Envisioning “Resiliency as a Service” across Enterprise and Edge Clouds

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Agenda

- Context & Motivations
- Enablement Mechanisms
- Resiliency @ Edge clouds
Context

- Proliferation of Things
- Containers and Microservices Convergence
- DevOps and AIOps Toolchains
Proliferation of Things

- Millions of Services
- Billions of Devices
- Trillions of Digital Entities
Containers & Microservices Convergence

• Emergence of Microservices Architecture Pattern
• Maturing Multi-Container Toolchains
• Clouds using commodity servers and embedded devices
DevOps and AIOps Toolchains

- Frequent and automated deployments
- Real time and prescriptive insights
Microservices + Containers = New Concerns

- Discovery
- Observability
- Orchestration
- Resiliency
Discovery

- Dynamic IPs
- Autoscaling
- Failures
- Upgrades
Observability

- Health check
- Metrics
- Distributed tracing
- Log aggregation
Container Orchestration

- Config. management
- Service Discovery
- Load balancing
- Self healing
- Automatic binpacking
Resiliency

• Fault detection
• Fault isolation
• Fault tolerance
• Service Recovery
Enablement Mechanisms

- **Technologies & Patterns**
  - Reactive programming
  - Circuit Breaker
  - Retry & Timeout
  - Bulkhead Isolation
  - Compensating Transaction
  - Leader Election

- **Tools**
  - Resiliency Libraries
  - Container Orchestration & Mgmt
  - API Gateways
  - Service Mesh
  - Prediction services
  - Code Analysis
Tending towards Resilient Edge Clouds

1. Edge Appliance
2. Edge Clouds
Why Containerized Fog/Edge Clouds?

- An exponential growth of connected devices
- Edge / fog device clusters/clouds for real-time analytics and applications
- Device Services are being containerized and stocked in local hub
- Containerization is the abstraction to surmount the device heterogeneity
- Containerized devices enable device-to-device (D2D) and device-to-cloud (D2C) interactions towards multi-container and composite applications
Device Clouds Challenges

- Device/Resource Discovery
- Service Discovery and Scheduling
- Load Balancing
- Service Resiliency
- Device Container Monitoring, Measurement and Management
- Device Cloud Infrastructure and Service Management
- Device Movement
- Data Partitioning for Edge Analytics
Resiliency at Edge Clouds

- Container Orchestration and Management Platform for Edge Clouds
- Resiliency Framework for Edge Clouds
- Reactive Programming Platform for Devices
- Machine and Deep Learning Algorithms for Edge Device Resiliency Insights
Resiliency as a Service

Continuous Deployment
Build, Integrate, Test

Continuous Integration
Build, Integrate, Test

Source Code Control

Developer Workspace
Code, Test, Debug

Container Registry

Monitoring

Enterprise Cloud Orchestrator

API Gateway
MS1 MS2 MS3 MS4
MS5 MS6 MS7 MS8

Service Mesh

Edge Cloud

IoT Gateway

IoT Orchestrator

Device
MS 1

Device
MS 1

Device
MS 1
Questions
Thank you