
GSC 22
MONTREUX, SWITZERLAND
IEC
ISO

TIA Update & Overview

Telecommunications Industry Association
David Bain, VP Standards

GSC-22, Montreux, CH 26-27 March 2019

Standards Engineering Committees

ICT manufacturers and suppliers, network operators and service enablers, distributors and system integrators

US technical position for the international committee to support 5 technologies through US Technical Advisory Groups" (13 groups total /TAGs covering 5 technologies)


Convening and Enabling Communities of Interest
Technology
Standards
Government Affairs
Business Performance

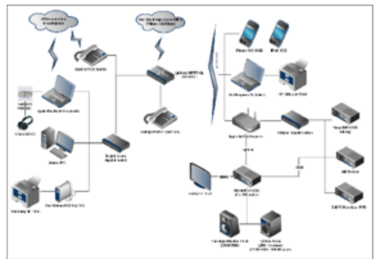
What to Certify…

People
Designers
Engineers
Installers
Integrators
Testers

Auditors / Organizations

Buildings / Campus

Components



Processes

Networks

TIA's Program's Roadmap

Smart Buildings / Cities

Edge
Data Center

NFV / CO To DC
Transition

Network Service Assurance

Device
Assurance/ Registration

Core Competency: **Network Infrastructure, Connectivity, Quality**

Standards SDO

Technology

Government Affairs

Business

- TR-8 I Mobile and Personal Private Radio Standards
- TR-14 I Structural Standards for Communication
- TR-34 I Satellite Equipment & Systems
- TR-41 I Performance and Accessibility Communications
- TR-42 I Telecommunications Cabling Systems
- TR-45 I Mobile and Point-to-Point Communications Stds
- TR-48 I Vehicular Telematics
- TR-50 I M2M - Smart Device Communications
- TR-51 I Smart Utility Networks

Definition
Benchmark
TL9000 QM
QF / TIA Tools
Assurance
Certification
Registration
Sustainability

Communities Of Interest

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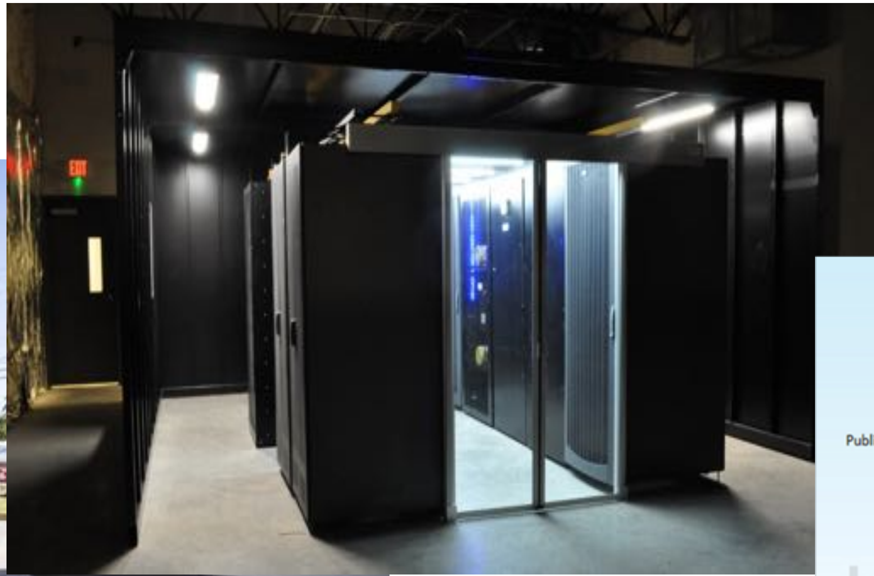
Edge Data Centers

