Cisco Digital Ceiling & Asset/Energy Mgmt
Deeper Dive & Panel session

John Baekelmans
CTO
June 9, 2016
Agenda

- **Digital Ceiling - Deep Dive** – 15 mins
  John Baekelmans - Cisco

- **Cisco Energy Management** – 15 mins
  Michel Van Heiningen - Cisco

- **Panel Discussion & Q&A with Ecosystem & GTM partners** – 60 Mins
  Onno Willemse – Philips
  Lee Funnell – Siemon
  Jeroen Van Meel – Axians
  Jake Butterbaugh - Cisco
Workplace Trends and Customer Insights

**Trends**

- **Costs of Real Estate and Occupancy Utilisation**
  - Real estate is the 3rd largest corporate expense after salaries and COGS
  - Commercial buildings consume 23% of all global electricity (~60% HVAC, 15% lighting)

- **Increasing Push for Sustainable Energy Efficient Workspace**
  - Huge savings potential from intelligent control systems
  - Massive transition to Smart LED lighting underway, driven by consistent 12% YoY price reduction in LED's, and green building codes and energy regulatory requirements (e.g. California Title 24)

- **Transition to Flexible Workspace/Hot Desking Office Environments**

**Customer Insights**

- **Typical Workstations are Unoccupied 60% of the Day**
- **25% of Meetings are “no-shows”**
- **40% of Employees Spend > 30 Min of Everyday Trying to Block Meeting Rooms**

Source: Expert interviews; Herman Miller Living Office
Do You Have an Real Estate Strategy Covering:

• Increasing Real Estate costs?
• Energy Management Compliance?
• Next Generation Workforce Expectations?
What Is a Digital Ceiling?
Digital Ceiling: Solution Features and Deployment Options
## Digital Ceiling Framework: Enabling Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. IOS: CoAP Protocol Support</td>
<td>CoAP Within IOS with Stacking Support as per RFC 7252: Cisco Switch as a CoAP End Point, Resource Discovery, Core-link-format, DTLS Support</td>
<td>Standards based IOT Protocol for Communication</td>
</tr>
<tr>
<td>2. EIoT Information Model</td>
<td>Information Schema, Encoding Format Based on RFC 7461, SenML, Cisco EIoT Extensions</td>
<td>Common Information Model for Vendor Interoperability</td>
</tr>
<tr>
<td>3. Perpetual POE</td>
<td>Uninterrupted POE Power to PD During Warm Reboot</td>
<td>Maintains PoE Power to Lighting During Switch Reboot (Software Upgrades)</td>
</tr>
<tr>
<td>4. Fast POE Power to Port After Switch ON</td>
<td>POE Power to Ports Under 30 Seconds After Power Restoration</td>
<td>Fast Lighting Restoration After Power Outage</td>
</tr>
<tr>
<td>5. 2 Event Classification</td>
<td>Discover POE Powered Devices (Partner Lights and Wall Switches) Power Requirements Without LLDP Based on Physical Layer Negotiation</td>
<td>Enables Faster Endpoint Power Up</td>
</tr>
</tbody>
</table>
Enabling Network Platforms

3560CX Compact Switch

- Fanless Design with Flexible Mounting Options
- 240W Power Budget for PoE+
- Option to Run Instant Access with Optional 10G Uplink Ports
- Industry First to Support Perpetual POE
- 2-event PoE Classification Support
- Fast PoE Support
- Ideal for In-ceiling Applications/Distributed Deployment Model

3850UPOE Switch Family

- Flagship UPOE Switch With and Dual 1.1KW Power Supplies
- Converged Wired and Wireless Access
- Stack Power Support
- Foundation for Open Network Environment (SDN and Cisco One)
- Perpetual PoE Support
- 2-event Classification Support
- Fast PoE Support
Possible Deployment Scenarios

- **Centralized High Density**
  - Energy Management
  - Smart Spaces
  - Lighting Control
  - Building Management

- **Decentralized Low Density**
  - Energy Management
  - Smart Spaces
  - Lighting Control
  - Building Management

- **Hybrid/Tiered**
  - Energy Management
  - Smart Spaces
  - Lighting Control
  - Building Management

**Compact Switches in the Ceiling**

**Zone Controller**
# Security Models

<table>
<thead>
<tr>
<th>Security Feature</th>
<th>Gold</th>
<th>Silver</th>
<th>Bronze</th>
</tr>
</thead>
<tbody>
<tr>
<td>Separate Lighting VLAN</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Access Control Lists (ACLs)</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Default Route to Null 0</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>IPv6 First-hop Security</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>IGMP/MLD Snooping, Storm Control, STP Security, Dynamic ARP Inspection, DHCP Snooping, IP Source/Destination Guard</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Port Security</td>
<td>NO</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>Dot1x MAB, EAP-MD5, PEAP, EAP-TLS</td>
<td>YES</td>
<td>YES (MAB)</td>
<td>NO</td>
</tr>
<tr>
<td>NDAC</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>MACSEC</td>
<td>YES</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>SGT</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Profiling (ISE)</td>
<td>YES</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>Communications Protocol Security (EW, COAP)</td>
<td>YES</td>
<td>YES</td>
<td></td>
</tr>
<tr>
<td>AAA at Device and Application</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>HTTPS&lt; SSH, SNMPv3</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>Firewall</td>
<td>YES</td>
<td>YES</td>
<td>YES</td>
</tr>
</tbody>
</table>

