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

- Al Milestones
 - Chess
 - Jeopardy
 - Go
- Future
 - Fast learning Complex interactions



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What kinds of problems can AI help with? Making Predictions

- Events that are effected many variables 20
- 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

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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







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What do you need to use AI? Compute and storage



Parallel Computing

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Impact of AI in Data Centers Compute and storage



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CPU Based Architecture

GPU Based Architecture



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Thousands of Cores

Integrated Memory Bus

S L O W E R

Impact of AI in Data Centers Power Trends

Rack Power Density



■ 1-3kW ■ 4-6kW ■ 7-10kW ■ >10kW ■ Don't Know

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

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Impact on AI in Data Centers Al 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



ANSI/BICSI 003-2014

Bies

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

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How can DC Professionals Use Al Example 2: Prediction

Data Center Operations - Predicting Equipment Failures

- Predicting network usage

BICSI 009 Data Center Operations





How can DC Professionals Use AI? **Example 3: Troubleshooting**

Data Center Troubleshooting outages



- Understanding DC



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 1.2 1 Change Index 0.8 0.6 0.4 0.2 0 -0.2 Data Analist Electrical Technican
Mechanical Technition Software Engineer



How does AI affect ICT Job Market?

Guidance

- Learning Mindset
 - Its not about changing profession once
 - Lifelong learning
- Learn AI Skills

Questions?

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