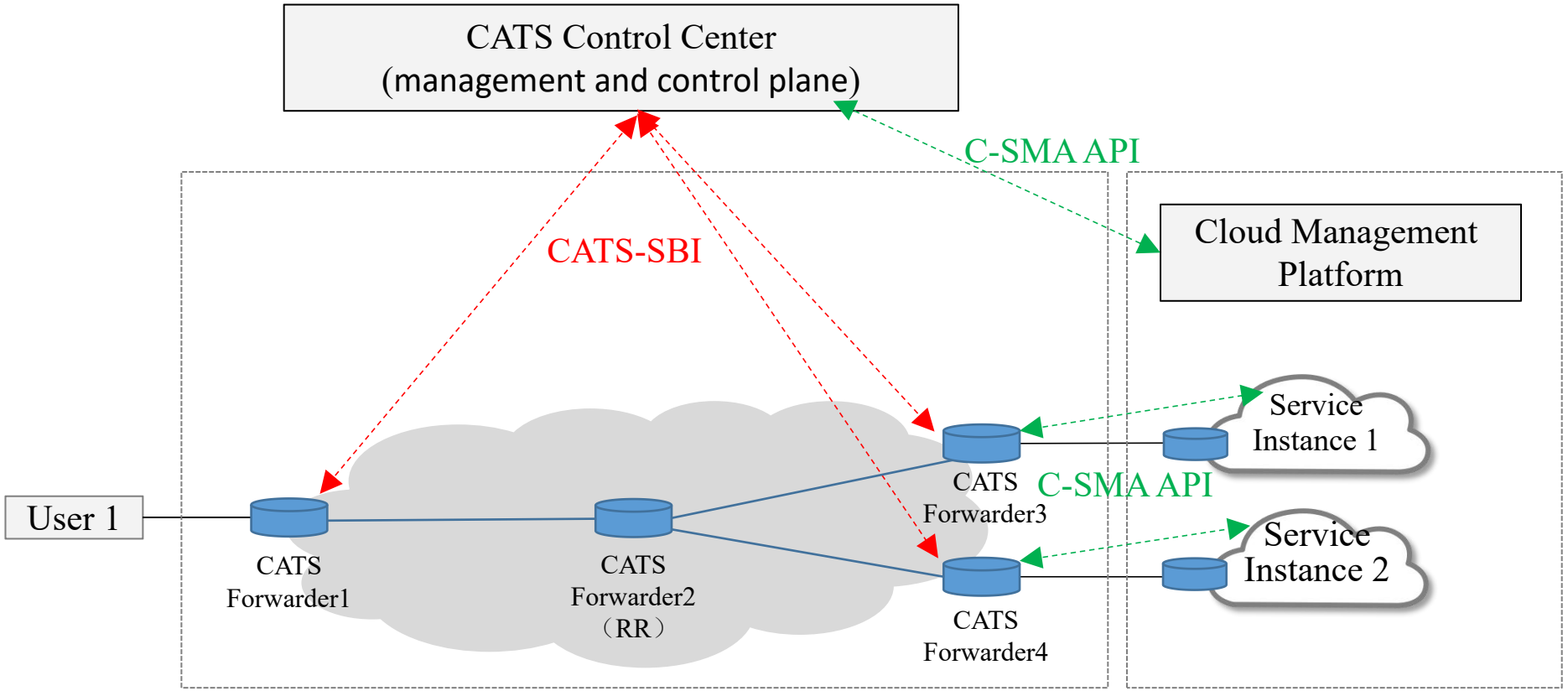
# Data Model for Computing-Aware Traffic Steering (CATS)

draft-yl-cats-data-model-03

Huijuan Yao (China Mobile)
Changwang Lin (New H3C)
Zhenqiang Li (China Mobile)
Presenter : Quan Xiong (ZTE Corporation)

