TeraFlow SDN by ETSI

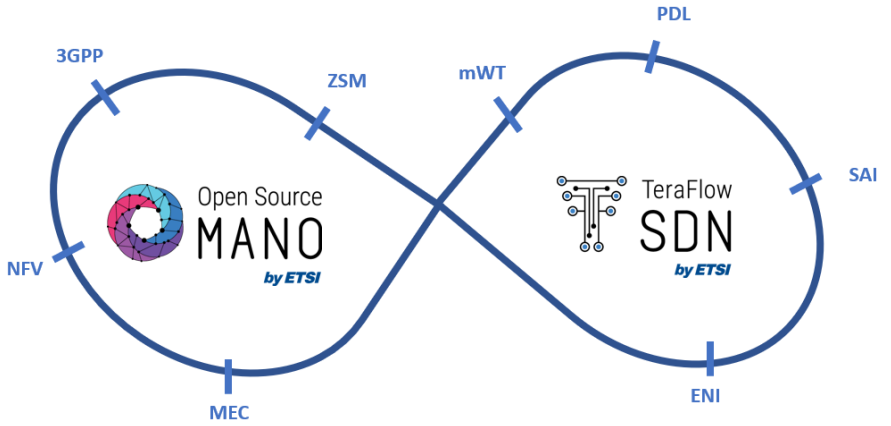
TeraFlowSDN and ETSI MEC

Ricard Vilalta, Chair ETSI OSG TeraFlowSDN (TFS)

TFS Ecosystem Day

Toolbox for Experimentation, Prototyping and Use Case Validation

Multiple opportunities have been identified for TeraFlowSDN and several ETSI groups working on Network Transformation, more will follow:



- WAN Infrastructure Manager for ISG NFV.
- Federation Manager for ISG MEC.
- Dynamic Monitoring and forecasting mechanisms for ISG ENI.
- Smart Contract applicability to Network Management with ISG PDL.
- Wireless Transport Profile and Backhaul Automation with ISG mWT.
- Resilient ML components for adversarial attacks and AAI protection patterns with ISG SAI.

Interoperability with OpenSourceMANO opens the door to a wider set of complex use cases.

TeraFlowSDN and ETSI ISG MEC

Discussion on multiple touchpoints:

- Data plane connectivity (Mp2)
- TFS could play a role with Federation Manager
- Multi-access Edge Orchestrator
- TFS and DECODE WG

MEC Federator

https://www.etsi.org/images/files/ETSIWhitePapers/ETSI_WP_49_MEC-Federation-Deployment-considerations.pdf

Inter-MEC systems and MEC-Cloud systems coordination: “MEC Federation” (MEC 035 – published / MEC040 -- ongoing)

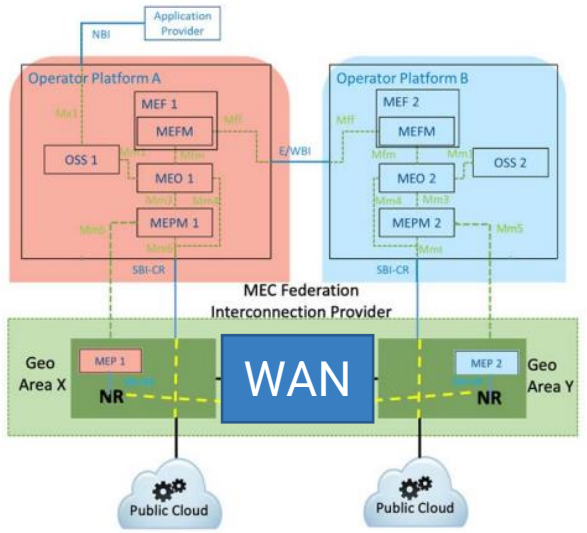


Figure 35: MEC Federation Interconnection Provider hosting MEC Platforms, enabling Network Resources and access to Cloud Resources to Operator Platforms in MEC Federation.

