

September 25 - 27, 2018  
Amsterdam, The Netherlands



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# Open Source Possibility for 5G Edge Computing Deployment

OpenStack NFV, Openshift edge container engine and Ceph data lake  
(<http://sched.co/Gk1r>)

Hyde Sugiyama, Red Hat Japan  
Ignacio Verona, Red Hat EMEA



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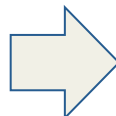


Technology innovation  
Shifting to new

3G



4G



5G

TDM+GPRS  
(Circuit Switching  
+Packet Switching)

All IP packet

Multiaccess  
Edge  
Computing

Cloud Native, CUPS, Multislice

	Presence	Future
Computing resource	Virtualization	Cloud native Kubernetes (or Hybrid...)
Computing architecture	Multi-core architecture for CPUs(Homogeneous)	Heterogeneous Computing (CPU, GPU and FPGA) <a href="http://bit.ly/1BOIEuC">http://bit.ly/1BOIEuC</a>
Data management	Centralization	De-centralization



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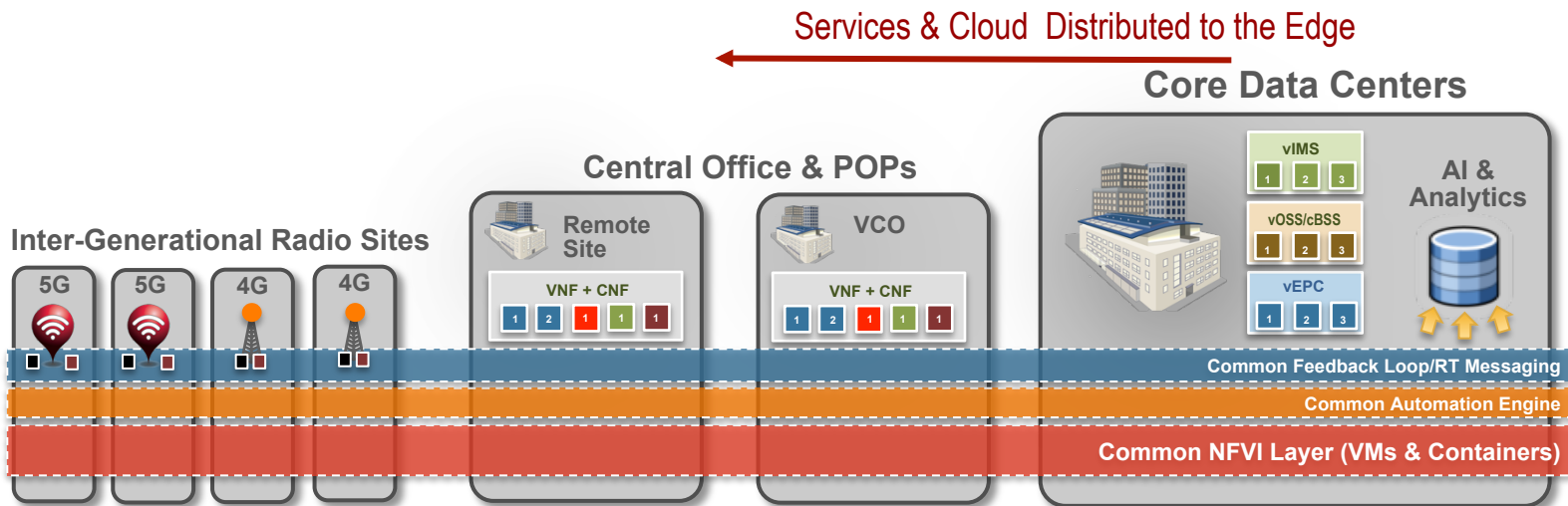
# Agenda