**Gold**
- Highly Secure
- SAFE 2.0 Compliant
- TrustSec Architecture
- Encrypted Communication Protocol
- Endpoints Profiled in ISE
- Suitable for Campus Network Requiring High Security

**Silver**
- Encrypted Communication Protocol
- Partial TrustSec Architecture
- Endpoints Not Profiled and Identity based on MAB
- Suitable for Customers Extending Existing Campus Network for Lighting

**Bronze (Day 0 Approach)**
- Unencrypted Communication Protocol
- Non TrustSec Architecture
- Non Dot1x
- Suitable for Trusted Networks Where There is a Low Security Risk
Building Codes Are Changing to Embrace the Digital Ceiling

- Low Voltage is Safer
- Facilitates Adds, Moves, Changes Without Turning Circuit Power Off
- Simplifies Integration with Applications and Other Building Systems Maximize Energy Savings
Regulatory Compliance for Network-powered Lighting

- UL-2108 Specifically Allows PoE as a class 2 Input Power Source for Low Voltage LED Lighting Systems
- A UL System Listing Has Been Created for Cisco, Cabling, and Fixture Products: IFDR/7 1 Model - Low Voltage System Consisting of UL/C-UL Listed 60950 PoE Switches and UL/C-UL Listed UL 2108 Low Voltage Luminaires. UL File: File E477344

TCO
Digital Ceiling – Network Powered Lighting
Lower TCO Advantage

Key Factors Driving Lower TCO for UPOE-LED
- Lower Installation Costs
- Incremental Energy Savings
- Lighting Fixtures on the Network will Continue to Evolve to Add New Features and Capabilities

TCO Expected to Improve
- LED Price/Performance Increase 20% per year
- LED Luminosity Efficiency Will Continue to Improve

*US NYC customer, 35K Sq Ft space
Where are we going ?
Common Phases of IoT Journey

Phase 1
IP Convergence of Building Infrastructure

Phase 2
Smart Services with Analytics
- Smart HVAC
- Smart Lighting
- IoT – enabled Smart Control and Applications

Phase 3
Digital Workplace
- Smart Space
- Smart Meeting
- Building systems
- IT System
- Workspace Zone

Common Phases of IoT Journey
Summary
Digital Transformation Must be Part of Your Overall Real Estate Strategy

- The Workforce is Changing and Real Estate is Evolving to Accommodate
- Digital Transformation is Essential in the Workplace of the Future
- The Cisco Digital Ceiling Solution Set will Play a Major Role in the Digital Workplace
Digital Ceiling Summary

- Lower TCO; Reduced Material/Labor, Quicker Install
- Enables Facility Flexibility, Analytics and Metrics
- Improved Employee Experience and Productivity:
  - Intelligent and Granular Lighting Controls
  - Granular Daylight Harvesting, Individual Workspace Control
  - Human-Centric Lighting: Control Temp Based on Many Factors
  - Embedded RGB Colors for Room Status, Beaconing, Pathway Guidance
- Enable Future Value - Leverage GE “Big-Pipe” Connectivity for Fixture-based Dense Sensor Network for Applications Beyond Lighting: Motion, CO2, BLTE, LiFi, etc.

Essential in Next-gen Workspace Experiences
Robust, Scalable and Lower TCO Through IP Convergence
Enables Future IoT Applications
Cisco Energy Management
Enable your Smart Building Journey
Customer Needs
How to get Most Out of Your High-Value Assets

- Asset Identification, Tracking, Location
- Asset Utilization, Manage by Exception
- Physical Security, Theft Prevention, Detection
- Energy Baselining & Optimization
- Improve Business Productivity
What is Cisco Asset & Energy Management?

- Asset Visibility/Utilization
- Power/Environmental Efficiency
- Physical Access, Security
- Business Productivity
- Operations Stability

• Measure and manage all connected assets across multiple and unique environments.
• Drive Cost Savings and Better Business Outcomes.
Top 5 Hurdles for Digital Transformation

1. Upfront-investment (39%)
2. Management support (23%)
3. Security (25%)
4. Availability of end-to-end solutions (23%)
5. Skill-gap (19%)
Common Phases of IoT - enabled Smart Control and Applications

Phase 1
Energy Management of IP connected office equipment

Phase 2
Smart Services with Analytics

Smart HVAC
Smart Lighting
IoT – enabled Smart Control and Applications

Phase 3
Digital Workplace

Smart Space
Smart Meeting

Building systems
IT System
Workspace Zone

Energy Management

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Cisco Energy Management Differentiation and Benefits

