Open. Together.
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Building resiliency through a collaborative ecosystem

Steven Carlini, VP, Innovation and Data Center
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Our simplified view of this architecture

**CENTRALIZED**
Massive compute and storage located in remote areas

**REGIONAL EDGE**
Large compute and storage located in central or urban areas

**LOCAL EDGE**
Compute and storage where data is generated and consumed
Availability implications from the viewpoint of the edge

If my focus is the availability of only the centralized data center...

**Centralized data center** (tier 3)

- Tier 3 Availability = 99.98%
- Downtime = 1.6 hours/year

But, if I take the viewpoint of the customers and employees at the retail store...

**Local edge data center** (tier 1)

- Availability system = Availability\_Centralized Data Center \times Availability\_Edge Data Center

  - Centralized Data Center Availability = 99.98%
  - Edge Data Center Availability = 99.67%
  - Availability = 99.98% \times 99.67% = 99.65%
  - Downtime = 30.7 hours/year

White Paper 256 “Why Cloud Computing is Requiring us to Rethink Resiliency at the Edge”
The industry needs improvement in 3 key areas to make the edge resilient

1. An integrated ecosystem
2. Management tools
3. Analytics & AI to augment staff
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A collaborative ecosystem addresses unique edge challenges

Edge Challenges

Many sites

Lack of onsite staff

Customer

Physical infrastructure vendors

Systems integrators

IT equipment manufacturers

Managed service providers
“Open-access” is critical…

- Edge ecosystems require open systems
- Open-access
- Partner access to data and outputs to leverage in management tools
Fully integrated modular/micro data center

- Remote administration & real time monitoring, management & control
- Security access & CCTV
- Environmental monitoring (temperature, humidity, smoke, water)
- Cables/cable management
- Rack power distribution
- Rack power distribution
- UPS
- Storage
- Servers
- Network & storage switches
- Converged infrastructure
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Conventional management tools are inadequate to address the challenges at the edge.

How do I know if I have a problem, before it’s too late?

How do I monitor if I can’t get enough IP addresses?

Who is accessing my equipment?

I get so many status alerts, how do I know what to act on?

How do I monitor and maintain the equipment?

I have so many edge sites and no onsite IT and facilities staff...
Assertion: Each edge site should be managed as a complete micro data center, not individual components.

Old paradigm
Each device is managed separately and requires its own IP address.

New paradigm
One dashboard to manage all components as a single system at a given edge site.
Assertion: Management tools must be cloud-based

The biggest challenge is keeping everything good (normal operating status) because it’s not just monitoring the alarm, the alerts, etc., it’s resolving them.

Customer – 451 Research, 2017

- Easy to get started
- Access from anywhere, at anytime
- Pay as you grow
- Maintenance free
- Up-to-date cyber security
- Automatic software updates and backup
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We believe there are the 4 key ingredients:

1. A secure, scalable, robust **cloud architecture**
2. A **data lake** with massive amounts of normalized data
3. A talent pool of **subject matter experts** with deep knowledge of system behavior
4. Access to **machine learning algorithm expertise**
A solid foundation is critical

1. Cloud architecture
   - Aggregate data securely
   - Create specific AI use cases
   - Identify critical variables
   - Normalize the data sets
   - Provide compute power to analyze data

2. Data lake

3. Subject matter experts

4. Machine learning algorithm expertise
   - Develop algorithms
   - Train algorithms
   - Test & refine algorithms
AI enables better insights

Methodology

• Benchmark performance of key parameters
• Determine pattern of healthy behavior
• Generate alerts when outside expected operation
• Provide scorecard identifying what needs attention

Benefits

• Hours spent evaluating alarms
• Downtime avoidance
• Peace of mind & pressure off team
Key takeaways to achieving a resilient edge

1. A collaborative ecosystem that includes the customer is necessary

2. Cloud-based software is imperative to managing the edge

3. A strong industry foundation for applying AI will address unique management challenges by augmenting staff