

Public Cloud Interfacing at Telco Edge

Akraino API Whitepaper Proposal (TSC Review)

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API Sub-committee Infrastructure Work Stream

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Why is this whitepaper needed?



“Public Cloud Interfacing at Telco Edge” addresses:

- › ***What are challenges in Telco and OTT collaboration? Where the interfaces can be?***
- › ***How are APIs from SDOs adopted (or not) in Akraino’s edge stack projects?***
- › ***Edge Enabler functions: Access Gateway and Connect Gateway***

We need opinions on these open questions. Akraino projects express their opinions with stack and solution designs. There are technical considerations as well as business. The white paper presents thoughts from telco operators and Hyperscalers on Telco Edge.

What is the white paper about?

“Public Cloud Interfacing at Telco Edge”

- Analyzing various challenges
- Identifying interface options
- Comparing leading solutions
- Open Source community efforts to date



The paper shall cover both 4G and 5G scenarios. On carrier premises and enterprise premises will be included. Technical internals of Telco network and webscalers are not included unless when necessary to explain interfacing solutions. Telco edge represents mobile and fixed edge access.

1.	Introduction
1.	Background
2.	Scope and assumptions
3.	Relevance to Akraino community
2.	Challenges
1.	Expectations from both sides and gaps
2.	Technical challenges:
1.	4G vs. 5G, strategy and capability differences
2.	Inter edge
1.	Device mobility and service continuity
2.	Inter public cloud
3.	Inter Telco network
4.	Fixed wifi access
5.	Transport layer and overlay network for global reach
3.	Intro edge
1.	Edge aware device vs. not-edge-aware
2.	Edge aware application vs. not-edge-aware
3.	AF influenced traffic steering
4.	Available ETSI MEC APIs
5.	Measurable KPIs for latency
1.	Context
2.	Observability
3.	Business challenges:
1.	Regulatory concerns on CT and IT differences
2.	Taxation
3.	SLAs on CT and IT (KPIs)
4.	Operational challenges
1.	Organization within Telco responsibilities
2.	Labor/Union
3.	Vertical, use case scenarios
4.	Where the interface can be?(Architecture and APIs)
1.	Anatomy of the OTT edge stack
2.	UPF and DNN - 3GPP standards
3.	Shim layer of edge enabler - Open UPF?
4.	On prem enterprise, RAN break out
5.	Highlight APIs that may be developer facing or have DF counterparts
5.	Solutions (by examples) and evaluations
6.	Conclusion
	** The summary of the evaluation and recommendation in Section 5 should be captured in this conclusion
7.	References

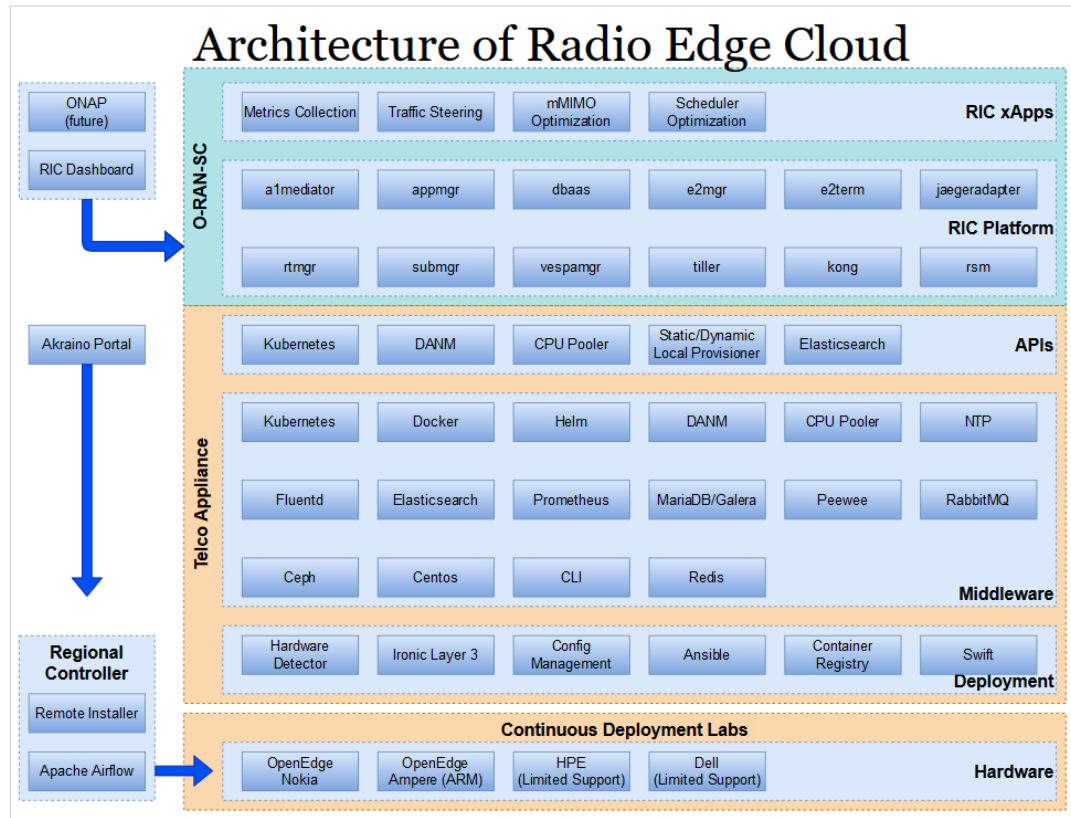
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How does this Whitepaper relate to Akraino