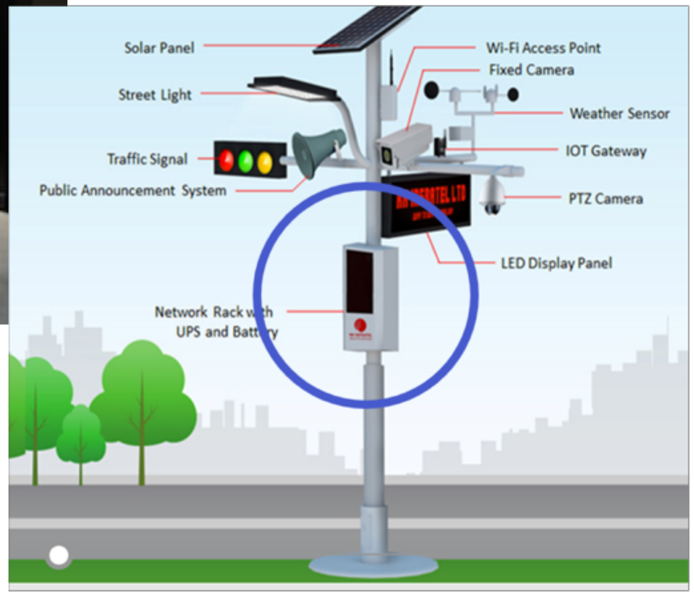
IoT, AIoT
Industry 4.0
Buildings
Towers
Corners
CO's
Shelters
Cabinets