Ease of Deployment

- No Software Agents
  - No Costly Revision Management
- No Hardware Meters
- No Network Changes
  - No Costly Downtime

Cisco Powered Network Embedded

Multi Vendor: Any Network Connected Device

- Any Vendor, Any Device
  - Highly Saleable & Secure
  - Multi-vendor
  - 50+ Protocols supported
  - Simple support expansion

- IoT, Facilities
  - Integrated with key BMS
  - Agile: easily customize to Manufacturing and other IoT use-cases

Large European Automobile Manufacturer
100,000+ Assets Managed and Deployed in 2 Days

20 - 35%
Savings in distributed office environments

100%
Visibility over all physical and virtual devices in your Data Center

<6 Months
Return on investment

SaaS
Per device subscription, pay as you use
All Networked Devices and Systems
Supporting Multivendor Environments

Campus
- Microsoft
- Cisco
- Siemens
- Lenovo
- IBM
- HP
- Dell
- VMware
- Intel
- Mainframes
- Blade Servers
- VoIP Phones
- Laptops
- Desktops
- Access Points
- Thin Clients
- Printers
- Routers
- Switches
- Core Switches
- Virtualized Servers
- Storage
- UPSs
- PDUs
- CPUs
- Servers

Facilities (BMS Partners)
- HVAC
- Lighting
- CRAC
- Video Cameras
- Access Control Systems
- Gateways

Data Center
- Honeywell
- Johnson Controls
- Schneider Electric
- Siemens
- HID
- Delta
- TRIPP-LITE
- APC
- Jacarta
- WTI
- FieldServer
- Microchip
- Echelon
- Tivoli
- Software

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## Flexible Policy Architecture

<table>
<thead>
<tr>
<th>Time-Based</th>
<th>Event Based</th>
<th>Location Based</th>
<th>Data Center</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td><img src="image2.png" alt="Image" /></td>
<td><img src="image3.png" alt="Image" /></td>
<td><img src="image4.png" alt="Image" /></td>
</tr>
</tbody>
</table>

### Example
- Power management of devices: VoIP phones, PCs, printer servers, etc. based on work patterns

### Example
- Response to external triggers: Respond to energy events with policies
- Systems management: Integration with systems management tools and user-authentication events

### Example
- Smartphone location coupled with badge management app
- Access control triggers office environment to power on

### Example
- Data center infrastructure management
- Capacity management of power and device lifecycle in data centers
- Ties physical to logical environment
Asset Management ‘Building’ Blocks

- Energy Management
- Digital Ceiling
- Environment Monitoring
  Temperature, humidity, carbon monoxide, illumination
- Refrigeration
- Building Management System Integration
- Digital Video – Physical Security
- Asset Tracking
- Custom IoT Use Cases
Network Infrastructure
Cisco Switches
- CoAP, PoE, PoE+, UPOE
- Security with ISE
- Converge disparate networks (HVAC, metering, lighting) into one IP network
Cisco’s OpenBerlin

External Data
- Weather
- News

Local Sensing
- Motors
- Light Sensor
- Temperature

Business Data
- BMS / ERP
- SFDC / SAP

External 3rd Party
- WAGO / BACNET
- Nest / Hue
- Bosch
- API’s

Asset & Energy Management platform

Reporting, Analytics, Full Building Behavior Service Correlation

www.cisco.com/web/solutions/trends/innovationcenters/openberlin
Use Cases
Elevator’s Digital Transformation

“Superior Passage Experience”

The enabled elevator

Smart Products
Connected over the Internet of Things (IoT)

Sensor Technology

Electronic Controller
Connect the unconnected using environmental sensors like temperature, pressure, power, fuel level, IP cameras, etc. Location technologies such as RFID and GPS. Support for many other sensors.
## Solution Capabilities

### Cisco Asset Management

<table>
<thead>
<tr>
<th>Remote Unmanned Utilities</th>
<th>Smart Cities and Buildings</th>
<th>Manufacturing and Automotive</th>
<th>Transportation and Logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Environmental Sensors</td>
<td>- IT Assets</td>
<td>- Capital Assets</td>
<td>- Real-time Asset Location</td>
</tr>
<tr>
<td>- Energy Sensors</td>
<td>- RFID Assets</td>
<td>- Supply Chain Integration</td>
<td>- Asset Utilization</td>
</tr>
<tr>
<td>- Integration with IP Cameras</td>
<td>- WiFi Assets</td>
<td>- SCADA Integration</td>
<td>- Optimization and Efficiency</td>
</tr>
<tr>
<td>- Safety &amp; Theft Detection</td>
<td>- CIP Integration</td>
<td>- High Speed Machine Data</td>
<td>- Cargo Condition</td>
</tr>
</tbody>
</table>

- Historian, Reporting, Dashboards, and KPIs
- Real Time Location on Indoor & Outdoor Maps
- Historical Data Logging and Anomaly Detection
- Asset Identification, Utilization, and Optimization
- Thresholds, Notifications, and Control