Data Center Infrastructure Management (DCIM)

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Agenda

- The Evolution of DCIM
- Users’ Perspectives
- Management Methodology by Delta DCIM
The Evolution of DCIM
What is DCIM

DCIM is software for Data Center Infrastructure Management.

“Data center infrastructure management (DCIM) tools monitor, measure, track and sometimes control data center resources and energy consumption of both IT-related equipment and facilities‘ infrastructure components.”
To integrate both of the infrastructure and IT devices

Manage the resources to optimize your datacenter

Automation, modeling and prevention
Optimizing Datacenter Operation

Measurement
- Operation Manager
  - Power
    • UPS/ PDC/ PDU/ ATS
    • Generator
    • Power Meter
  - Cooling
    • Row-Cool/ Room Cool
    • Chiller
    • Pump/ Cooling Tower
  - Environment
    • Temperature/ Humidity
    • Leakage/ Smoking/ Fire
    • Motion/ Door Contact
  - Security
    • IP Cam/ NVR
    • Door Access
  - IT Device
    • Server BMC
    • Network Switch/ Router

Analytics
- Energy
  - PUE/ EUI
  - Electricity Cost
  - Energy Analysis
- Capacity
  - Analysis
  - Prediction
- Asset
  - Modeling
  - Operation
  - Search
  - Connectivity
  - Failure Impact Analysis

Plan
- Work Order
  - Template
  - Schedule/ Event Trigger
  - Statistics and History

Action
- Asset Inspection
  - On-site audit app
  - Download plan
  - Executing
  - Inspection log review
  - Statistics
Users’ Perspective
Management teams in Datacenter

**IT Manager**
- Where is my server physical located?
- Is there any underutilized servers that I can consolidate?
- Where do I place the next server?
- How will the new servers impact existing circuit and datacenter?
- Does the existing cooling and power have the capacity to accommodate new IT equipment?

**Facility Manager**
- Where and how can I address the hotspot in the datacenter?
- What’s the PUE in the datacenter?
- What do I have in the datacenter and where are they located?
- The CRAC is having an alarm, What is the problem? What do I do now?
- How can I automate the process when there is a fire in datacenter?
- 1 of the rack has exceeded the power capacity. What should I do?

**C-Level Management**
- What’s the operation cost of the datacenter?
- How do I reduce the datacenter operational cost?
- When will the datacenter running out of power and cooling capacity?
- How efficient is the datacenter?
- When will I need to build another datacenter?
Empower every member of your datacenter team

- Overall Layout of your datacenter
- Overall Environment mapping or profile of your datacenter
- All Equipment Status
- Chiller Plant Status and profile
- Power Diagram
- Alarm notification, reporting
Empower every member of your datacenter team

IT Management

- Access control and surveillance
- Asset Management
- Capacity of Rack, DC level for U space, weight, Power and Network
- Multiple site management
- Alarm notification, reporting, schedule, etc.
Empower every member of your datacenter team

- Real time and historical PUE
- Electricity Cost and billing
- Overall Capacity utilization
- Work order progress and approval process
- Alarm notification, reporting
Management Methodology by Delta DCIM

You cannot manage it without measurement
Equipment Monitoring

Be Organizational for

Equipment monitoring
Role-based management
Monitoring privilege
Control privilege
Notification

Performance reply
Show the result

Metrics integration
Decision management

Departmental organization
Hierarchical management
Energy Management

Formula, Statistics

Data Collection, Integration, Transfer, Store

Energy Classification
- Illumination
- Cooling
- Office
- IT Rack

Energy Type
- Oil
- Electricity
- Gas
- Water

Bicsi
Building PUE model

Use measurable (controllable) parameters to construct a model to predict PUE

Given

Setpoints:
- Ventilation fan
- Chilled water temperature
- IT power consumption
...

Predict PUE

1. Total server IT load [kW]
2. Total Campus Core Network Room (CCNR) IT load [kW]
3. Total number of process water pumps (PWP) running
4. Mean PWP variable frequency drive (VFD) speed [%]
5. Total number of condenser water pumps (CWP) running
6. Mean CWP variable frequency drive (VFD) speed [%]
7. Total number of cooling towers running
8. Mean cooling tower leaving water temperature (LWT) setpoint [F]
9. Total number of chillers running
10. Total number of drycoolers running
...
Power Management

**Single line diagram**

Show the SLD with power meter, breaker and component status

**Power Equipment Monitoring**

UPS, ATS, Genset, PDC, PDU, ...

The device can be identified quickly from the layout plans

**Power connectivity**

Failure impact analysis
Cooling Management

Cooling Loss Monitoring
IT power consumption v.s. Cooling capacity

Identify the hot-spot
Rack load map
Thermal map

Airflow & Cooling Performance
RCI (Rack Cooling Index)
RTI (Return Temperature Index)

<table>
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<th>Rating</th>
<th>RCI</th>
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<tbody>
<tr>
<td>Ideal</td>
<td>100%</td>
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<tr>
<td>Good</td>
<td>≥ 96%</td>
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<td>Acceptable</td>
<td>91 ~ 95%</td>
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<tr>
<td>Poor</td>
<td>≤ 90%</td>
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</table>

<table>
<thead>
<tr>
<th>Rating</th>
<th>RTI</th>
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</thead>
<tbody>
<tr>
<td>Target</td>
<td>100%</td>
</tr>
<tr>
<td>Recirculation</td>
<td>&gt; 100%</td>
</tr>
<tr>
<td>Bypass</td>
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</table>
Security Management

Door Access Integration

Card reader, access controller integration
Door status detection
Event log for door and ID information

Surveillance

Full time/ scheduling recording
Event trigger recording
Playback based on time and event
Rack Management

Rack Asset

Quickly search for server, network and power equipment
Display detail rack content
Power path backtracking
Network connectivity

Rack Capacity

Utilization of u-space, power, weight, network for room and rack
Rule-based prediction for new asset plan
Commit to workorder
**Process Management**

**Workorder**

- Scheduling for maintenance plan, onsite inspection
- Event trigger for alarm elimination, prevention
- Problem report, record and execution platform

**Asset Inspection**

- Reduce the asset inspection time
- Follow the planned instructions by using the app
Best-in-Class Service

Design for Flexibility

Delicate Software Team

Professional Support & After Sales Service
Delta InfraSuite Manager – EMS3000

EMS3000 Module

- Energy
- SlideShow
- Asset
- Capacity
- Work Order
- Asset Inspection

Our Customer

(Manufacture, telecom, education, government, financial, hospital, entertainment, energy, traffic, enterprise, ...)

Hundreds sites installed experience
Mission Critical Infrastructure Solutions (MCIS)

The power behind competitiveness