- Core to Edge
- B2B2X at Carrier Edge DC
- Practical Examples
- Summary



# Platform Imperative: Core to the Edge

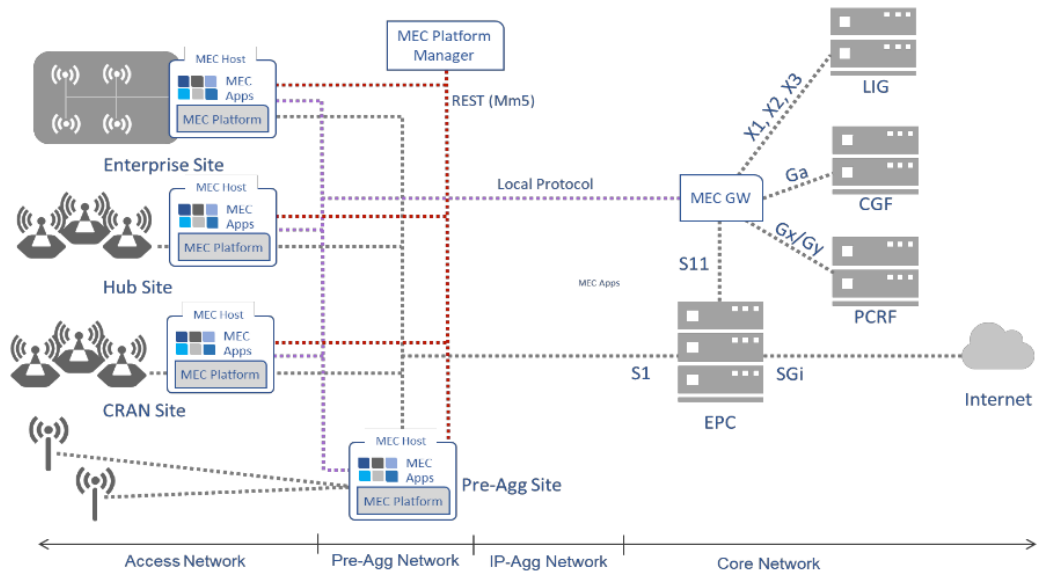
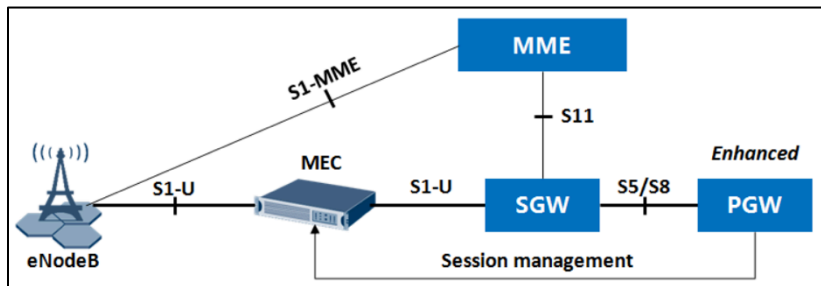
With software defined Multi access Edge Computing(MEC) and 5G/vRAN, you can intelligently distribute functions and services to the edge. Common infrastructure is an imperative!





