Requirements for C&U separation BNG Protocol

draft-cuspdt-rtgwg-cusp-requirements-00

draft-cuspdt-rtgwg-cu-separation-bng-deployment-00

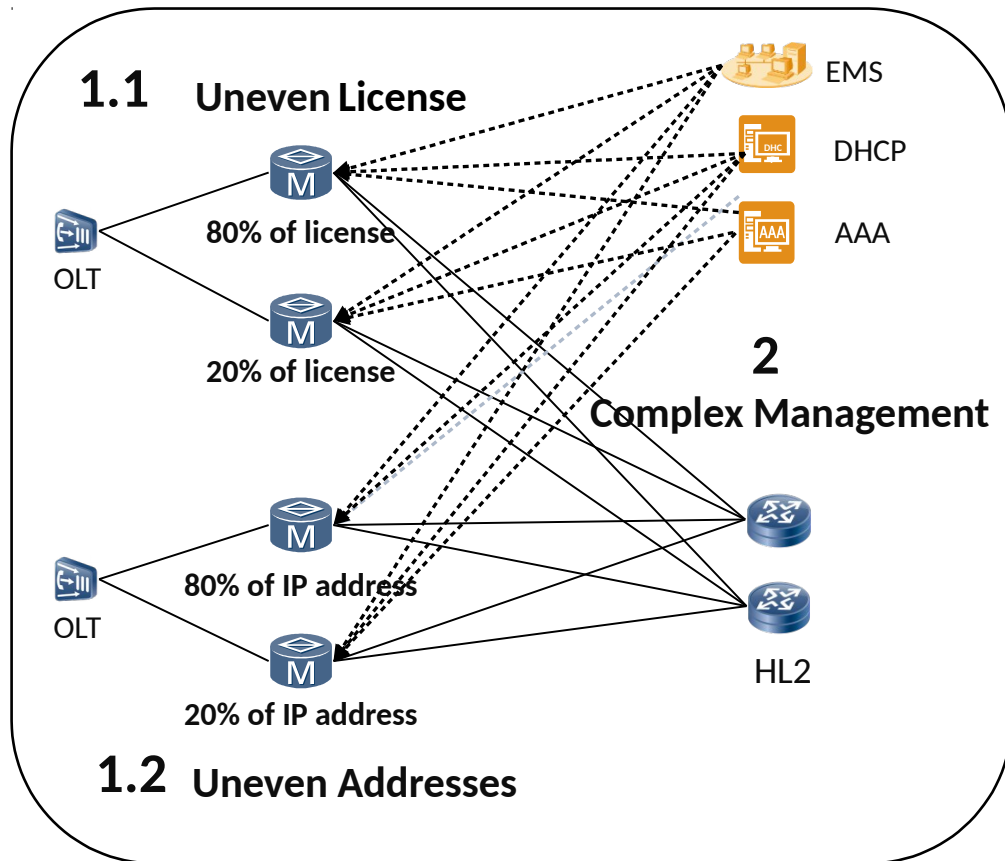Author: Shujun Hu (presenter)

Lu Huang

Rong Gu

Victor Lopez

Michael Wang

What is and Why we need the CU separation BNG?