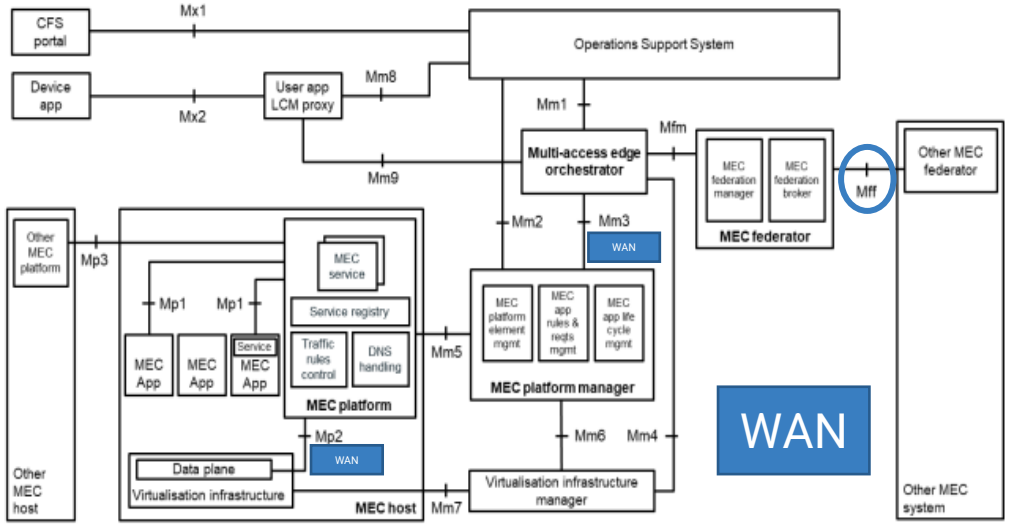
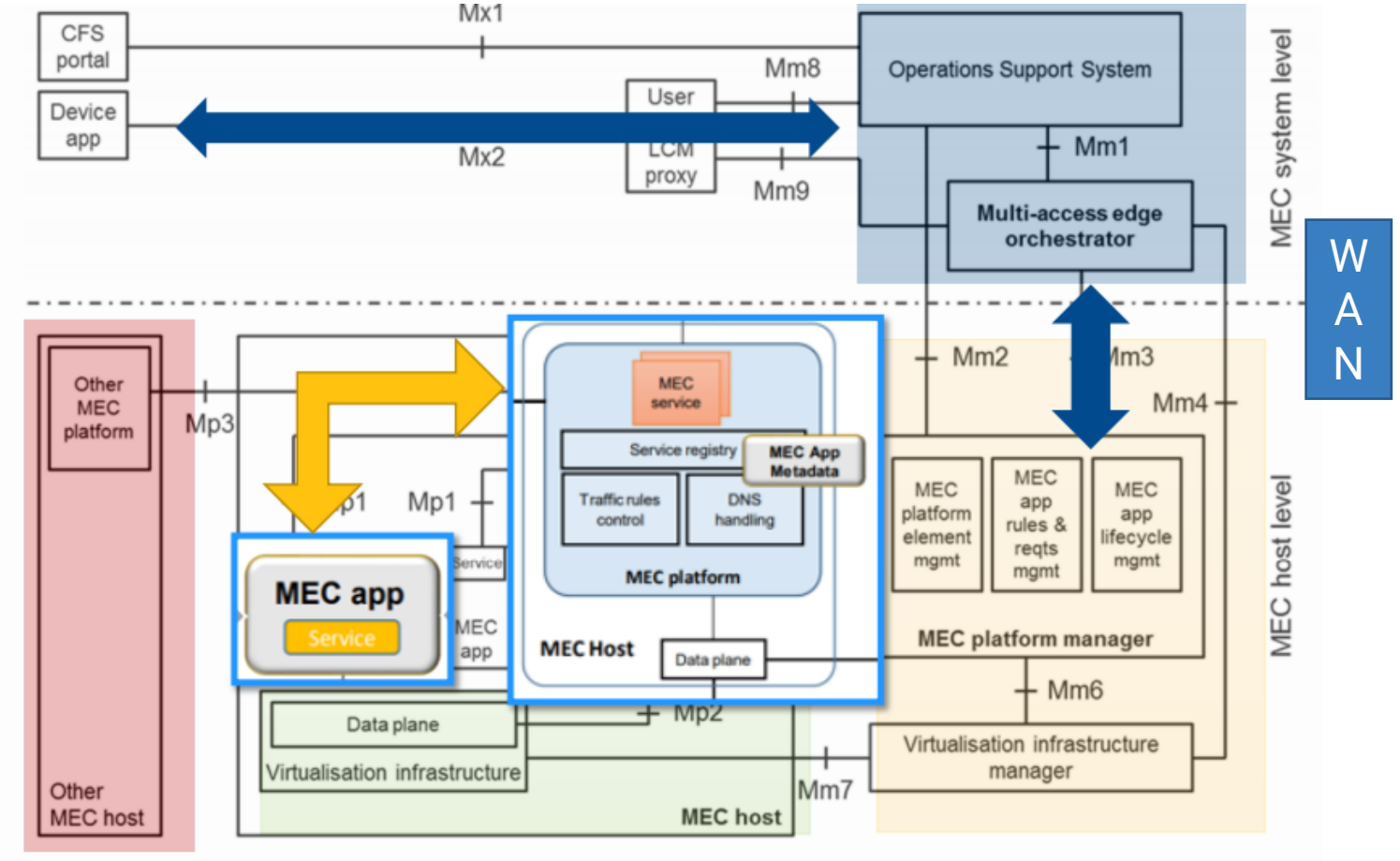


