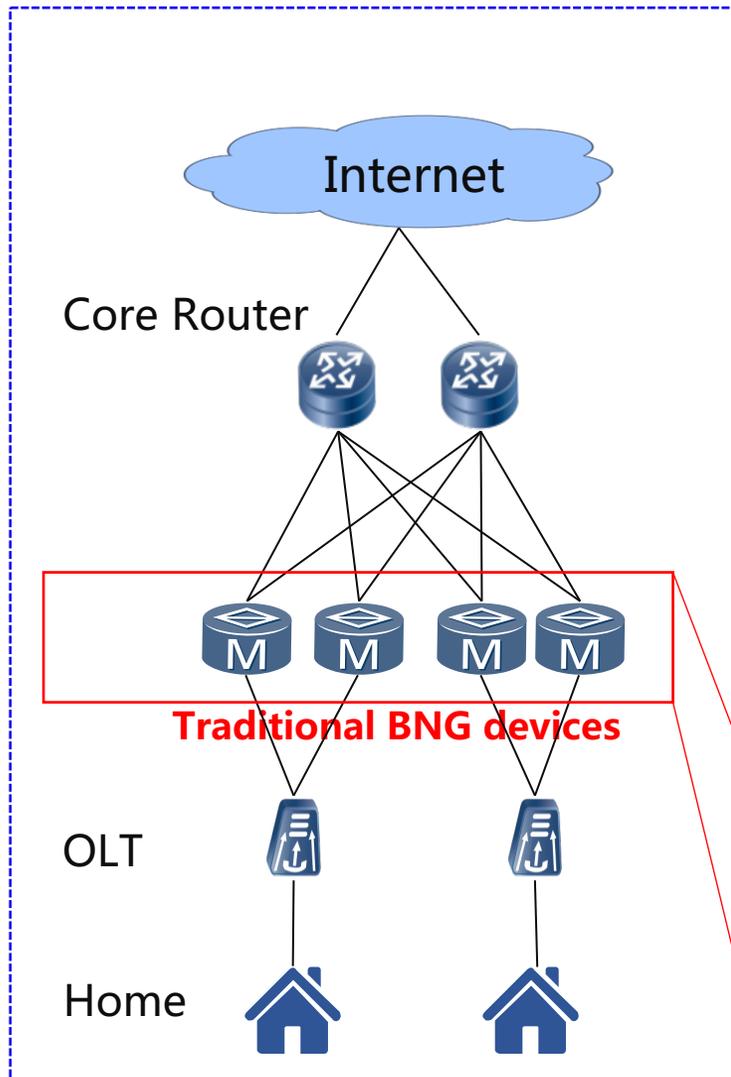


Control and User Plane Separation Architecture of Cloud based BNG

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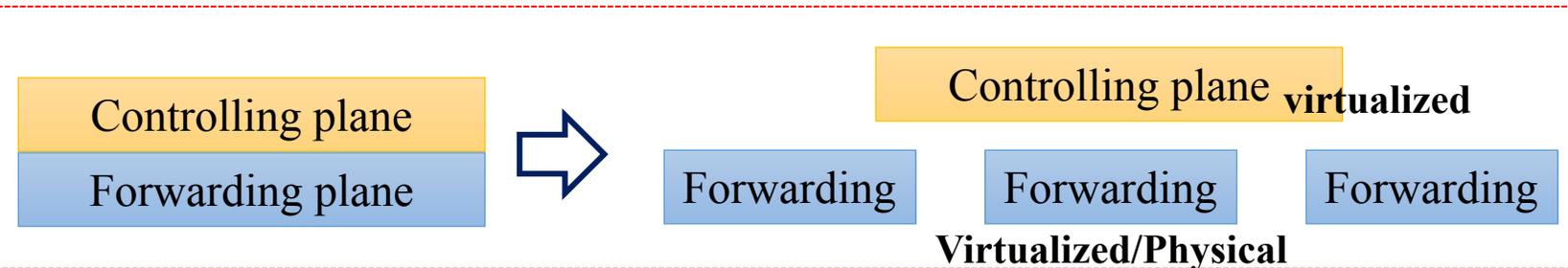
Motivations of the new architecture



BNG (Broadband Network Gateway) device is defined as an Ethernet-centric IP edge router, and the aggregation point for the user traffic. It performs **Ethernet aggregation, access protocols termination**, supports **user management, QoS and policy management, packets forwarding via IP/MPLS** and etc.

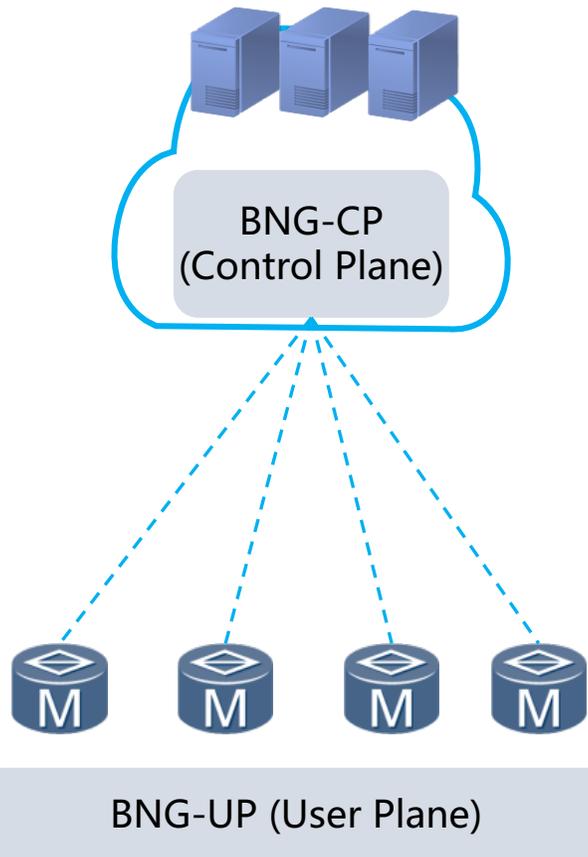
Some Concerns:

- (1) Services are **not well balanced** in different parts resulting to different utilization of resources such as sessions and IP addresses for example.
- (2) BNG is evaluated by indicators some related with forwarding resources and some related with controlling resources. Both can be the limitation of a BNG device .
- (3) BNGs are configured on each device. It's not convenient **on management**.