5G Will Not Happen Without Edge Computing

Edge Data Centers

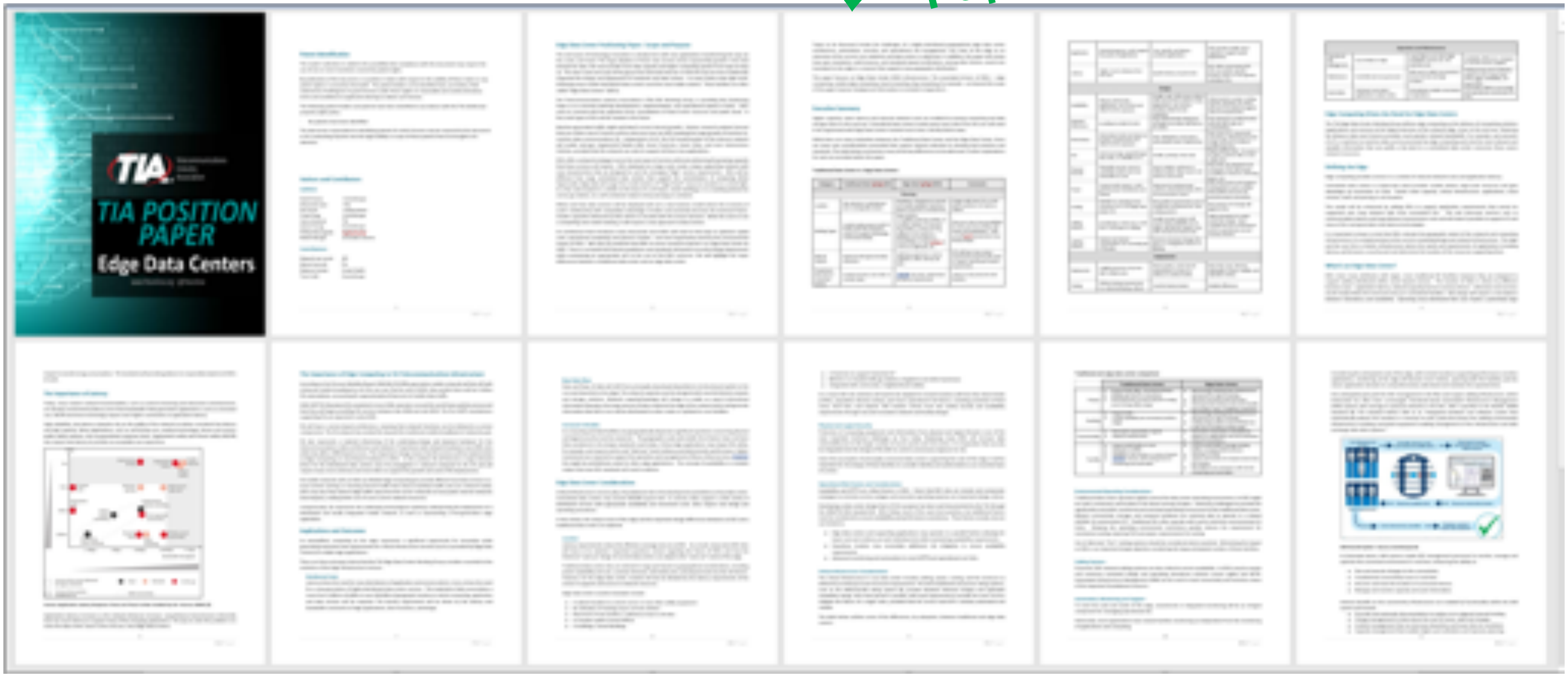
In Buildings
Mailbox
Light Pole





Position Paper **Edge Data Centers**

✓ Paper Released 10-10-18



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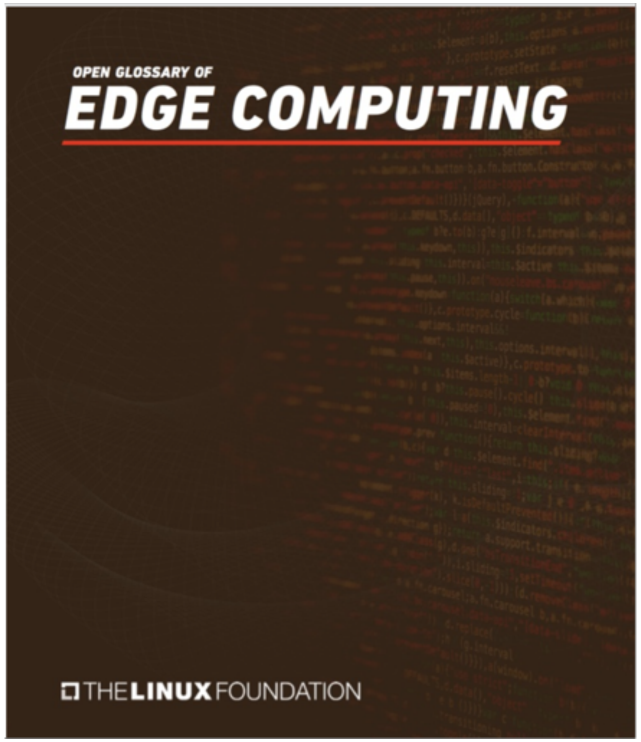
Glossary The Linux Foundation



Edge Cloud

Cloud-like capabilities located at the infrastructure edge, including from the user perspective access to elastically-allocated compute, data storage and network resources. Often operated as a seamless extension of a centralized public or private cloud, constructed from micro data centers deployed at the infrastructure edge.

See also: Cloud Computing

Edge Computing

The delivery of computing capabilities to the logical extremes of a network in order to improve the performance, operating cost and reliability of applications and services. By shortening the distance between devices and the cloud resources that serve them, and also reducing network hops, edge computing mitigates the latency and bandwidth constraints of today's Internet, ushering in new classes of applications. In practical terms, this means distributing new resources and software stacks along the path between today's centralized data centers and the increasingly large number of devices in the field, concentrated, in particular, but not exclusively, in close proximity to the last mile network, on both the infrastructure and device sides.

See also: Infrastructure Edge

Edge Data Center

A data center which is capable of being deployed as close as possible to the edge of the network, in comparison to traditional centralized data centers. Capable of performing the same functions as centralized data centers although at smaller scale individually. Because of the unique constraints created by highly-distributed physical locations, edge data centers often adopt autonomic operation, multi-tenancy, distributed and local resiliency and open standards. Edge refers to the location at which these data centers are typically deployed. Their scale can be defined as micro, ranging from 50 to 150 kW of capacity. Multiple edge data centers may interconnect to provide capacity enhancement, failure mitigation and workload migration within the local area, operating as a virtual data center.

See also: Virtual Data Center

Edge Meet Me Room

An area within an edge data center where tenants and telecommunications providers can interconnect with each other and other edge data centers in the same fashion as they would in a traditional meet me room environment, except at the edge.

See also: Interconnection

Paper: Traditional vs. Edge

	Traditional Data Center	Edge Data Center
Power	○ Purpose-built utility / site electrical feeds ○ Multiple grid feed for redundancy ○ Diesel generators provide long-term energy source during utility outage	○ May leverage existing power infrastructure repurposed for edge computing ○ May lack redundant power grid feed ○ Diesel generator backup may not be feasible due to space, noise, or pollution restrictions
Cooling	○ Purpose-built ○ Cooling capability and redundancy built by design	○ May leverage existing power infrastructure repurposed for edge computing ○ Cooling design options may be limited due to the size or location of data center
Connectivity	○ Redundant connectivity is typical ○ Design for performance	○ Redundant connectivity is desirable but depends on applications and site restrictions ○ Design for low latency
Facility	○ Purpose-built facility or room ○ Dedicated or MTDC ○ Flexibility in site location, to reduce hazards ○ Typically manned, with varying levels of monitoring and automation	○ Purpose-built facility, leverage existing facility, or purpose-built enclosure ○ Dedicated or MTDC ○ Latency and location of compute needs drive EDC location ○ More likely to be unmanned, with remote monitoring and automation

