CMCC's Consideration on Disaggregated BNG
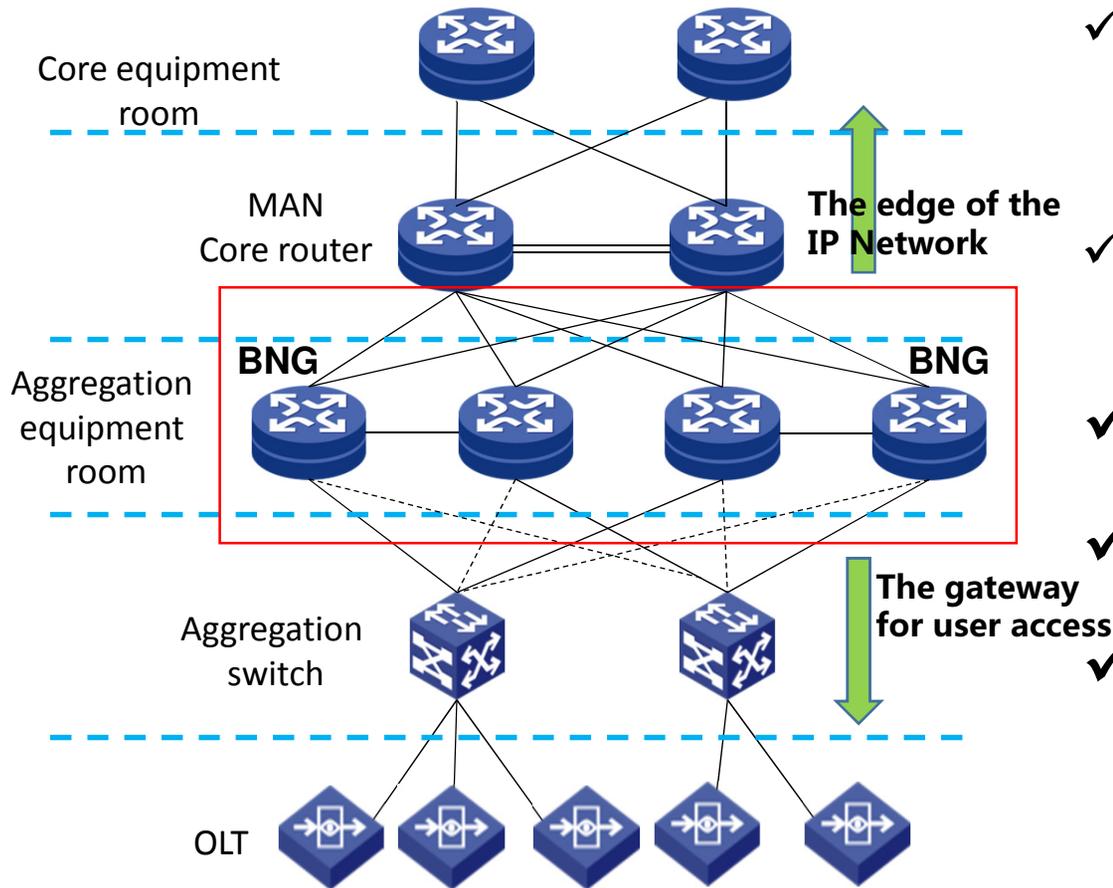
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BNG In CMCC's Network