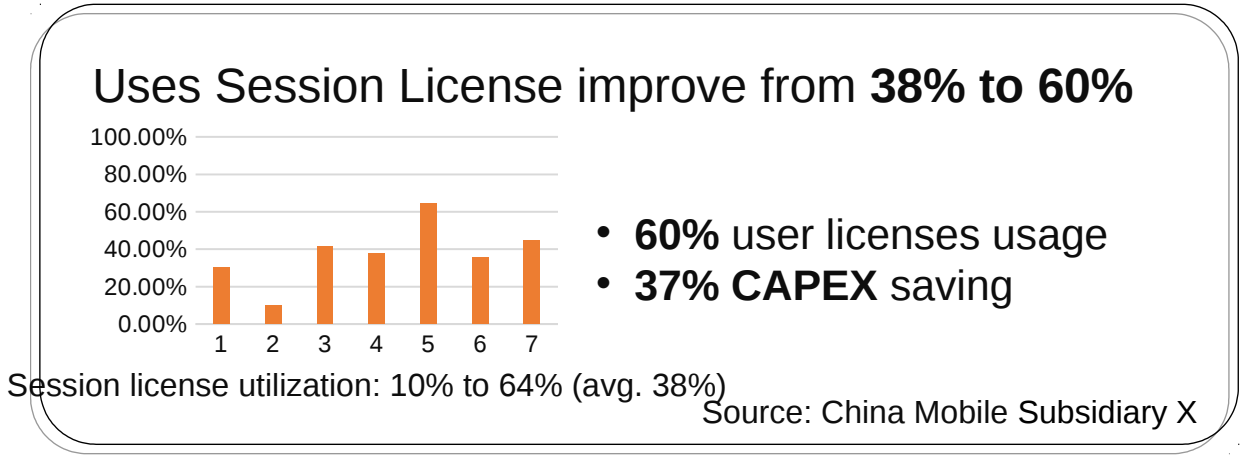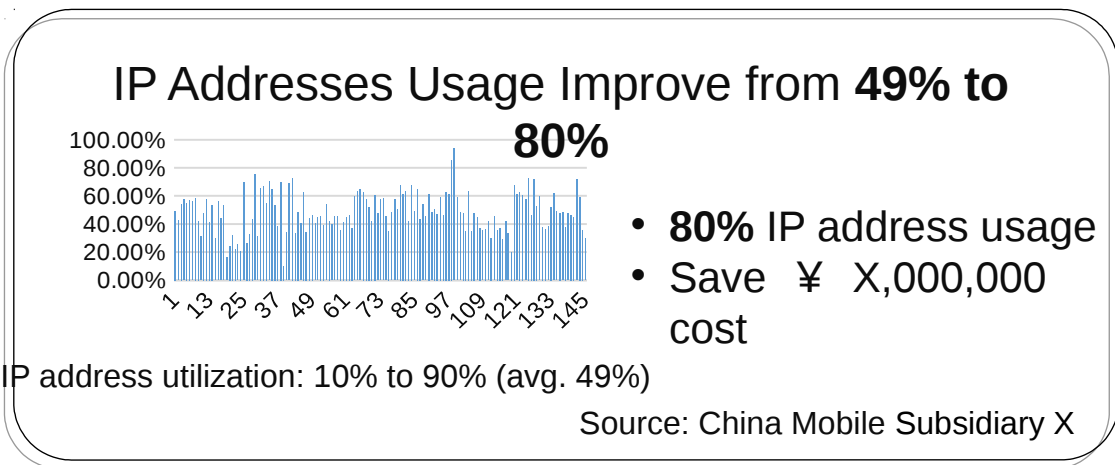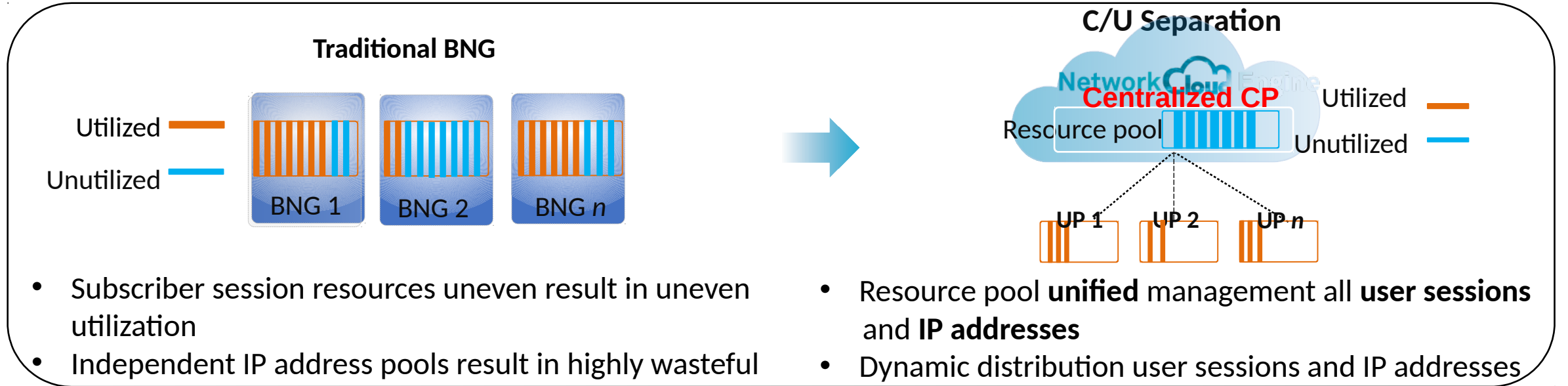Challenges: Traditional BNG Uneven Resource Usage & Complex Management

#1 Uneven Resource Usage (Lack of overall view)