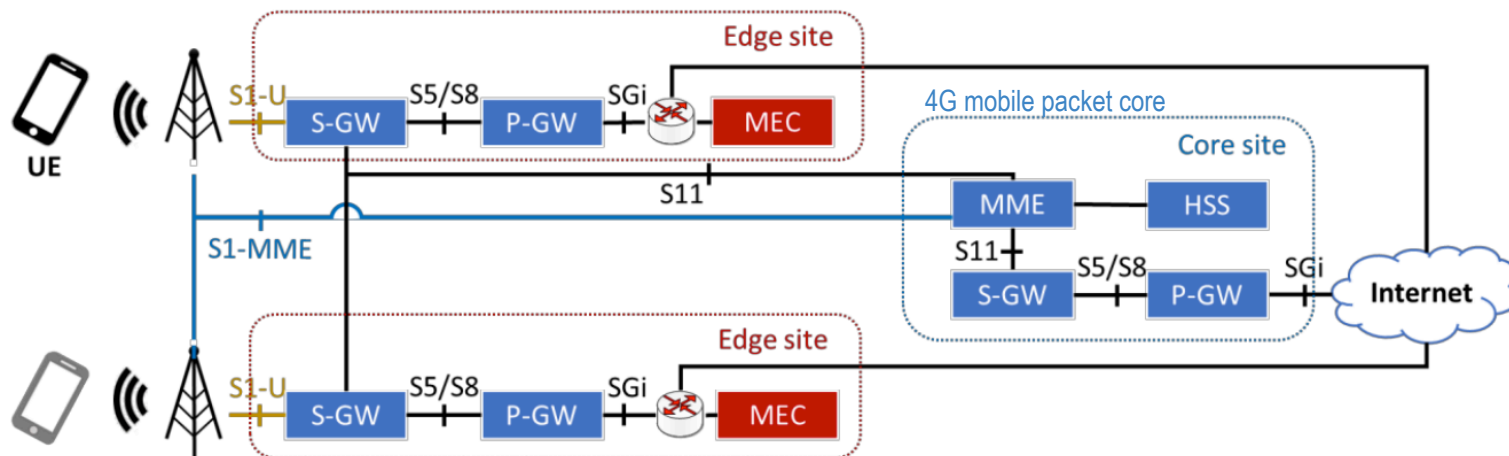
## Bump-in-the-wire model

Steering users traffic at S1-U  
in access/pre-aggregation network



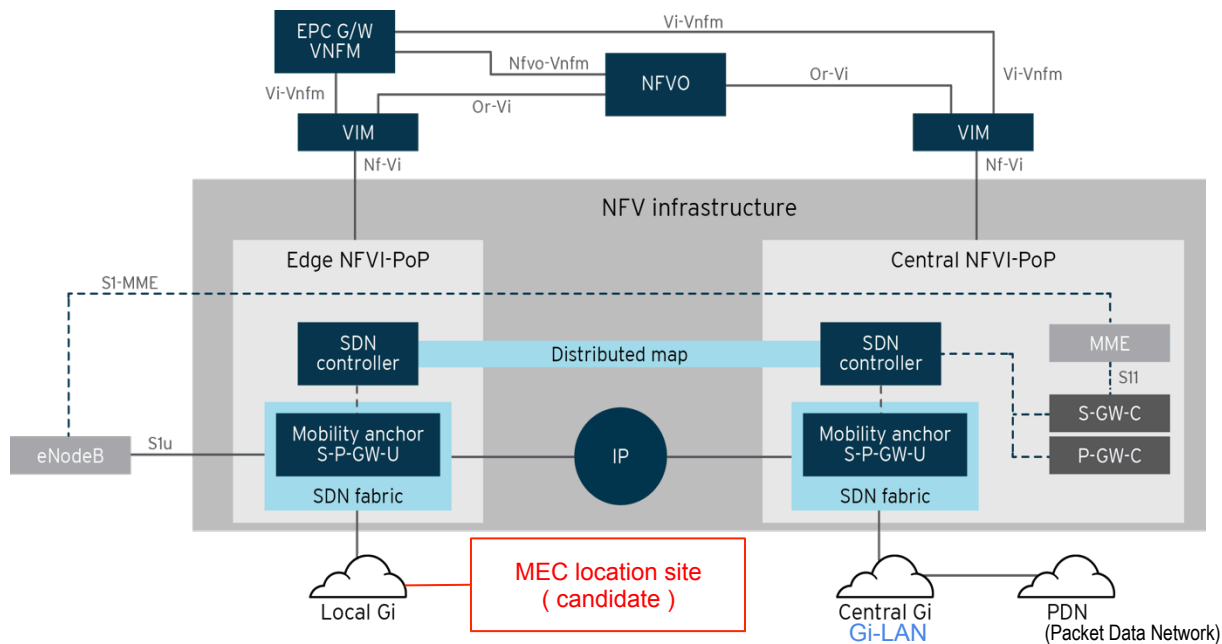


Distributed S/P-GW at Edge site that can provide clear demarcation to user packets