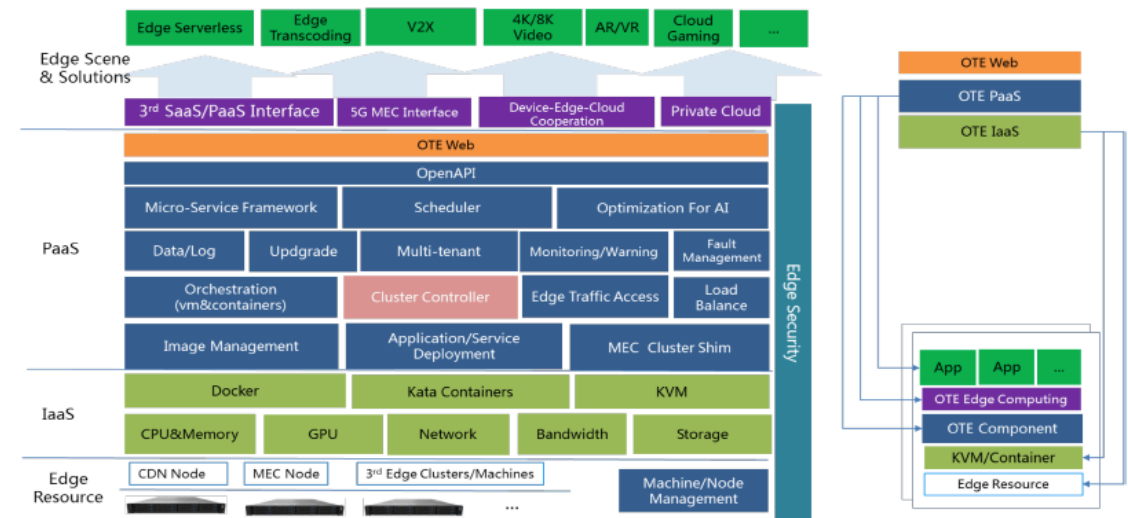


- ❖ Collaborating with “Public Cloud Edge Interfacing” blueprint families
 - Two (2) blueprints are planned under this family: Google Anthos and Tencent ECM.
- ❖ With other edge stack platform projects: reveal gaps, identify new opportunities.
- ❖ Marketing Akraino community’s technical strength and deep domain understanding

Telco vs. OTT Edge Stack (2 BPs from Akraino)



- The Left is a Telco Edge function stack; Below is from Baidu as an OTT edge stack for AI applications.
- Can these stacks share common layers at the infrastructure level?
- Telco stacks orchestration and management vs. OTT stack service management

