New World Order

- Smart Cities
- M2M and Robotics
- Digital Health
- Autonomous Driving
- Connected Living
- Augmented Reality

5G

- Edge Compute
- Cloud DC
- Private Cloud
- Public Cloud
- Hybrid Cloud

Architectural Shifts
Rapid growth of small cells and antennas
New Applications

Mobile Device

New Applications

Rapid growth of small cells and antennas

Architectural Shifts
New World Order

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Cloud DC

Born in the Cloud Providers

Telco Cloud Transformation

Enterprise Hybrid Cloud

Smart Cities

M2M and Robotics

IEI

Digital Health

Autonomous Driving

HRS

5G

Central Office Transformation

Explosion of new Data Centers at Edge

Necessary for Low Latency Applications
New World Order

IEI

Smart Cities
M2M and Robotics
Digital Health
Autonomous Driving

CTG

Connected Living
Augmented Reality

HRS

5G

Edge Compute

Cloud DC

Private Cloud
Public Cloud
Hybrid Cloud

AI & Deep Learning
Custom Architectures & High Speed Optical
Global Deployment & Build Outs
**Edge Data Center Comparison**

**Edge Data Center**
- **Power**: Leverage existing power, May Lack Redundancy
- **Cooling**: Limited by size & location
- **Connectivity**: Designed for minimal latency, Applications & site may restrict redundancy
- **Facility**: Purpose-built, leverage existing or standalone

**Centralized Data Center**
- **Power**: Purpose-built, Redundant grid feeds, Diesel Generators
- **Cooling**: Purpose-Built, Redundancy & Capacity by design
- **Connectivity**: Redundant, Designed for Performance
- **Facility**: Dedicated or Multi-Tenant, Purpose-Built, Manned with automation & monitoring

**Additional Notes**
- Edge Data Center is typically unmanned.
- Centralized Data Center is designed for performance, and redundancy & capacity by design.
New IaaS Edge Ecosystem

Infrastructure as a Service forecasted to reach $92B by 2023 at a 25% CAGR*

Trends
- Data from a growing number of devices
- Imminent 5G impact
- Latency reduction requirements
- Distributed architecture that favors GPGPUs
- New applications

Flex- Global Supply Chain Solution Provider
- Global Manufacturing Scale and regional presence
- Established worldwide supply chain
- Sketch to Scale technology enablement
- Distribution, service, repair, and reverse logistics

* Allied Market Research
Creation of a New Open Standard

Founding Member of the Open19 Foundation

Sketch to Scale development to bring Open19 to market

Deploying Customized Equipment to enable the Intelligent Edge
Open19 Hardware Benefits

**FLEXIBLE**
Any Location, Any 19” Rack

**SCALABLE**
Small Edge To Massive Core Deployments

**MODULAR**
Multi-server Form Factors In The Same Rack

**SERVICEABLE**
5-6x Faster Rack Level Integration
Infrastructure

- Cage
  - 8U and 12U Passive Modular Cage
  - Standard 19 in rack

- Cable
  - Connectivity of server bricks to switch
  - Plastic ‘spine’ snaps around main cable breakout
  - Simplifies deployment

- Power Shelf
  - 1RU 9.6KW per leaf zone
  - 2RU 19.2KW per leaf zone
  - Shared power modules
Brick: Flex BC5152

Initial Brick Available from Flex (BC5152)

- 1U half width brick form factor
- Dual socket Skylake motherboard with 1 CPU
- Dimensions: 212.3mm(W) x 41.65mm(H) x 901.7mm(D)
- NIC Options: 25GbE Dual-Port, 50GbE Single-Port, 100GbE Single-Port
Network Switch

- 3.2T Switch
- Dual switch: Data Path & Management (OOB)
  - 50G per server data path
  - 1G per server management (optional)
  - Console port per server (optional)
- 12V input (no power supplies)
- Up to 8x100G uplinks or local switching ports
- Broadwell-DE CPU with BMC
- BCM ICOS certified
Open19 Get Started Option

Validated Reference Platform Available

- Dual socket Skylake Server Bricks
- 3.2T ICOS certified switch with Broadwell DE CPU and BMC
- 12U & 8U brick cages
- Power Shelf & Cables

Customization Opportunities in collaboration with customers to meet specific requirements and use cases
Akraino Edge Stack

- Open19 Available to the Akraino community for Test and Integration
- Akraino is an Open Source High-Availability Software Stack Optimized for the Edge
- Linux Foundation Project
- AT&T is a key contributor defining reliability and performance requirements
- Promise is to deliver new levels of flexibility, scalability and reliability at the edge
Flex Reference Akraino Stack

CI-CD Deployment Tools

Dashboard
User I/F Workflow

APIs & VNF
Edge API
Edge Cloud Integration API
Sample Edge App (CDN)

Infra Orchestration
NFV Orchestration

Open19
Edge Hardware

Edge API & Orchestration

Edge Cloud Integration API
Sample Edge App (CDN)
Open19 at the Edge

Flex and Vapor IO
» Validating Open19 in the Vapor Chamber

Edge Use Cases
» Autonomous Driving
» AR/VR
» AI and Machine Learning Computation
» Machine vision for Surveillance Systems
» Performance Optimization of NFV and C-RAN
» Large scale Industrial IoT
Key End to End Global Services for Cloud Support

- Distribution and VMI/SMI
- Reverse Logistics and Repair
- Spare Parts Logistics
- Asset Recovery
- Converged Infrastructure