Hybrid Cloud Edge Service Platform & Services

It’s all Services@Edge

Prakash Ramchandran
OpenStack (Indi - Member Board of Directors)
IEEE INGR EAP WG Co-chair

What is Edge Computing

By 2025, three quarters of enterprise-generated data will be created and processed at the edge, outside of a traditional data center or cloud (Gartner)

Edge Computing offers a more efficient alternative to process data, analyze and act closer to the point where it is created.

Placing workload as close to the edge where data is being created and acted upon.

Data is generated where work is done or performed- eg. Home-office, Labs, Industries, Vehicles or Cars, Banks, Hotels, Factory Floor,Distribution Center…

Thus we need IT Equipment like Edge Servers close to Edge where work is done. With advent of containers and kubernetes running all over it's easy to use them for matching 50 billion devices and growing 10% year over year for next 5 years. Thus leveraging local compute is key eg. Average car has 50 CPUs we cn use.

Service (SP2C) & Consumers

- Individual consumers - use Smartphone apps (multimedia - voice, video, data)
- Home users - Use Thermostat for Temperature control (Heating or Cooling) or wake up with Alexa or Hey Google to get their morning news, views and plan for day or fitbit to measure their 10000 steps per day or measure Sugar levels or BP’s
- Car Drivers - Use online-maps for navigation and real time traffic diversions

Service (SP2E/SP2G) to Enterprise & Gov

- Commercial Vehicle Operators or Police/Fire - Use online-maps for navigation and real time logistic delivery & Emergency E911/Ambulance Service
- Connected cars/Trucks use Lidar & CV Models to detect objects and use On-board devices to steer safely with V2X Infra based Intelligent transportation systems.
- Harbor Ports manage their Intermodal incoming/Outgoing Shipping Ops to load/unload and organize their pallets with truck loads and tags to keep goods movement optimal.
- Smart Factory use dynamic Robos & warehouses operations to improve production planning and quick turn around.

Scale, Automation, Provisioning,Rolling Updates Service, LCM all Declarative no more Imperative.

Scale - Big Data (DC) Scale is Massive with Resources > 100 Racks, 10,000 Servers or 50-100,000 VMs or 1-10 m Containers (Nation, Region, Markets)

Scale - Micro Data (DC) Scale is Distributed with Resources 1-10 Racks, 1-100 Servers, 1-1000 VMs, 10-10,000 containers (1 VM is a cloudlet) (Region, Markets, MDC Nodes or xSP PoPs)

Automation - What you can do manually can be Provisioned for Day-1,2,3...n

Kubernetes is now defacto Orchetstrator for Cloud, Edge, Services and Serverless computing. Cluster is main unit instead of Servers or Logical Nodes.

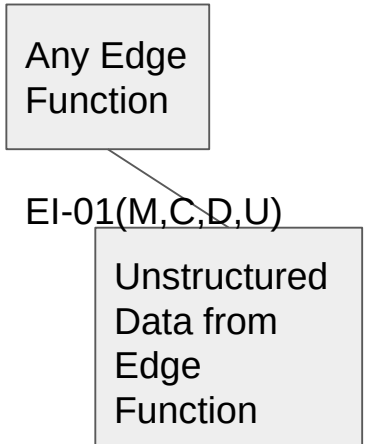
Workload Custers are the starting and ending point for all service. Which cloud is just incidental for Resource pools to use.