Values of the new architecture

New architecture brings big changes and brilliant advantages



Point1: Resources can be central controlled and balanced

Centralized control plane takes the responsibility of control and management. Thus it has the overall view of resources and can distribute the resources as required.

Point2: Device can be more efficient in extension

Control plane and user plane can be extended separately according to different situations such as the session overload and extremely high throughput.

Point3: Management can be easier as the BNG-CP is the only one facing to the outside system such as EMS, DHCP server, Radius and so on.

Point4: BNG-CP can be virtualized as a VNF with its management of MANO

Point5: BNG-UP can be a virtual machine or physical device as demand

Architecture

Neighboring policy and resource management systems

Radius Server

DHCP Server

EMS

MANO

Neighboring policy and resource management systems deploys different service systems such as RADIUS server, DHCP server and EMS. Besides, MANO is included.

Control plane

BNG-CP

PPP

Address
managementSubscriber
managementUP
management

AAA

Radius

DHCP

User plane

BNG-UP

Routing control

Forwarding
engine

BNG-UP

Routing control

Forwarding
engine

.....

BNG-UP

Routing control

Forwarding
engine

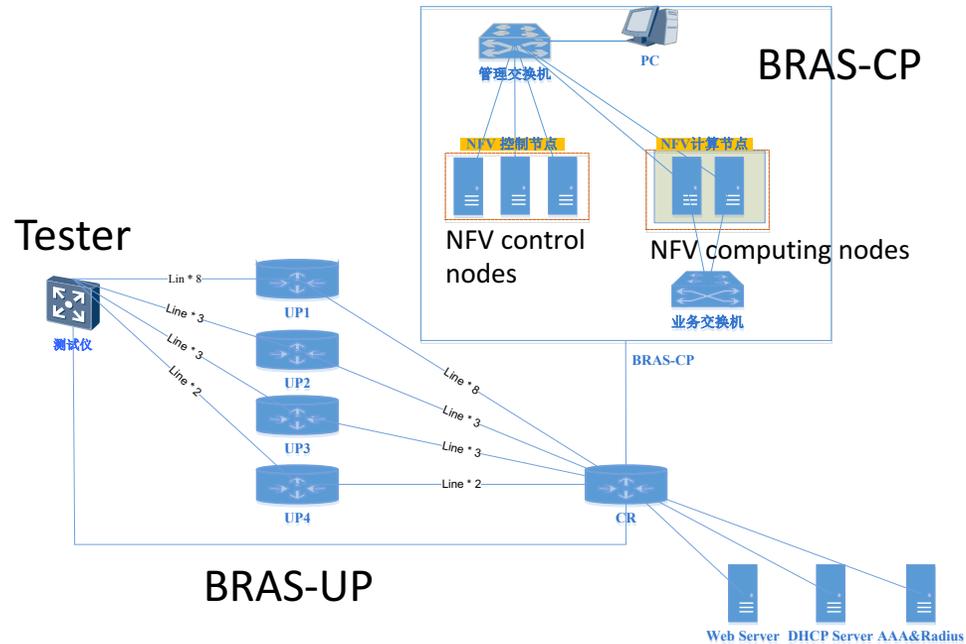
CP is a user control and management component

- PPP focuses on user dialup packets of PPPoE / IPoE process
- Address, subscriber and up management are responsible for address pool, user entry and user policy, and UPs respectively.
- AAA, Radius and DHCP are used to connect with the neighboring systems

UP is a network edge and user policy implementation component

- Routing control focuses on the routing thing such as IGP/BGP/MPLS
- Forwarding engine focuses on traffic forwarding and user policy implementation such as QoS
- Other functions such as traffic statistics collection

Recent tests



New architecture of BNG test

Functionality	Basic test considering BNG-CP	✓
	BNG access function	✓
	COA/DM function	✓
Performance	QoS function	Not well supported
	Dial rate of users on BNG-CP/BNG-UP	
Reliability	Maximum Sessions on BNG-CP /BNG-UP	
	BNG-CP failure	✓
	BNG-UP reload	✓
	HA of BNG-UP	Not well supported
	Channel of BNG-CP and BNG-UP failure	Not well supported

- Basic functions can be mainly covered by new architecture of BNG with BNG-CP focusing on controlling while BNG-UP focusing on forwarding.
- Performance of BNG-CP is not well enough to be widely deployed, lower than 10million users with the dial rate of 10 thousand and support lower than 200 UPs.

Comments

- From Kostas

Goal and scope: the new architecture of BNG and make it standardized

Dissemination activity for a project or not? No such activity

Work stage:

first the standardized architecture, and then the standardized interface between BNG-CP and UP

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Use case: we explain a new one in the previous slide to make it much more clear

- Any other comments are welcomed.

Thank you

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