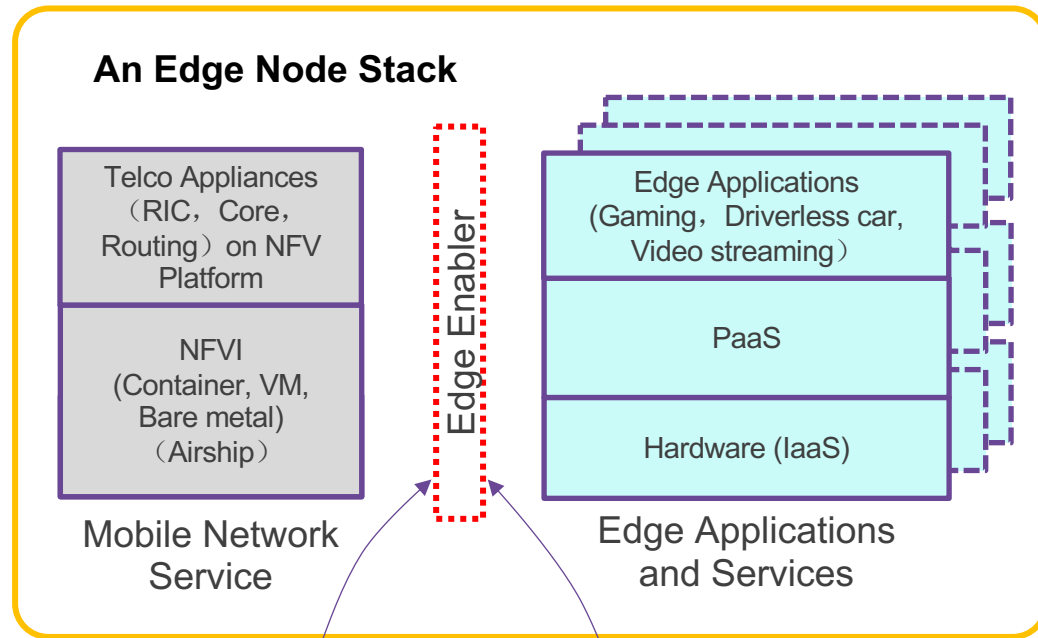


Upstream projects and standards



- ONAP's Edge APIs
- CNTT
- ORAN-SC
- ETSI MEC, 3GPP SA2, 3GPP SA6
- How are these leveraged (or not) in Akraino Projects?
- Gap analysis

Some observations of edge stacks



Edge Stack Strategies		Typical Deployments
	Telco MEP based (ETSI MEC)?	Operator centric, UPF+, Mission Critical edge
	Share common HW only	Some operators, xxx?
	Independent vertical stacks; IP interconnect	Public Cloud Interfacing at Telco CO
	Telco Appliances and Edge applications share common Edge platform	Private Network, LADN
	Non-telco with spectrum has its own RAN and Core services	CBRS, Industrial Spectrum

- UPF reselection
- Local routing and traffic steering
- session and service continuity
- AF influenced traffic steering
- network capability exposure
- QoS and charging
- LADN