Central Office to Data Center

Type/ Location

- ✓ 3X3 proposed model for 9 solutions
- ✓ Small pods to full rooms

Fire Protection

- ✓ Equip not NEBS “Level 1”: Fire Suppression may be required inside the Pod/Container
- ✓ Equip NEBS “Level 1”: No Fire Suppression needed

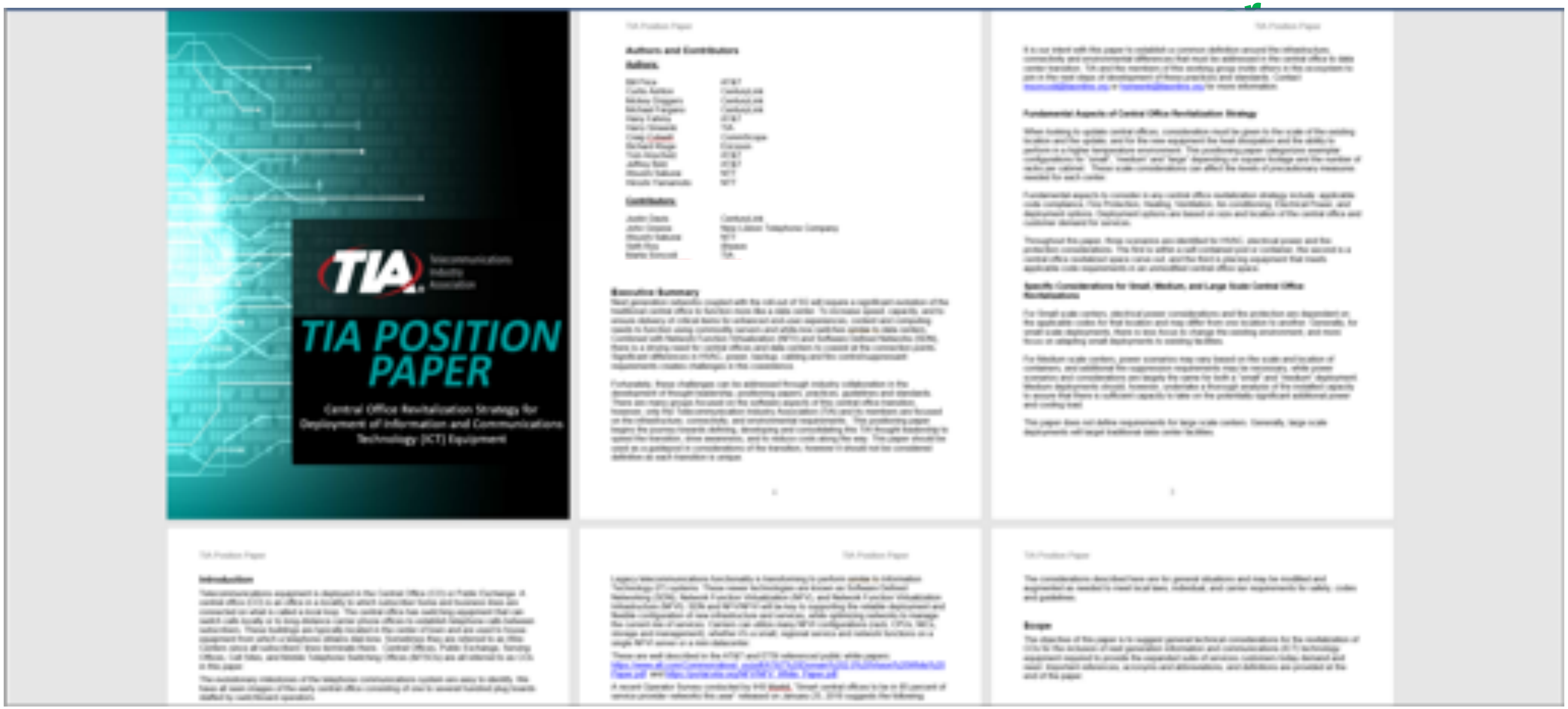
Power

- ✓ AC or DC Power
- ✓ Existing DC plant/New DC Plant/UPS
- ✓ AC only Outside

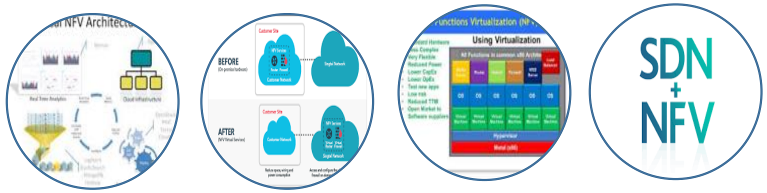
HVAC

- ✓ Heat Dissipation driven but there is no requirement for separate HVAC
- ✓ If Fire Suppression is required, isolation of local area is required in case of suppression discharge

Paper NFV/CO to DC Transition



Network Evolution



- Hardware-centric
- Physical Network Functions
- Vendor-specific Interfaces
- Central Offices
- Manual Configuration
- Hierarchical Network
- Vendor-specific Hardware
- Physical Network

- Software-centric
- Virtual Network Functions
- Open Standard APIs