Figure 6: Multi-access edge system reference architecture variant for MEC federation. (Source: ETSI GS MEC 003 [5])

Multi-access Edge Orchestrator

APIs
- Application Support
- Service Management
- Radio Network Information
- Location
- UE Identity
- Bandwidth Management
- Fixed Access Information
- WLAN Information
- V2X Information Service

- Application Package lifecycle and operation granting
- Device application interface



TFS and DECODE WG

Focus on SW developers engagement activities:

- OpenAPI representations: ETSI Forge ←→ OpenAPI and YANG models relate very well
- Testing and Conformance ← → TFS best practices
- PoCs (proof-of-concepts)
- Collaborations: Akraino → Once done architectural work, specific contributions could be assessed
- Hackathons and plugtests → Possibility to join forces

TFS demo during MEC#33 at CTTC

2023-2024 Roadmap

- Software assets (Present and potential): SDN controller
  - GS 015: https://forge.etsi.org/rep/mec/gs015-bandwith-mgmt-api/-/blob/v2.1.1-OAS3.1/BwManagementApi.yaml
  - Multi-access aspect
  - CDN-based MEC
  - LS TFS – MEC with contents of GS 015 (Dario)

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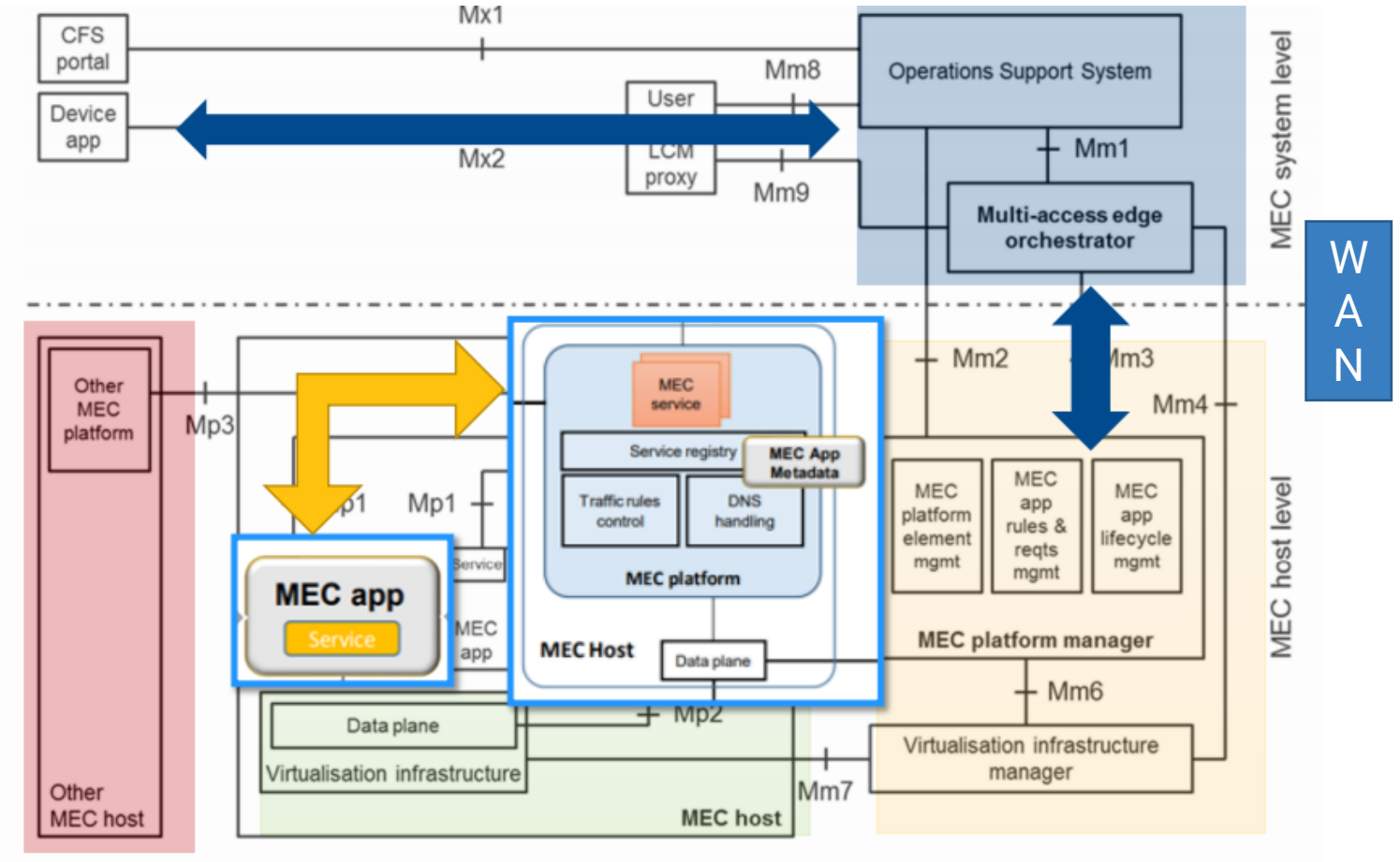
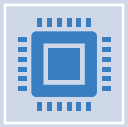




MEC BandWidth Management (BWM) service and TeraFlowSDN can be used to provide dedicated resources for network resource allocation for Gaming.

BWM allows applications to allocate specific amounts of bandwidth to gaming applications, while TeraFlowSDN provides a way to manage and control traffic flows.

This can help to ensure that gaming traffic has priority over other traffic, which can improve the gaming experience for users.

The tests of this compute-network interface can also be interesting for upcoming 6G networks.

ETSI MEC PoC: Team Members

	Organisation name	ISG MEC participant (yes/no)	Contact (Email)	PoC Point of Contact (*)	Role (**)	PoC Components
1	CTTC	YES	ricard.vilalta@cttc.es	X	Infrastructure provider	TeraFlowSDN Edge routers and servers
2	xFlow	YES	muhammad.hamza@xflowresearch.com	X	Aplication provider	App
3	Telefónica	YES	diego.r.lopez@telefonica.com joseantonio.ordonezlucena@telefonica.com		Network Operator	-

(*) Identify the PoC Point of Contact with an X.

(**) The Role will be network operator/service provider, infrastructure provider, application provider or other.