➢ Uneven **User Session/IP address** distribution

➢ Uneven Physical **Bandwidth usage**
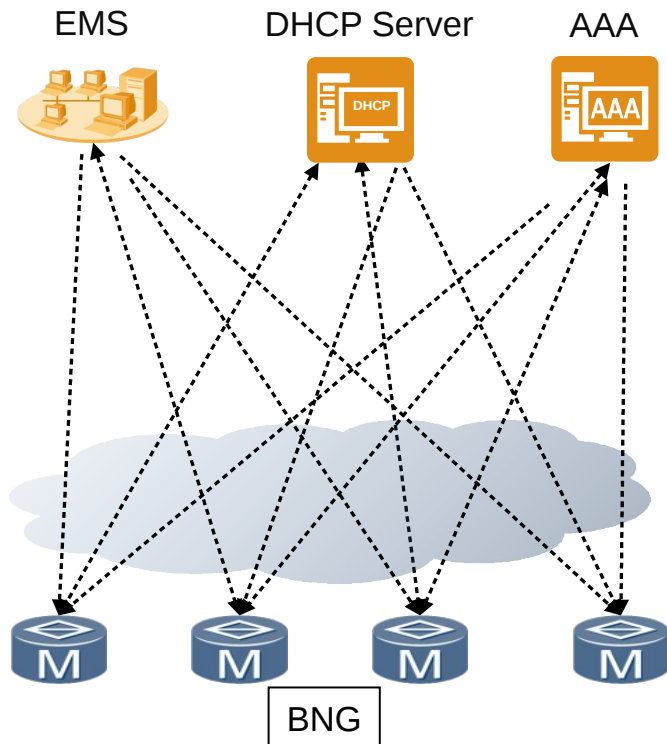
#2 Complex Management (Large number of BNGs)

➢Servers need to manage/integrate with **each BNG**

➢**New service** deployment result in **long TTM**

The CU separation BNG can address these issues: #1

Traditional BNG

Utilized

Unutilized

BNG 1   BNG 2   BNG *n*

- Subscriber session resources uneven result in uneven utilization
- Independent IP address pools result in highly wasteful

C/U Separation

Network Cloud Engine

Centralized CP

Resource pool

Utilized

Unutilized

UP 1   UP 2   UP *n*

- Resource pool **unified** management all **user sessions** and **IP addresses**
- Dynamic distribution user sessions and IP addresses

IP Addresses Usage Improve from **49% to 80%**

- **80%** IP address usage
- Save ￥ X,000,000 cost

IP address utilization: 10% to 90% (avg. 49%)

Source: China Mobile Subsidiary X

Uses Session License improve from **38% to 60%**

- **60%** user licenses usage
- **37% CAPEX** saving

Session license utilization: 10% to 64% (avg. 38%)

Source: China Mobile Subsidiary X

The CU separation BNG can address these issues: #2

Traditional Solution: Manage all BNG

EMS   DHCP Server   AAA

New Solution: Manage/Integrate with ONE CP

EMS   DHCP Server   AAA

Provide unified management interface

BRAS Control Plane (NFV)

Simplify management 90% saving

BNG

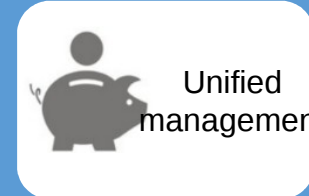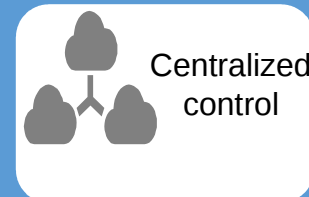BNG User Plane
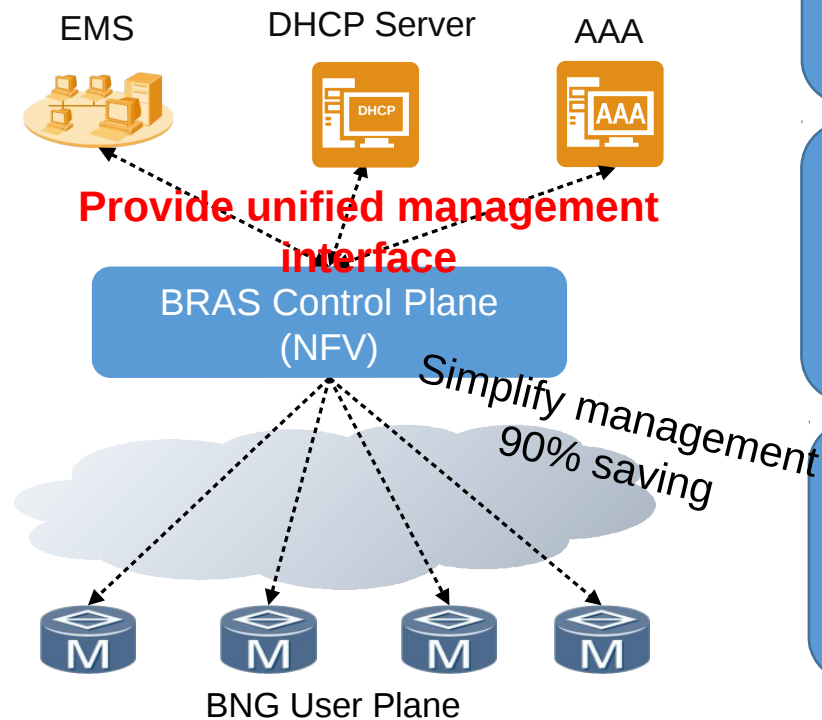
Capability openness — The BRAS-CP is based on the NFV architecture and supports quick service provisioning.

