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# Edge Computing & Modularity



HINS

Ali Moinuddin – Managing Director, Europe Uptime Institute 11<sup>th</sup> March 2020

### 2016: Bell Labs was saying.....

## 60% of servers would be placed in an Edge Data Center by 2025 (Bell Labs)\*

\*"The Future X Network: A Bell Labs Perspective by Marcus K. Weldon (2016-03-01), CRC Press"





### Distributed DC Speed-Volume-Complexity





#### **Edge Computing**



#### The AGE of: Hybrid - Multi Cloud – Edge

Regional Data Centers Legacy Company Data Centers Central Offices International Offices Smart Workers' Remote Tools

Input, Storage, Process, Output: anywhere, anytime

### **CONGESTION of NETWORKS**

Mostly due to IoT
 More data was generated in 2017
 than over the previous <u>5,000 years</u>\*

2) IP traffic to soar three-fold 2017-2022 (26%/Y) Total IP traffic 396 EB/m by 2022\*\*

\* Dave Johnson – Schneider Electric - 2018
\*\* CISCO

### Data+Things Growth

- Number of "Connected Objects" to exceed 40+B Smartphones to exceed 7B (IDC)
- More than 54% of all Internet traffic will originate from a wireless device (IDC)
- 80 Billion in the next 25 years

- 43% IOT Data processed at the EDGE
- Time-Sensitive applications will account for at least 10% of all Internet traffic

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### Immersive - Autonomous - Smart

### Latency Sensitive SAAS Cloud APPS



Online Collab Tools <25 ms Round Trip Latency (Gartner)



Productivity Suites <20 ms

(Bell Labs)



Virtual Desktops <20ms

(TRC Vienna)



### Real Time Streaming

### Speed of light (km)

Millisec	Vacuum	Glass	1RT	2RT	4RT	Fiber
1000	300.000	210.000	105.000	52.500	26.250	13.125
100	30.000	21.000	10.500	5.250	2.625	1.313
10	3.000	2.100	1.050	525	263	131
1	300	210	105	53	26	13
0,5	150	105	53	26	13	7

- 1. Glass: 70% of speed in fiber glass
- 2. RT: Software need multiple roundtrips
- 3. Fiber: Ground Distance 50%
- 4. Delay caused by hardware?



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#### MACHINE TO MACHINE LATENCY SENSITIVE

Optimization for machine consumption



- Smart Security 56
- Smart Grid 56
- Low-Latency Content Distribution
- Arbitrage Market
- Real-time Analytics
- Defense Force Simulation

#### Edge Ecosystem 2019-Vertiv

#### HUMAN LATENCY SENSITIVE

Optimization for human consumption

- Augmented Reality 56
- Smart Retail 56
- Website Optimization
- Natural Language
   Processing 56

#### DATA INTENSIVE

Vast amount of data to be transferred

1010101 1101010

- Virtual Reality 56
- Smart Cities 56
- Restricted Connectivity
- Smart Factories
- Smart Home/Building
- HD Content Distribution
- High-Performance
   Computing
- Oil and Gas Digitization
- High Network
   Infrastructure Costs 53

#### LIFE CRITICAL

High risk from machines interacting with humans

- Digital Health 56
- Smart Transportation 56
- Connected / Autonomous Cars 56
- Drones
- Autonomous Robots

### Edge and the Hyperscalers



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#### Large Regional Core DC 100+ MW

### There is no Edge!!

### It is just a Computing Continuum



#### Hub DC – Country Regions 10/50 MW



Local DC Metro Areas 500 kW to 10 MW



EDGE Data Centers 10 to 500 kW

Low Latency & Ultra-Low Latency



Orchestration Engines: automate all deployments

### Load Balancers & Orchestrators



Policy Engines: dictate what parts of which applications run in which target location



on-premise - regional data centre - cloud region - edge data centre

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### Edge DC Operators

Vapor IO USA

EdgeMicro USA

EdgeInfra Europe

MetroEDGE USA

SmartEdge DC Europe

Leading EDGE Australia

Edge Presence USA



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Colo looking into EDGE + Building Local DC EdgeConnex

Equinix (Packet)

Next DC (Australia)

DLT

Compass (USA)

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### Edge Startups to watch

- Axellio (Defence)
- Dart Points (Ecosystem)
- Scale Matrix (Colo)
- Zellabox (Manufacturing)
- Ori Ind. (Computing Enabler)

### Pre-Fab & Modular Data Centers





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### Benefits of Prefab and Modular

- Speed
- Lower Risk
- Granularity
- Better quality controls
- Repeatable results
- Overall improvements to project management that reduce risks
- Shifting complex electrical and mechanical tasks from the construction site to a highly controlled and more productive factory environment.
- Easiess of adding capacity
- Reduction of pressure to overbuild.
- Enterprises and smaller service providers choose turnkey PFM facilities
- Faster execution typically within 3 to 6 months of order,
- Better scaling of projects because of higher labor productivity of factories compared with construction sites.
- The race for more datacenter capacity in North America, Western Europe and Asia-Pacific (particularly China)

#### Figure 1: Aggregate PFM Revenue Forecast Through 2021 (\$M)

#### Source: 451 Research, 2018



Built and deployed fast Next Gen Data Centers They will deliver at high reliability least 75% of the local data traffic



Unmanned

Need for Resiliency

Known Resiliency.

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### Who?

- not only containerized kits
- mid Tiers Operators (Colo)
- hyperscalers (fast deployment)
- carriers (edge)
- repeated installation of data center subsystems and modular buildings
- one-off projects
- one of repeat installations of datacenter subsystems
- turnkey facilities at scalable campuses.

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### Prefab & Modular Types and Use Cases

#### • Scale/Types

- > Single Rack/IDF/MDF
- > Pods/Enclosures (2 to 8 racks)
- > ISO Containers (8-30 racks)
- Modular & Prefab Constructed (50-250-500-1000-1500kW+)



#### • Use cases

- DCs/DCs Expansions
- > 5G deployments, Towers, COs
- > Distributed Cloud
- > Edge computing
- > IoT computing
- > Limited Real-Estate Footprint
- > Just-In-Time dynamic capacity
- > Harsh environment
- > Low-Latency Applications
- Capital conservation/deferment
- > Mesh, Dense computing

### **TIER-Ready**



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### Manufacturers' Problems solved by TIER-Ready





COMPETITIVE PRESSURE VENDOR AND PRODUCT DIFFERENTIATION PFM SOLUTIONS SELLING COMPLETENESS FOR 'MISSION CRITICAL' USAGE

### Mission: Building Value for Manufacturers

- Provides MANUFACTURERS:
  - > Evaluation
  - > Assessment
  - > Validation
  - > Promotion

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### PFM Manufacturers Sell the UPTIME TIER Certification To their End Customers



#### VALUE: ALL PFM UNITS

**TIER Certified**.



End Customer Advantage: cheaper, easier and quicker access to Uptime Tier Certifications.



Tier Certifications TCCF as a standard option item in the Manufacturers' SALES CATALOG.



Yes

68%

If you are considering or using pre-fabricated (prefab) data center designs, would it make a difference if the prefab products had been assessed as Tier Ready by Uptime Institute?

titute Global Data Survey 2019: Designers/consultants n = 256

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### **TIER-Ready Summary**



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## thank you.

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