ETSI MEC PoC: Project Scope and Milestones

TeraFlow SDN

PoC Topic Code	PoC Topic Description	Related WG/WI	Expected Contribution	Target Date
Topic 4	MEC-enabled Vertical Segments applications			
Topic 3	MEC Architecture			

PoC Milestone	Milestone description	Target Date	Additional Info
P.S	PoC Project Start	01/09/23	
P.C1	PoC Expected Contribution 1	01/11/23	
	Submission for OFC24 demo	15/11/23	
P.D1	PoC Demo 1	15/03/24	San Diego, F2F
P.D2	PoC Demo 2	18/03/24	MEC Plenary #37
P.D3	PoC Demo 3	01/04/24	Webinar
P.R	PoC Report	TBD	
P.E	PoC Project End	TBD	

ETSI MEC PoC: Architecture

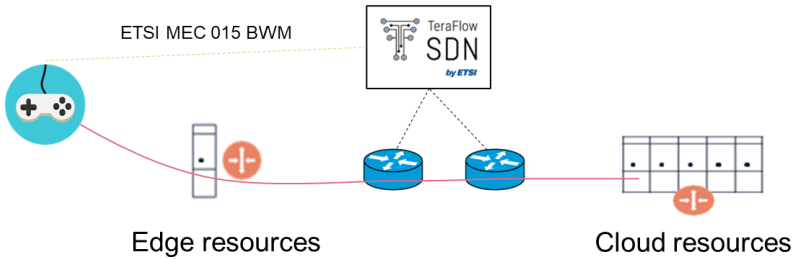
Network resource allocation for gaming using MEC BandWidth Management (BWM) service and TeraFlowSDN (TFS) can be done in the following steps:

1. Identify the gaming applications that need dedicated resources. This can be done by analyzing the traffic patterns of gaming applications and identifying the ones that are most demanding in terms of bandwidth.

2. Set up TeraFlowSDN including network equipment (e.g., CSGW). This involves installing the software and configuring the policies that will be used to allocate bandwidth to gaming applications.

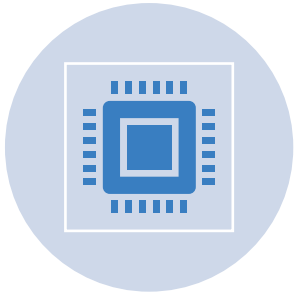
3. Allocate bandwidth to gaming applications. xFlow application will send to TeraFlowSDN bandwidth allocation request. The amount of bandwidth that is allocated to each application will depend on the traffic patterns and the performance requirements of the application.

4. TFS will monitor the network traffic. This is important to ensure that the bandwidth that is allocated to gaming applications is not being used by other applications.



ETSI MEC PoC: Additional considerations

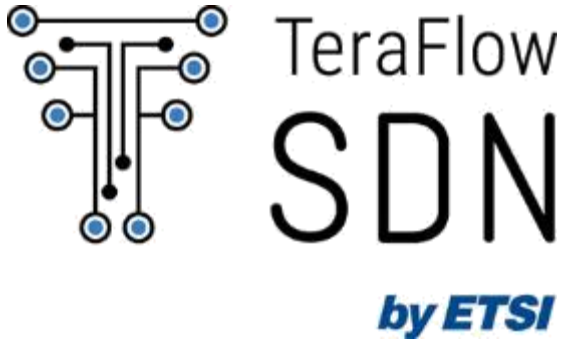
The amount of bandwidth that is allocated to gaming applications will depend on the type of game and the number of users. For example, a multiplayer game that requires real-time communication will need more bandwidth than a single-player game.



The location of the gaming applications will also need to be considered. If the gaming applications are hosted in the cloud, then the bandwidth that is allocated to them will need to be sufficient to support the round-trip latency between the user and the cloud.

The network traffic flows will need to be monitored to ensure that the bandwidth that is allocated to gaming applications is not being used by other applications. If the bandwidth is being used by other applications, then the policies that were set up in step 2 will need to be adjusted.

Overall, MEC BWM and TeraFlowSDN can be a valuable tool for operators who want to provide a dedicated gaming experience for their users. By carefully allocating bandwidth to gaming applications, operators can improve the gaming experience for users and reduce congestion on the network.



Thank you!

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