Unified management — Unified virtual resource management, improving virtual resource usage efficiency

Centralized control — unifying O&M entry Single-CP external interface, simplifying configurations

Source: China Mobile Subsidiary X

What we want to do in IETF

- Propose a set of standard interfaces to support the CU separation BNG (The following figure describes the CU separation BNG's interfaces)

BNG Control Plane (CP)

Service interface | Control interface | Management interface

BNG User Planes (UPs)
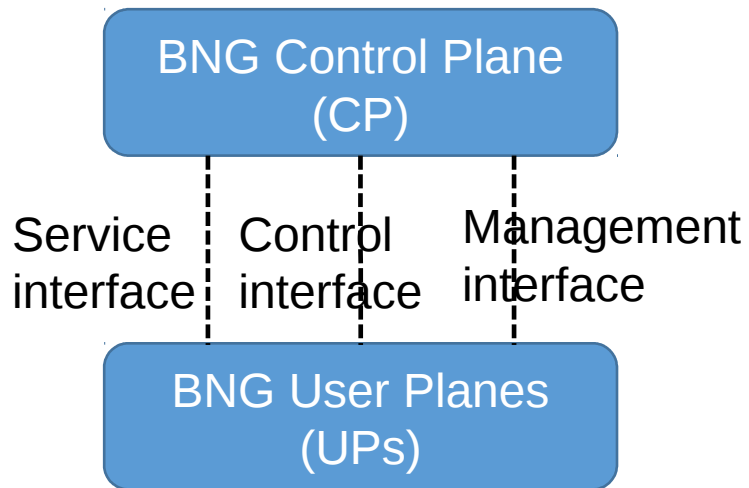
- Exist works list:
  - **Architecture** of CU-separated BNG device referring to BBF cloud CO: https://datatracker.ietf.org/doc/draft-gu-nfvrg-cloud-bng-architecture/
  - The information model for **Control interface:** https://datatracker.ietf.org/doc/draft-wcg-i2rs-cu-separation-infor-model/
  - Service interface: https://datatracker.ietf.org/doc/draft-huang-nvo3-vxlan-gpe-extension-for-vbng/
  - YANG data model **Management interface** https://datatracker.ietf.org/doc/draft-hu-rtgwg-cu-separation-yang-model/
- **Lack a standard protocol for the control interface** to carry the attributes which are described in https://datatracker.ietf.org/doc/draft-wcg-i2rs-cu-separation-infor-model/

The Crew (subset for CUSPDT)

- **CU S**eparation **P**rotocol **D**esign **T**eam Members:

  - China Mobile: Shujun Hu; Lu Huang; Rong Gu

  - Telefonica: Victor Lopez

  - Deutsche Telekom: Hans-Jörg Kolbe

  - Huawei: Michael Wang; Jun Song; Jinwei Xia

  - ZTE: Fangwei Hu; Rongrong Hua

  - H3C: Dan Meng

CUSPDT work methods

- To speed-up the our progress on the CUSP requirement, meeting are every 2 weeks.

- Meeting every weeks to discuss the design of the CUSP protocol.

- The progress will be published in the IETF mailing list on time.

- The important issue can be proposed in the mailing list for discussion.

- A GitHub page will be used to solicit more comments and inputs.

Welcome to join us

Current Research—the requirements for CUSP

Version negotiation
Different vendors' device may implement different versions of protocol, therefore, the CU separation protocol should provide some mechanism to perform the version negotiation.

Capability Report
The User Capability Report displays the devices profile, service capability, and other assigned capabilities within the CU separation BNG.

CP primary/backup capability
- backup CP for disaster recovery;
- Switchover of CP primary & Backup

allow the CPs to send user's information table to each UPs.
- The current BNG service requires that the UP should support as least 2000 users being accessed every second. Therefore, every user should be distributed at least 2000 bytes.
- To achieve high performance, the CU Separation protocol SHOULD be lightweight.
- CU separation protocol should support XML/binary data which serves as the encoding format.
- in order to provide centralized session management, high scalability for subscriber management capacity, and cost-efficient redundancy, batching ability should be involved.

