Fujitsu Secure Server Container

Data Center OPTIMIZATION SERVICES

Professional & Integration Services
Services Business Group
Fujitsu Technology Solutions
Agenda

1. Current data center facility issues
2. Fujitsu’s approach to solving these issues
Many enterprises rely on data centers to provide housing and operations of IT to support business growth.

Data center operators faced with many challenges to support the dramatic growth in IT:

- **Age** of the facility
- **Cost** of the facility
- **Available space**
- **Power and cooling**
- **IT Power/Density**
1. Age... It doesn‘t get better!

- Organizations experiencing rapid IT growth but data centers typically lag behind in investment

- Average age of a data center is 9 years *(IDC)*

- 70%+ of data centers in Germany more than 7 years old *(competitor study)*

- >75% of our customers are experiencing major challenges. Their IT growth continues to explode and they're trying to run all of this in data centers that are up to 20 years old *(competitor)*

“Data centers older than 7 years are obsolete.” *(Gartner)*
1. Age... over time it shows!

Older data centers are not designed to meet requirements of IT (power/cooling issues)

“Overall, modular servers — including both blades and density optimized machines — accounted for 20% of the server nodes shipped in the region for each of the past four quarters. This shows that demand for compact, ever more powerful computing solutions is rock solid, but also puts EMEA datacenter facilities increasingly under pressure to deliver unparalleled power density on a per-rack and per-square-meter basis.“

(Giorgio Nebuloni, IDC EMEA, June 2012)

Older data centers are a source of high cost (power/cooling/spatial layout/operations)

New data centers, designed well, can provide 400% capacity growth in 60% less space (Gartner 2011)
2. Cost... data centers don‘t come cheap!

- Cost cutting projects are the norm in most companies – and many areas of cost reduction have been exhausted

- Data Centers are an obvious target for companies looking to reduce costs
  - Long-term and somewhat static investments – often needing to last 10 to 20 years for good ROI – many CFOs focus on the upfront capital costs when looking at a new data center proposal
  - IBM estimates that the data center facilities operating costs are 3 to 5 times the capital costs over a 20-year period

- Drives companies to extend the life of existing DCs
  - Control costs through efficient power/cooling/spatial etc.

- Drives companies to plan new DC investments differently
  - **Build modular and container DCs**
  - Blended sourcing models (match to IT and strategy requirements)
  - Consolidation (cheaper location, eliminate old DCs, reduce operational costs)
  - Use colaction and outsource options
3. Space... It's finite!

- 36 percent of large companies expect to exhaust IT capacity within the next 18 months (May 2011, Uptime Institute)

- Data centers typically require 24 months from planning to implementation – *container data centers can be introduced in a couple of months!*

- x86 servers are running at 12% utilization, racks are populated to 50% to 60% capacity, floor space is "spread out“ to disperse the heat load - it becomes clear that an efficiently designed and implemented data center can yield significant improvements in these compute ratios (*Gartner*)

- Trend to Mega Data Centers and DC consolidation leads 2015 to fewer DC locations in North America, EMEA and Japan, but number of DCs increasing in Asia Pacific and Latin America (*Gartner*)

  - In 2015, most DCs are placed in EMEA (39%)
  - Number of Computer Rooms are shrinking, shift towards larger Data Centers
4. Power/Cooling

- Climate change is becoming a board room issue – driven by legislation, public awareness, championed by media and pressure groups

- Data centers consume 30 to 80 times more energy per square meter than traditional office space. (Gartner)

- Energy consumption will be the most dominant trend in data centers during the next five years (Gartner)

- 33% of clients surveyed in 2010 selected energy issues as one of their top challenges in data centers (after data growth, systems and network performance) (Gartner)

- The Environmental Information Agency predicts that energy costs will continue to rise by 10% to 25% in the next few years, so data centers and the energy they consume should be a primary area of concern for CFOs

- Government environmental regulations and increased public scrutiny have put energy cost management squarely in the hands of the finance department (competitor)

- Many data centers are running out of available power!
Fujitsu’s approach to solving these issues
Fujitsu Data Center OPTIMIZATION Services

**APPRAOCH**

- **Data Center OPTIMIZATION**
  - Inspection
  - Certification
  - Simulation and Modeling
  - Planning & Implementation

**ACTIVITIES**

- Consulting services to assess efficiency:
  - Power/cooling/airflow
  - IT Networks
  - Security and anti-theft
  - Fire/smoke protection
  - Room/Spatial

- Implementation Services
  - Facility Modernization
  - New builds (Plan/Design/Implement)
    - Modular - rack, container, rooms
  - IT relocation
A complete range of services...

