Artificial Intelligence in Data Centers

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Recap from last year

• Sensor-DCIM Integration for cooling management
• Cloud Services with Machine Learning
Artificial Intelligence

• AI Milestones
  • Chess
  • Jeopardy
  • Go
• Future
  • Fast learning Complex interactions
What kinds of problems can AI help with?

Making Predictions

• Events that are effected from many variables
• Non linear relationships
What kinds of problems can AI help with?

Learning from Data

- Feed data to learn relationships
- Anomaly detection
What is not likely in short term?

Fully automated Data Centers
What is not likely in short term?

Robots taking over Data Centers
What do you need to use AI?

Collect lots of data

- Sensors
- Integration with other systems
What do you need to use AI?

How AI Works

- Analytical Models
- Machine Learning

Better Decision Making

Validation

Feedback
What do you need to use AI?
Compute and storage

Parallel Computing
Impact of AI in Data Centers

Compute and storage

**CPU Based Architecture**
- Tens of Cores
- Separate Memory Bus
- Local Memory
- System Memory
- Storage
- Network

**GPU Based Architecture**
- Thousands of Cores
- Integrated Memory Bus
- Local Memory
- System Memory
- Storage
- Network
Impact of AI in Data Centers

Power Trends

Rack Power Density

AFCOM State of Data Center Survey
Impact on AI in Data Centers

Power Trends

• Specialized Compute Units increase power density by **2x**!
  – Typical Blade Server: 10U, 16 Blades, 5kW
  – AI Box: 10U, 16 GPU’s, 10kW
Impact on AI in Data Centers

AI Server Load Guidelines

- Non-Uniform Power distributions
  - Managing hot spots will be harder
  - Better Data Center Management Tools
Impact on AI in Data Centers

AI Server Load Guidelines

• Data Center upgrades in the horizon
  – DC power distribution may need to be upgraded sooner
  – Review DC Cooling strategies
How can DC Professionals Use AI?

Overview

• Next Year
  – Data Center Infrastructure Management (DCIM)

• 1-3 Years
  – Computational Fluid Dynamics (CFD)
  – Building Information Management Software (BIM)
How can DC Professionals Use AI?

Example 1: Optimization

Rack/Server Placement
- Power System Optimization
- Cable optimization
- Cooling
- Fire Suppression
How can DC Professionals Use AI?

Example 2: Prediction

- Predicting Equipment Failures
- Predicting network usage
How can DC Professionals Use AI?

Example 3: Troubleshooting

Data Center Troubleshooting - Understanding DC outages
How can DC Professionals Use AI?

Guidance

• Consider below for DCIM solutions
  – Equipment failure prediction
  – Anomaly detection
  – Predictive thermal services
  – Power management
How does AI affect ICT Job Market?

Current Trends

Growing and Declining Occupations for Data Centers
WEF 2018 Annual Meeting of New Champions

- Software Engineer
- Data Analyst
- Electrical Technician
- Mechanical Technician
How does AI affect ICT Job Market?

Guidance

• Learning Mindset
  – It’s not about changing profession once
  – Lifelong learning

• Learn AI Skills
Questions?