- Data Centers
- Self-Organizing Networks
- Distributed Cloud
- White Boxes
- Logical Network Slicing

New Use Cases

Use Cases Performance Examples

Dense Urban Mobile Broadband (MBB)

User DL data rate: 300 Mbps
DL Traffic density: 750 Gbps/km^2
User density: 25,000/km^2
Mobility: 0-60 km/h

Robotic Motion Control

E2E latency: 1 ms
Jitter: 1 µs
Availability: 99.9999%
Traffic density: 1 Tbps/km^2
Connection density: 100,000/km^2

Intelligent Transport Systems

E2E latency: 10 ms
Jitter: 20 ms
Availability: 99.9999%
Traffic density: 10 Gbps/km^2
Connection density: 1,000/km^2

Electricity Distribution – High Voltage

E2E latency: 5 ms
Jitter: 1 ms
Availability: 99.9999%
Traffic density: 100 Gbps/km^2
Connection density: 1,000/km^2

Massive Machine-Type-Communication (MTC)

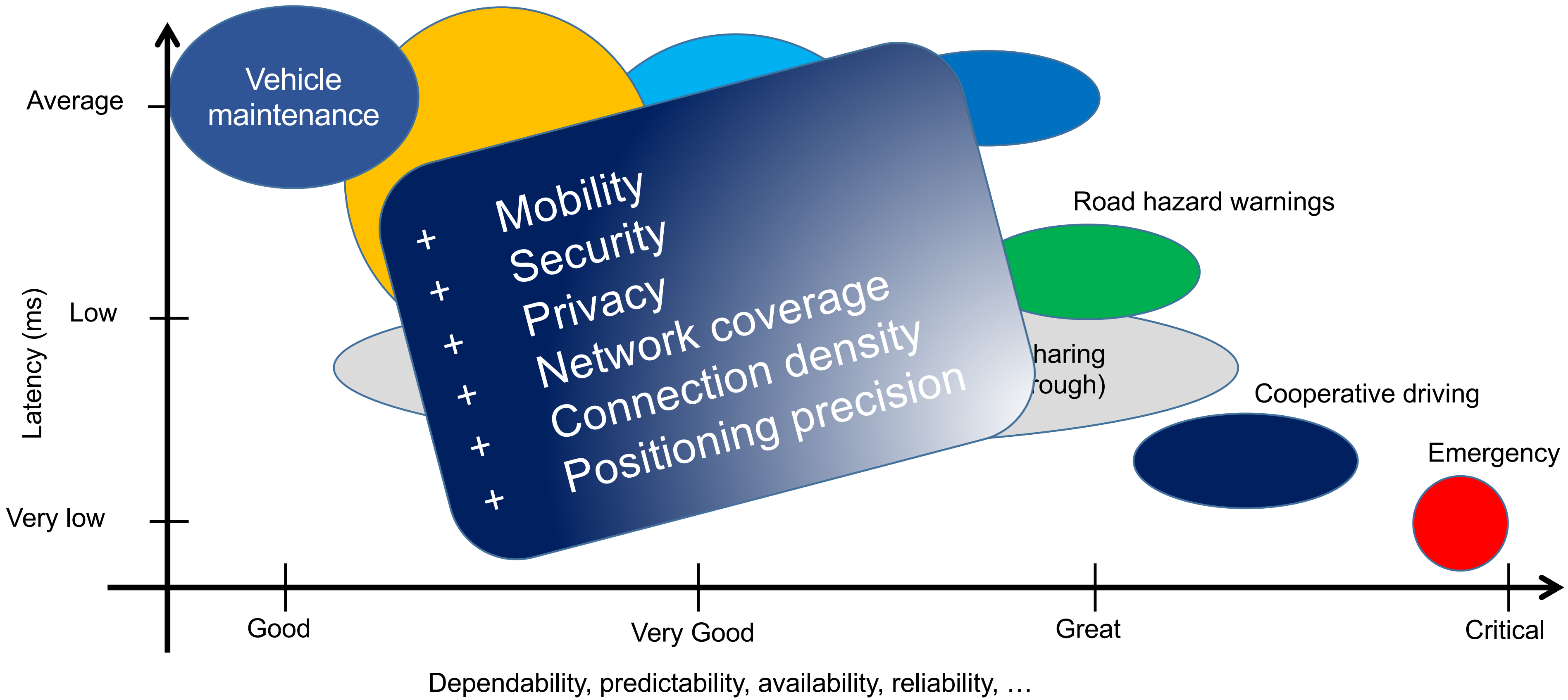
E2E latency: Seconds to hours
Data rate: 1-100 kbps
User density: 200,000/km^2
Mobility: 0-500 km/h