... ensure the right solution based on your individual requirements

- Usage goals current & future
- Site location
- IT technologies & availability
- Facility availability levels (Tier)
- Sustainability goals
- Communications
- Security

- Detailed Planning & Costing
  - Architecture
  - Civil Works
  - Electrical Engineering
  - Air Conditioning/Ventilation
  - Safety and Security Systems
  - Energy Efficiency Consultancy

- Complete Project Management
  - Subcontractor and supplier management
  - Quantity Survey
  - Quality Control
  - Checking of Documentation
  - Management of Certification processes

- Training of staff
  - Process documentation
  - IT relocation
  - In-place testing
  - Maintenance schedules and agreements
  - Hand-over
Why Modular Data Center Containers?

- **Overcome cost obstacles**
  - Minimized **CAPEX** due to smaller size – add as you grow to keep costs in-line with demand
  - Potential for leasing – avoid upfront budgetary hurdles, maximise cash-flow

- **Maximize time-to-market opportunities**
  - Typically require no building planning permission
  - Are significantly faster to implement than other data centers
  - Enable use of latest technologies per container (and re-fit as necessary)
  - Can be portable (can be re-deployed)
  - Can be used as additional capacity solutions or long-term strategy alike
  - Can be extended in modules

- **Provide the same standards as „normal“ data centers**
  - Tier level certification to match security and performance standards
  - Can be designed with state-of-the-art power/cooling in-line with corporate sustainability and cost goals
Fujitsu Secure Server Container (SSC)

- Flexible, individual solutions, designed specifically for your data center needs
- Top-quality container design with a very high degree of organizational convenience (a state-of-the-art data center)
- Maximum insulation values
- Almost limitless options
- Transportable, reusable, investment protection
- Racks with integrated cooling
- Many rack types can be supported (regardless of manufacturer)

All the features of a “normal” data center... with no restrictions!
SSC Materials/Insulation (example)

- Non-ventilated flat roof (warm roof)
- 180 mm rigid foam insulating boards made of polystyrene, EPS 040 DAA 100 kPA, class B1 building materials according to DIN 4102
- 19 mm wooden composite board, V313 E1/P5, glued to be watertight and placed between steel frames
- Supporting structure consisting of rolled and hollow sections as well as cross members according to static calculation
- Mineral wool insulation as per thermal insulation specification (European class A1 building materials according to DIN EN 13501-1)
- Thermal bridges of the supporting steel structure are eliminated by the external insulation
- Options
  - Burglary resistance, Bulletproofing, Extended insulation, Special dimensions, further openings
SSC Example Deployment 2
SSC Example Deployment 3
SSC Electrical engineering

- Designed typically for TÜV (Technical Control Board) Level 3 or according to Tier III (Tier II also available)
  - Separate power backup container, mobile, reusable.
  - Separate tank container (necessary according to the Water Resources Law [WHG])
  - Separate technology container for UPS, power distribution and fire fighting technology
  - Power rails for a safe and future-oriented supply.
  - All normal connectors can be used on a modular basis; also 32 and 63 A.
  - Maintenance during ongoing operation
SSC - Power supply (example)

Performance data:

- 14 Racks * 15 kW = 210 kW, approx. 235 kVA

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<thead>
<tr>
<th>Component</th>
<th>Description</th>
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<td>NSHV Container DC</td>
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<tr>
<td>HUV UPS A</td>
<td>Bypass onsite UPS</td>
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<tr>
<td>HUV UPS B</td>
<td>3 x 160 kVA</td>
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<td>UPS B 1-3</td>
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<td>Power rail A</td>
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<td>Power rail B</td>
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<td>Hardware</td>
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Feed cable
Normal electrical network onsite

Feed cable UPS onsite

Bypass onsite UPS

500 kVA 400 kW
**SSC - Power Backup System**

**Parameters: PBS**
- **Power rating:** 500 kVA / 400 kW
- **Control:** *Operation in parallel with a network*
- **Startup time:** < 15 s
- **Consumption:** approx. 120 l./h at full load

**Container dimensions: Tank**
- **Length:** approx. 3 m
- **Width:** 2.45 m
- **Height:** 2.45 m
- **Weight:** > 2.4 t
- **Volume:** 10,000 l.

