Logic
Server Product Strategy: PRIMERGY

- By pursuing synergies with PCs, expand volume and reduce costs
  - Raise market presence with unified ad/PR campaign
  - Leverage PC infrastructure (SCM, China-based production, vendor quality management) to achieve cost reductions

- Unify marketing and development organization for blade servers
  - A project team directly reporting to the president of Fujitsu Limited
  - Enhance products based on market needs

- Differentiate with green technology
  - Provide low-power blades
  - Compact, low-noise operation

- Accelerate globalization
  - Start BTO* in N. America
  - Unified development with FSC

*Build To Order

Blade Server Business Project
- Establishment of strong products:
  - create value for customer throughout lifecycle
  - create unified system (TRIOLE Blade Server)
- Full-fledged expansion into global market

Use feedback on market needs to improve products

President
Managing Directors' Meeting

Product line Business Units
Product line Business Units

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PRI MERGY TX120 Compact Server

- Smallest footprint in its class
  - 1/4\(^{th}\) size of previous model (TX150 S5)
- World’s lowest power consumption levels
  - First tower model to reach below 200W: uses only 175W
- World’s quietest operation
  - Uses heat-pipe cooling method
  - Operates at 32db (equivalent to whispering)
Product Road Map

<table>
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<tr>
<th>Year</th>
<th>GS21</th>
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<th>C8 (Next-generation CPU)</th>
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Global Servers (Mainframes)

SPARC Enterprise (UNIX Servers)

PRI MEQUEST (Mission-critical IA servers)

PRI MERGY (Windows/Linux servers)

ETERNUS (Storage)

- GS21
- GS21 500/900 (x1.5 Performance)
- C8 (Next-generation CPU)
- Montecito
- Montvale
- Xen (virtualization)
- Dual Core
- Quad Core
- ETERNUS 4000/8000
- ETERNUS 2000
- ETERNUS 2000
- FC 8G I/F
- SAS 6G I/F

※ This road map is subject to change
Cycles of innovation using advanced simulation and product evaluation technologies

Design Cycle
- Circuit design
- Chassis design
- Simulation
- Design feedback
- Evaluation prototype
- Performance evaluation
- Transmission evaluation
- Cooling evaluation

Simulation
- Design of return current countermeasures by large-scale electro-magnetic field analysis
- Heat design through thermo-fluid analysis

Theoretical Analysis of Variance
- Troubleshooting (noise wave analysis)
- Off-line quality control (Taguchi method)

Analysis / Measurement
- Noise wave formation measurement (print board)
- Heat distribution in casing, temperature measurement
- Return current noise measurement (digital oscilloscope)
- Board internal temperature measurement (infra-red camera)
- Wind measurement (laser velocity meter)

Shape optimization through quality engineering
QCD improvement through introduction of Toyota Production System (since FY ’04)

- Improvement at FJIT in server production (’04 - ’06)
  Production lead-time: -47%  Processing cost: -43%  Line stop rate: -24%
- Small UNIX server production line improvement

Reduction in total lead-time (planning development / production) (since FY ’06)

- Make Product Planning process visible
- Thorough implementation of DFM / DFT*
- Handling of back-end component procurement, reduction of delivery time

* DFM: Design For Manufacturing
DFT: Design For Testability

Example of results:
Through DFM, reduction in number of/types of parts
- Part types for system board -48%
- Units used in PT board DIP parts -84%

Before

Reduced space by 12,800㎡
Target: -12,000 ㎡

After
Commitment to frontlines, products, and reality (outlined below)

- Frontlines: Bring engineers closer to customers
- Products: Rely on strength of own engineers
- Reality: Fully ascertain cause of malfunction, respond quickly
Environmental Initiatives

High evaluation in environmental indexes
Included in Dow Jones Sustainability Index, FTSE4 Good Global Index

- Provide super green products, which have industry-leading features
- Reduce power consumption: leading-edge semiconductors, high-efficiency amplifiers
- Comply with and laws and regulations of each country, such as EU RoHS regulations
- Office environment
  - the “team minus 6%” initiative of Japan (to reduce CO₂ emissions)
Providing platforms optimized for data centers

IT infrastructure optimization initiatives

Strong products for the global market
Synergies Between Services and Platforms

- Provide strong platforms for strong services

Overall effect magnified by 4x

![Diagram showing relationships between services and platforms]
Fujitsu seeks to be a trusted partner to its customers, by maximizing its comprehensive resources to provide IT solutions to support the management of its customers’ businesses.
THE POSSIBILITIES ARE INFINITE
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• Fujitsu’s ability to dispose of non-core businesses and related assets through strategic alliances and sales on commercially reasonable terms, and the effect of realization of losses which may result from such transactions;
• uncertainty as to Fujitsu’s access to, or protection for, certain intellectual property rights;
• uncertainty as to the performance of Fujitsu’s strategic business partners;
• declines in the market prices of Japanese and foreign equity securities held by Fujitsu which could cause Fujitsu to recognize significant losses in the value of its holdings and require Fujitsu to make significant additional contributions to its pension funds in order to make up shortfalls in minimum reserve requirements resulting from such declines;
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