## SDN-enabled virtual EPC gateway at Edge site... Distribute S/P-GW (4G)

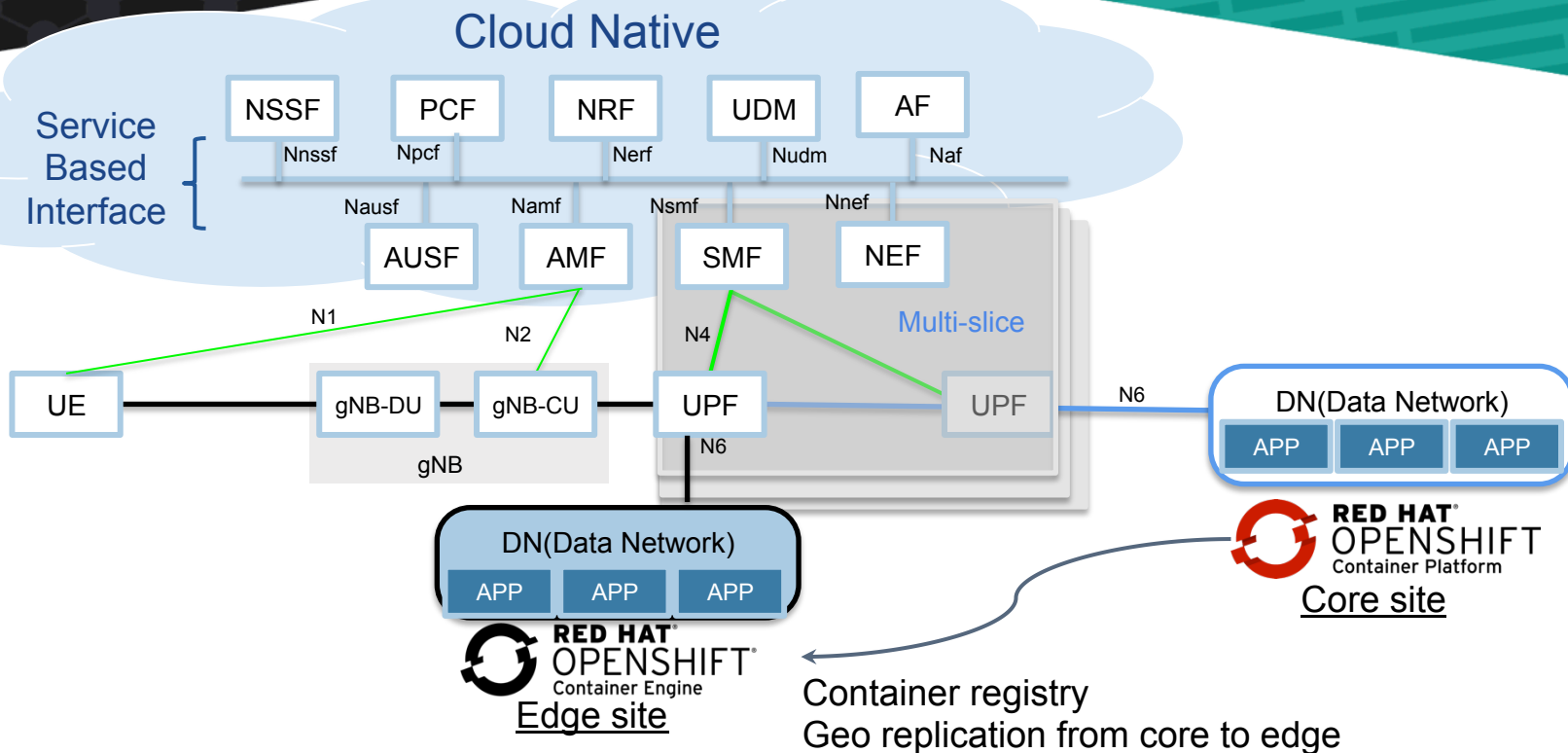


Altiostar	Cloud Ran with Ethernet Front-haul
ConteXstream, An HP Company	ODL based Distributed SDN Controller, GTP Open Flow Switch, TCP Optimization
HP	Compute, ToR switch, NFV Director
ImVision	Live TV multicast platform
Mavenir	MME, S-GW and P-GW Control plane
RedHat	Openstack, KVM, Linux