Defining Service, Enabling CI/CD, Deployment, GitOps is the norm

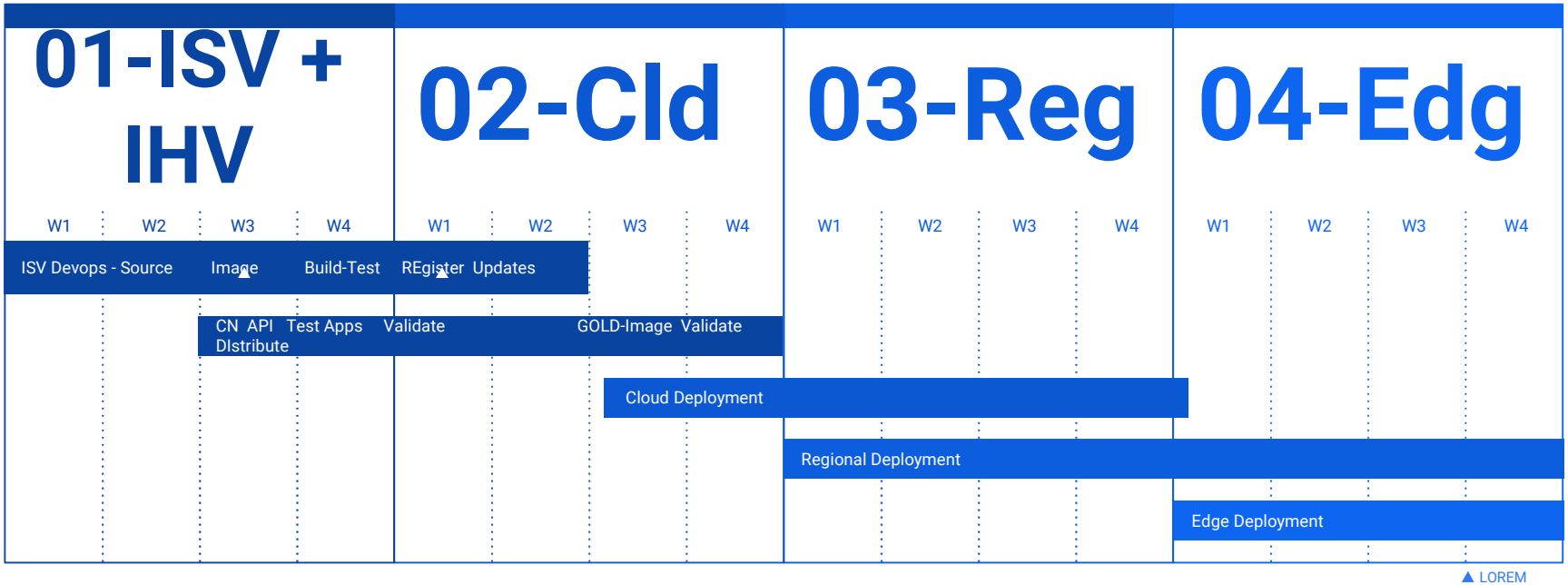
Edge Function as a Service (Similar to 5G I18 I/F)

Edge Function	Image	Manifest	Dependencies	K8s-API
app	distroless	app.yml	Packaging tools	Core + Lib*
container	os-image	DockerFile	Process NS	Core + Service
pod	os+app-image	Operators/AA	CRDs	Core+Service+ API Extend(CR)
node	BM/Hypervisor / OS Image	Bootloader + all above	OS Lib/CLI Lib	k8s+CR+AA
cluster	K8s/CAPI+ OSB GW for Cloud(s)	CRD/AA/+ all above	Cloud or Edge	kgs+CR+AA

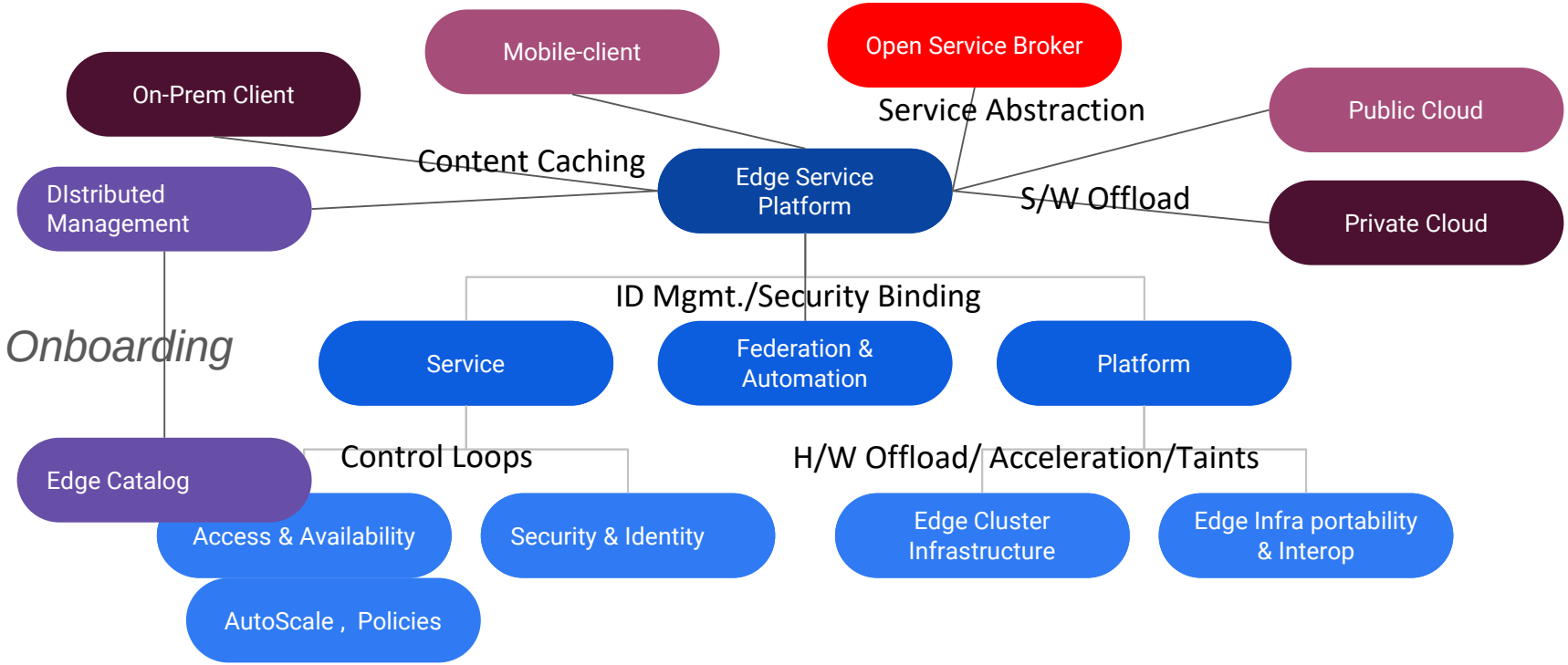
IoT Data Interface & storage architecture (unstructured data from any EF)