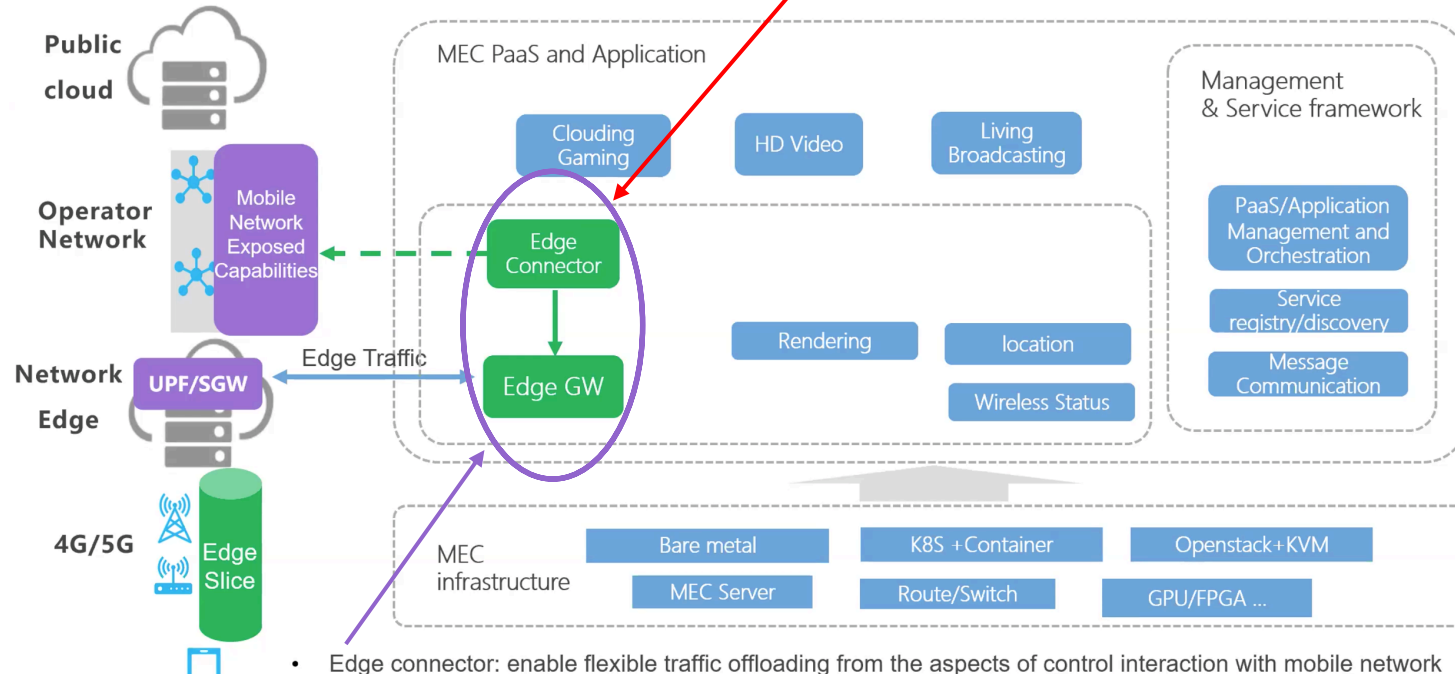
- Telco Operators' ownership and responsibility
- Non-Telco ownership and responsibility

APIs consumable to Edge Application and Services

Blocks corresponding to component blocks on the left "edge node stack" diagram

Ideas: Edge Access GW and Connect GW

Architecture Overview



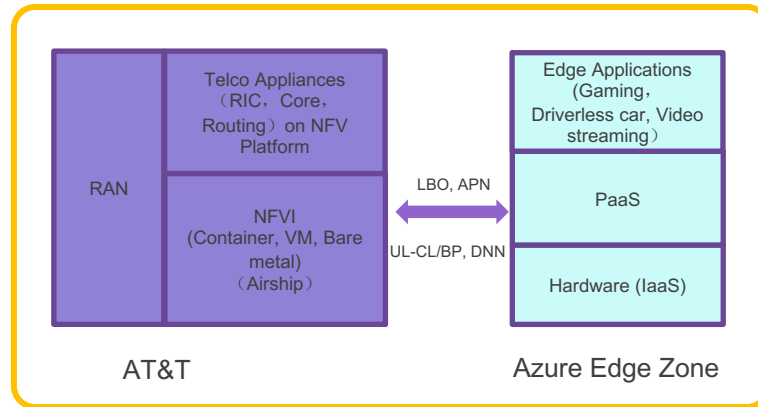
- Can functions from Edge Connector and Edge GW be provided via a 5G slice? If not, what's missing?
- Are there specific requirements from OTT applications not provided by a 5G slice? Or is it a business consideration to do it this way? If so, what's the Biz drive?
- From Telco side, apart from the biz consideration to agree with this or not, are there technical challenges in this architecture?

- Edge connector: enable flexible traffic offloading from the aspects of control interaction with mobile network exposed capabilities, and subscribe the edge slice between UE and edge application
- Edge GW: enable the traffic offloading from the aspects of data plane with local traffic routing, traffic management and so on.