CUSP requirements

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Current Research – the requirements for CUSP

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**CUSP requirements**

Event Notification

The CUSP protocol MUST be able to asynchronously notify the CP of events on the UP:
- Statistic parameters ;
- Response to CP's request;
- User TRACE;
- User detection;
- Failures;
- Change in available resources;
- Change in capabilities.

Reliability

- The CUSP should support some kind of heartbeat monitor mechanism.
- And this mechanism should have ability to distinguish whether the interruption is an actual failure.

Secure Communication

the CUSP should support multiple security mechanisms to satisfy various scenarios.
- when the special lines are implemented between the CP and UP, the key chain mechanisms may be supported.
- if some VPNs are deployed between the CP and UP, the TLS need to be supported.
- In case of the CP and UPs cross several domains (i.e. cross third-party network), the IPsec mechanisms may be supported.
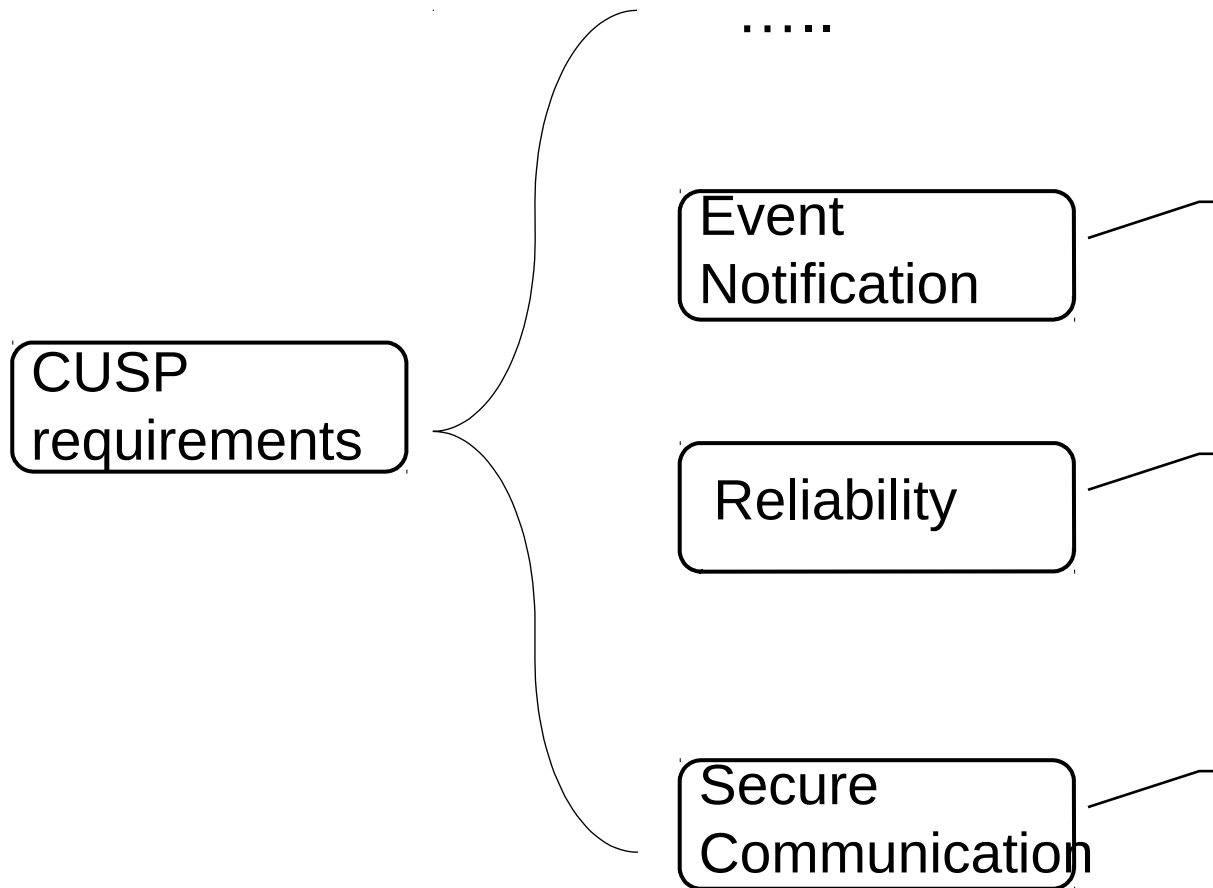
Next Steps

- Please go through our drafts
- Please provide your important feedback
- Welcome new members to join the Design team.

Thank You