**Container dimensions: PBS**
- **Length:** 9 m
- **Width:** 2.50 m
- **Height:** 2.50 m
- **Weight:** > 10 t
**Compact**
The UPS system is very compact (700mm x 830mm at the bottom). Thanks to the ventilation from the front and well arranged access options for maintenance it is possible to install the UPS along the wall in order to use the existing space more efficiently.

**Profitability**
Due to the outstanding efficiency level of 96% your energy bill will be several thousand euros lower. This efficiency level has been tested by an external, independent institute, the Technical Control Board (TÜV).

**Environment**
The hitherto unique efficiency level of this UPS system enables heat production to be reduced (plus the appropriate air conditioning) and thus lower energy consumption for the cooling. The use of batteries and therefore of lead is optimized thanks to the great flexibility of the DC bus and better control when it comes to charging batteries (Expert Battery System).

**Performance**
Specially designed to be able to supply the latest generation with an inductive or capacitive power factor of 0.9 without reducing the effective power. That means 12% more effective power in comparison with a conventional UPS system.

**Quality of supply**
Thanks to a precise output voltage, also in the case of nonlinear loads. Classification VFI SS 111 (online double conversion).

**Easy to integrate into your low voltage network**
The power drawn from the UPS system is - on account of the rectifier with a high power factor above 0.99 - low and has a very small proportion of harmonic distortion (THDI above<3%). These loads prevent any disturbance to and oversizing of your upstream network.

**Integrated maintenance bypass**
Serial interface 1xRS485 with JBUS protocol for a modem connection

**Contact interface – 2 potential-free inputs**
(incl. emergency stop ESD), 4 outputs 2A/250V + temperature transducer

**2 x 160 kVA in parallel + redundancy**
SSC Power distribution system (example)

- Standards with superior advantages
  - No fire load due to the rail system
  - Flexibility as regards configuration
  - High level of security, high degree of availability
  - Type testing (type-tested switchgear combination)
  - Routing, overhead
SSC Cooling (example)

- TÜV (Technical Control Board) Level 3 or according to Tier III
- Chillers with moving free-cooling, 3 x 120 kW
- Side cooler integrated in the rack
- Maximum efficiency
- Consideration of noise emission and health (key words: biocides, legionella, dry coolers).
- Redundant piping
- Ventilation system with a heat exchanger and air humidity tracking
Performance data:

- Refrigerating machines, each with 120 kW, incl. free-cooling
- Redundant cold water network
- Reduction in operating costs thanks to rack-based cooling
- Ventilation system with a heat exchanger and air humidity tracking

SSC Air-conditioning / Ventilation (example)
SSC Example Equipment Racks
SSC Fire alarm & extinguishing options (example)

- Single-zone extinguishing system NOVEC 1230 (4 bottles)
- LB server room version 3:
  - approx. 107 m³, DEE 600 cm² at 300 N/m²
  - (approx. 35 cm x 40 cm)
- System according to VdS 2381
- Design concentration according to VdS 2381, IT class A risk
- Fire detection according to VdS 2095 Appendix C
- Interface according to VdS 2496
- Early fire detection for the server room
- Inspection switch for safe inspection and maintenance
- 1 hand release switch
SSC Burglar alarm options (example)

- Monitoring of containers 1 - 6
- 3 protected zones (DC + technology + supply)
- VdS class B as the basis

Protected zone 1 = Data center and outer room
   5 dual detectors incl. long range detectors
   All doors are monitored for Open and Locked

Protected zone 2 = Technology 1 and Technology 2
   4 dual detectors
   All doors are monitored for Open and Locked

Protected zone 3 = PBS and tank
   Monitoring of doors for Open/Locked
SSC Further security options

- Access control, video surveillance
  - Fault alarm technology
  - Cabling of all fault reports to a central point (LSA-Plus distributor VKA)
  - Remote management system with 60 potential-free inputs
  - 8 temperature sensors
  - 5 combined sensors
  - Option: Contact doubling
SSC References

- St. Bonifatius-Hospital, Lingen, Germany
- General Association of the German Insurance Industry, Hamburg, Germany
- Federal Republic of Germany, Finanzagentur GmbH, Frankfurt, Germany
- BJB, Arnsberg, Germany
Summary

Fujitsu offers Data Center OPTIMIZATION SERVICES to enable our clients to realize efficient and sustainable data center facilities.

Our specialists offer consulting and solutions based on clients’ individual requirements.

Within our services we offer flexible and high performance fit-to-purpose Fujitsu Secure Server Container solutions.

Our highly specialized team is ready to assist you in achieving your goals!
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each call 14 ct/min; the prices for calls made from mobile devices are limited to 42 ct/min
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