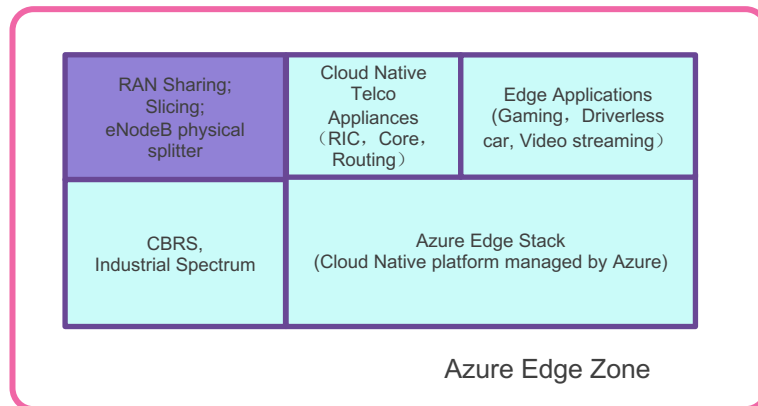
- From Tencent BP project
- What can be exposed in these GWs?
- How can these be exposed (APIs)?
- Consumption of these APIs?

Example: Microsoft Azure Edge Zone (2 Types)

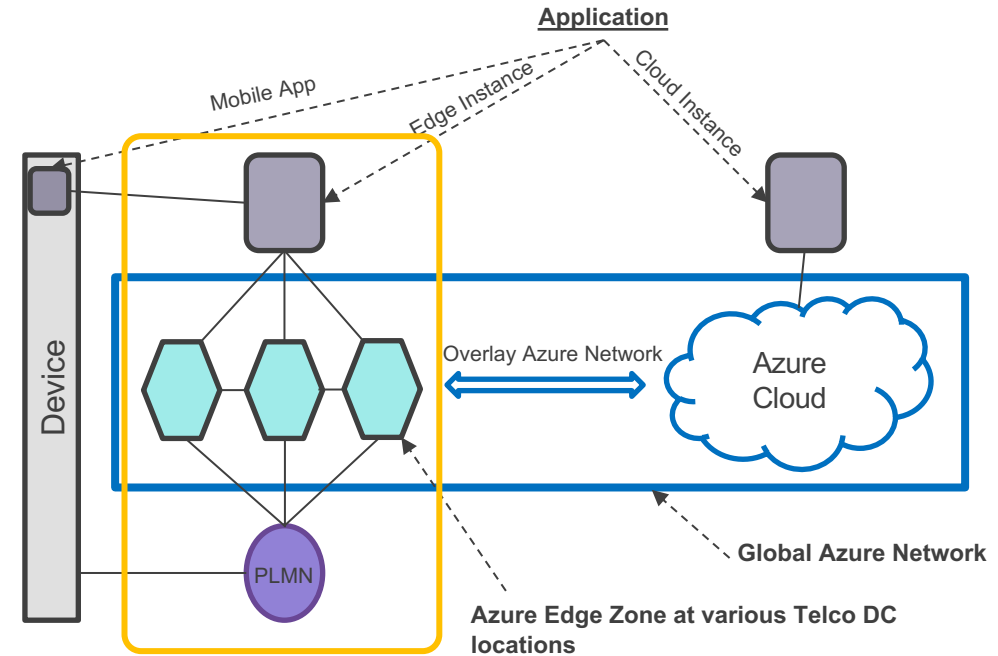
Type1 : Edge Zone with Carriers (In Telco DC)



Type2 : Private Edge Zone (On Premises)



- Telco Operators' ownership and responsibility
- Non-Telco ownership and responsibility



- Application aware of edge vs. not aware of edge
- Application makes edge placement decisions vs. gives declarative placement requirements
- Device aware of edge vs. not aware of edge
- APIs to reflect device mobility and service continuity
- AF influenced traffic steering (AF proxy ?)
- Capability exposure (ETSI MEC 0016)

Discussion topics

Thank You!