Augmented and Virtual Reality

Immersive video: 6 DoF
User DL data rate: 1 Gbps
E2E latency: 7 ms
Motion-to-Photon: 15 ms
Vestibulo-Ocular Reflex: 7 ms

References: 3GPP TS 22.261 V16.3.0 (2018-03)
Enabling Mobile Augmented and Virtual Reality with 5G Networks (Jan 2017)

V2X Performance Requirements



Network Service Assurance

Traditional Perception of “failure” is inadequate and needs to change

- Old - Failure is a disruption
- New- Failure is user interruption and could be critical

Data Center 1	99.67% Availability	→ 28.8 hours downtime
Data Center 2	99.74% Availability	→ 22.7 hours downtime
Data Center 3	99.98% Availability	→ 1.6 hours downtime
Data Center 4	99.995% Availability	→ 25 Minutes downtime
Telecom today	99.999% Availability	→ 5.26 Minutes downtime
5G / Next Gen	99.9999% Availability	→ 32 Seconds downtime
5G / Critical needs	100% Availability	→ No downtime

NSA Key Verticals

- Automotive Industry (cars, trucks, buses, subway, city trains, tramways, boats)
- Industry 4.0 (smart factories)
- Healthcare (telemedicine)
- Entertainment (stadium, VR/AR, UHD)
- Real Estate (Smart Buildings)
- Smart Buildings / Smart Cities
- Agriculture (Smart Farming)
- Utility (Smart Grid, Gas)
- Logistics/Distribution
- Retail
- Public Safety
- Education

- Security
- Gaming
- Mining
- Tourism
- Hospitality
- Transportation (Cargo boats, trains)
- Insurance
- Construction
- Government services
- Financial services
- Public long distance transport (inter-city buses, trains, boats, planes)


Smart Buildings:
Microcosm of Smart Cities


Buildings
Are
Cities


Smart Buildings
are a
Microcosm
of Smart Cities
Smart Campus
Smart Neighborhood
Smart City
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Smart Buildings Value Proposition

Financial Proposition:
- Reduce Total Cost of Ownership
- Efficiencies
- Monetize Connectivity
- Competitive Advantage

Tenant Proposition:
- Workforce Enhancements
- Safety, Comfort, Satisfaction
- Mobility & Flexibility
- Innovative Solutions