BNG=Broadband Network Gateway

Core equipment room

MAN Core router

The edge of the IP Network

BNG   **BNG**

Aggregation equipment room

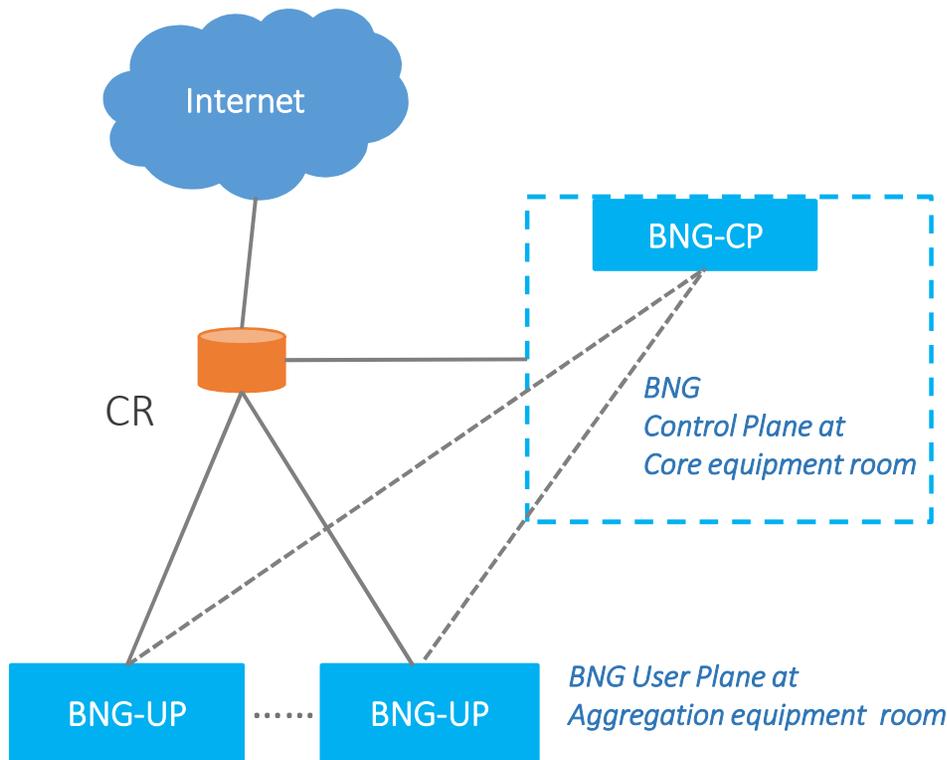Aggregation switch

The gateway for user access

OLT

- ✓ Gateway for residential access with necessary management functions (PPPoE, AAA,etc.).

- ✓ First hop for fixed line Internet service

- ✓ **10,000+** Deployed in CMCC

- ✓ **>150 million** subscribers

- ✓ **95%** FTTH GPON

Challenges of Legacy BNG

- ✓ Inefficient address management
    - • Inadequate IP address + Hard to predict user base
    - • Advance planning results in inefficiency of address allocation
- ✓ Bucket effect cased by integrated CP and UP
    - ✓ Unbalanced Session management (CP) vs Capacity (UP) load
    - ✓ Whichever reaches the limit causes performance degradation of the other
- ✓ Complicated interfaces with neighboring systems
    - ✓ Each BNG interconnects with Radius/DHCP/EMS etc.
- ✓ Inflexible software upgrade for BNG

Desired DBNG Architecture

DBNG=Disaggregated BNG

Internet

CR

BNG-CP

BNG Control Plane at Core equipment room

BNG-UP

BNG-UP

BNG User Plane at Aggregation equipment room

Beijing: 200+ BNG-UPs (multi-vendor)
Managed by 2 BNG-CPs (Geo-redundancy)

✓ Fixed-Access BNG is our major requirement, should support
  - PPPoE, IPoE, L2TP, CGN, …
  - High Reliability
  - Multi-vendor interoperation
  - …
✓ BNG-CP (Control Plane)
  - Subscriber/Session management
  - Address management
  - AAA, QoS, Policy…
✓ BNG-UP (User Plane)
  - Forwarding (PPPoE/IPoE, IP, MPLS, NAT…)
  - Routing Control

CMCC DBNG Practices

Investigation was carried out since 2017 with PoC and field trial practices

- ✓ CP (VNF) + UP (VNF or PNF) deployment
    - CP deployed in the centralized cloud;
    - VNF UP for session-greedy services, PNF UP for traffic-greedy services;
- ✓ Better performance achieved
    - ✓ IP address utilization increases 40%;
    - ✓ Session capacity from 512K to 20million
    - ✓ Subscriber activation rate increase from 1000/s to 10k/s
- ✓ Service provisioning substantially simplified

Supporting Partners : Huawei, ZTE, H3C, CertusNet, Nokia;

Next Steps

- Wide DBNG deployment in 2019 and 50% legacy BNG (150 million subscribers) will be upgraded to DBNG in the coming years.

- Interoperation is required between DBNG-CP and DBNG-UP (year 2020)

- Progress in IETF
  - Discussion in RTGWG since 2017
  - Consensus on requirements and use cases
  - Consensus on proposing a new WG

Thanks