# 5G Service Based Architecture



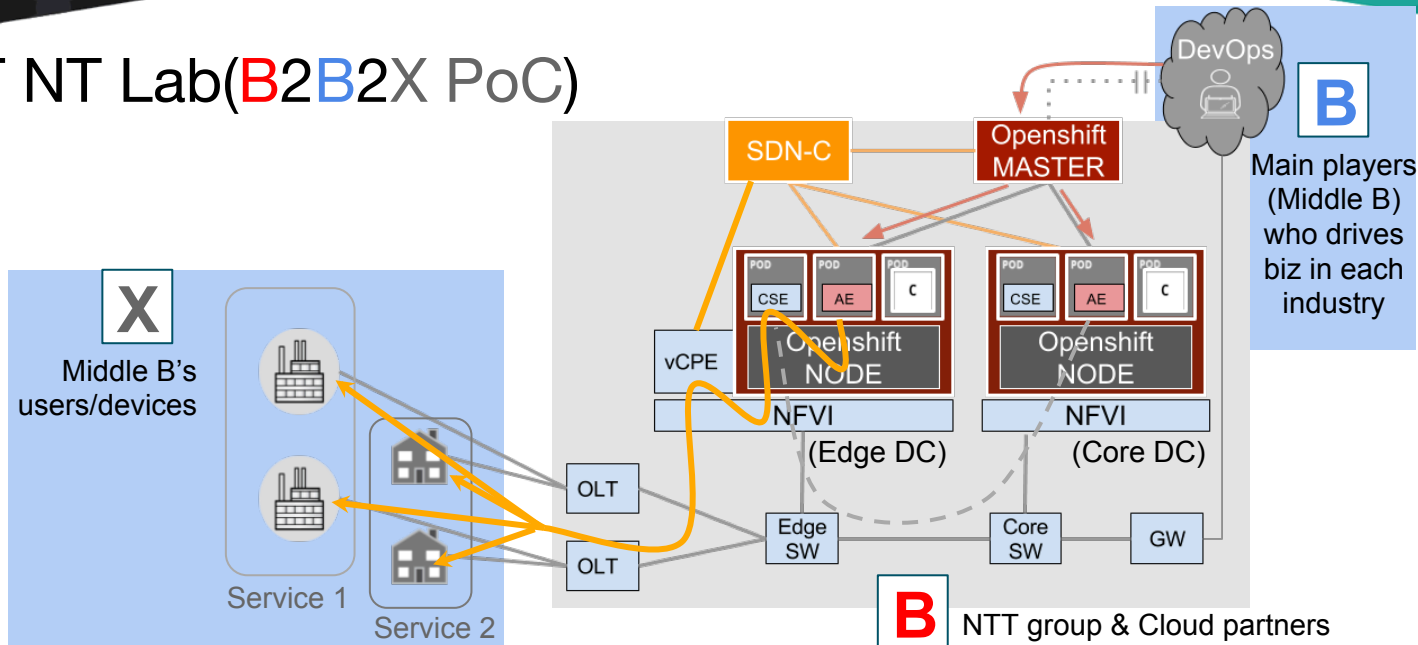


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# Carrier Edge DC use case Y2017

## NTT NT Lab (B2B2X PoC)



# X

## Application centric networks

Edge Data Center/Central Office

Central Data Center

Town/City

Arban City

Regional Area

Container Engine

IoT  
eclipse.org

VERT.X

kafka

APACHE  
Spark

TensorFlow

Kubeflow

BLOCKCHAIN

STRIMZI

DevOps at  
Central DC cloud

WiFi  
Edge

Broadband  
access

4/5G  
vRAN

RED HAT  
OPENSSHIFT  
Container Engine

RED HAT  
OPENSTACK  
PLATFORM

RED HAT  
CEPH STORAGE

Ceph Data Lake

Container Engine

RED HAT  
OPENSSHIFT  
Container Platform

RED HAT QUAY

amazon  
web services

Microsoft  
Azure

Google Cloud Platform

NFV Edge Computing / Edge Cloud

Geo replication

CORE

Agile deployment at  
any Telco Edge cloud  
for middle B

B

Disaggregated networks

A  
ANSIBLE  
TOWER  
by Red Hat

okd

NEXT STEP B2B2X platform

redhat.



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# Practical Examples



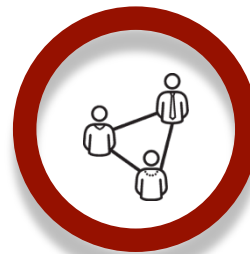
Face  
Recognition,  
security apps



Connected Car  
MEC video  
processing



CDN



Blockchain as a  
Service



IIoT Intelligent  
Edge



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# What do 5G&MEC mean for a CSP?

## Better Connectivity

Increased Bandwidth

Decreased Latency

Proximity Services  
(MEC)

Management Challenges





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Innovative Revenue  
Streams

New competitors (C-SP)

Need for Agility





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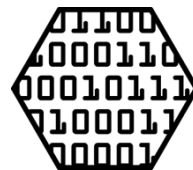


## Explosion of Data

Storage requirements

Data privacy

New Revenue Streams  
(*again!*)





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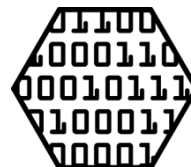


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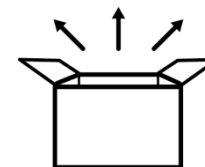
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## Analytics

AI/ML

Flexible Big Data  
platforms







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## Summary

- Cloud Native and Carrier infrastructure environment for 5G
  - Kubernetes ... fast becoming de-facto master
  - VNF workload and Container workload will co-exist
  - Heterogeneous computing ... CPU based, GPU based and FPGA based
- Need to develop Edge and Core de-centralization architecture
  - Container registry for Geo replication from Central DC to Edge DC
  - Ceph data lake
- Telco Edge needs access technologies(VNFs, etc) on OpenStack NFV platform for bringing user traffic into cloud native apps in Kubernetes
- Openshift meets B2B2X



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# Q & A

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ignacio@redhat.com

Another session by Ignacio Verona  
Telcos New Edge: Blockchain Technology Applied

Wednesday, September 26 at 14:10

<http://sched.co/Fnsd>

# THANK YOU



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