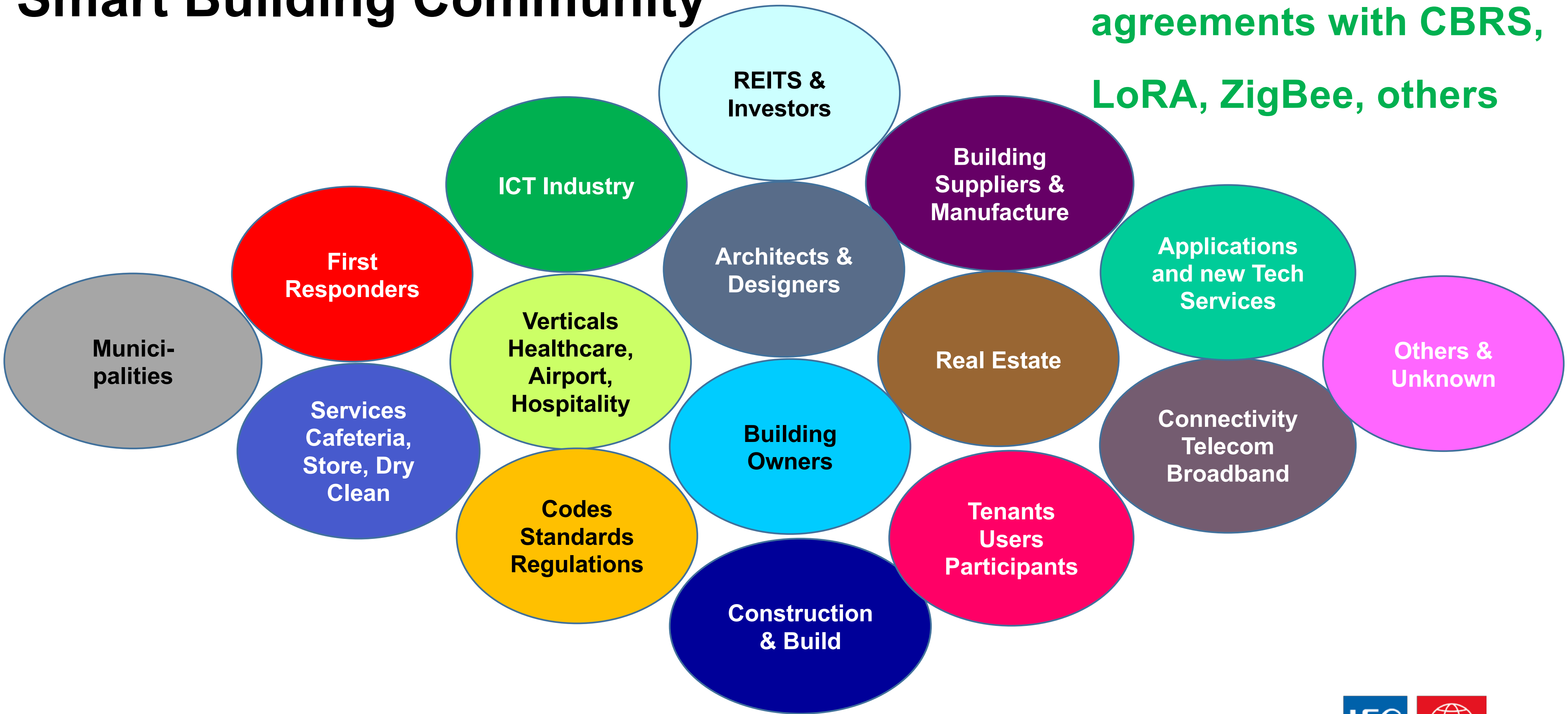
Owner Proposition:
- Optimized Operations
- Business Intelligence, Data, Analytics
- Environmental / Sustainability
- Social Responsibility

Smart Buildings as a Service

- **TIA is Building a New Marketplace**
  - A market shift is required due to tenant's recognition of technology valuations
  - "Proptech" entering every phase of the RE
  - Smart Buildings as a Service
  - Education / leadership are needed
- **Developing a Common Language**
- **Leading the Vision**
- **Leveraging TIA Standards Position**
- **Supporting Smart Environment Ecosystem**
  - Includes smart municipalities; wellness; sustainable and safe environments, both in and outside of buildings (i.e. LEED, WELL, others)

Smart Building Community

✓ Collaboration agreements with CBRS, LoRA, ZigBee, others



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Questions

Thank You

David Bain, VP Standards

dbain@tiaonline.org
+1(703) 587-9590