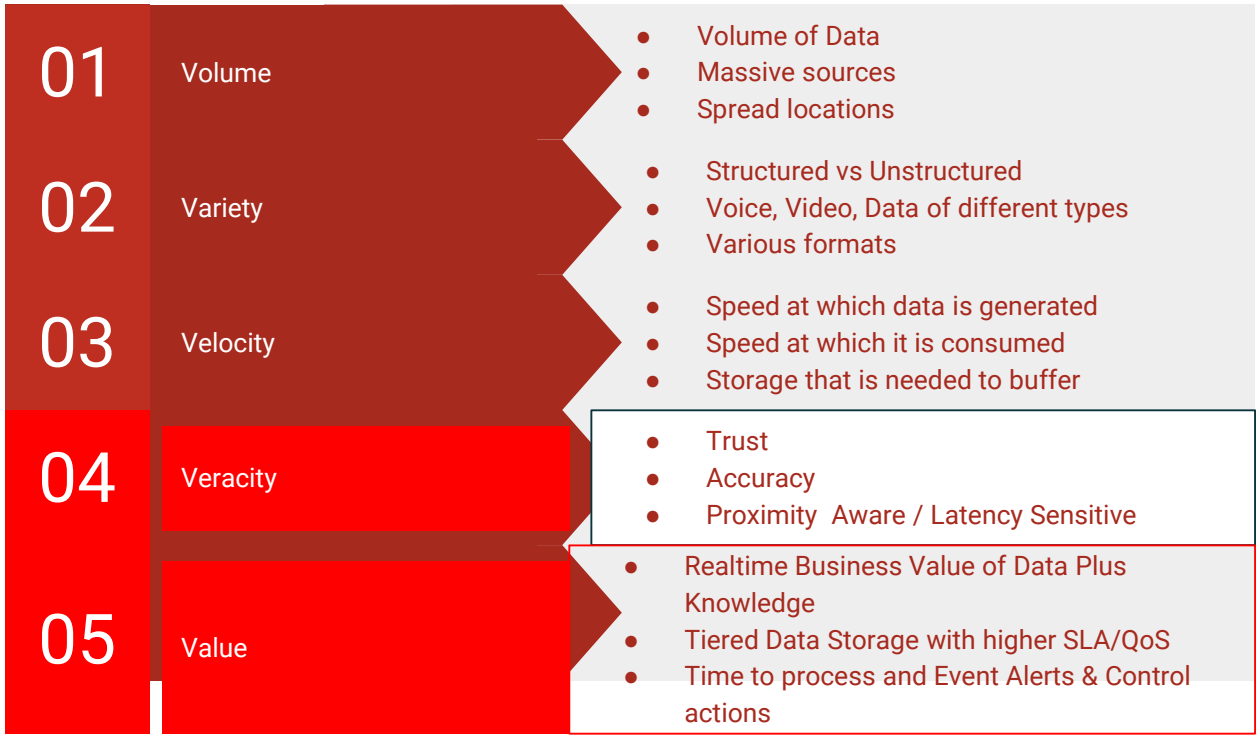
Edge Strategy of MicroScaler DC + HypeScaler DC



Hybrid Cloud (HC) -Edge Service Platform (ESP)



Big Data to HyperScalers / Micro Data to Micro Scalers



Q&A

Contact for Prakash Ramchandran - Co-chair IEEE INGR EAP WG

cloud24x7@ieee.org

And for Local Portland Attendees please connect with

OpenInfra-PDX guest talk / Out-of-Box Networks/ IEEE INGR EAP WG

sunku.ranganath@intel.com / sujata.tibrewala@intel.com / tk2929@gmail.com