IETF-123, July 2025

# CATS System Architecture

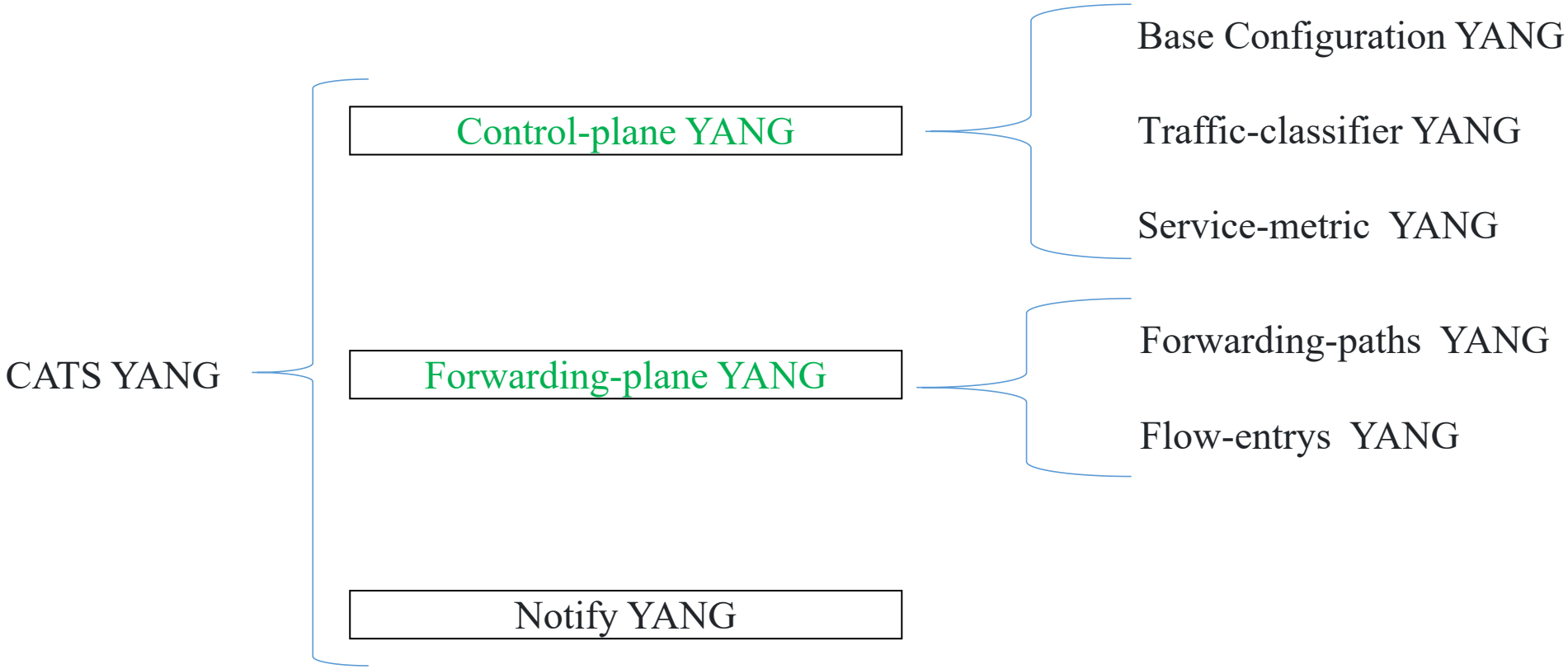



**CATS-SBI:** it could be used to report computing service information from CATS-Forwarders to the CATS-Control Center, and also could be used to send path and service policy information or computing service information from CATS-Control Center to CATS-Forwarders.

**C-SMA API:** it is the interface between the CATS-Control Center and the Cloud Management Platform or between CATS-Forwarders and Service-Instance, which can be used to report computing service metric information to the CATS-Control Center or to CATS-Forwarders.

# CATS Data Model Structure

- The CATS YANG data model is defined for the configuration and management of CATS data.



# CATS Base Configuration Tree

- It could be used for **C-SMA API** between the CATS-Control Center and Cloud Management platform, as well as for **CATS-SBI** between the CATS-Control Center and the CATS-Forwarder.

- **"enable"** : Enable or disable the CATS function;
- **"cats-update-interval"** : Determine the interval of metric changes notification. The default value is 30 seconds.
- **"entry-limits"** : Configure the maximum number of table entries.
- **"flow-limits"** : Configure the maximum number of flow tables.
- **"flow-timeout"** : Control the aging time of flow tables.

```
+--rw base
|  +--rw enable           bool
|  +--rw update-interval  uint
|  +--rw entry-limits     uint64
|  +--rw flow-limits      uint64
|  +--rw flow-timeout     uint
|  +--rw service-policy
|     +--rw cs-id         index, type cs-id
|     +--rw policy-type   enumeration
```

- **"service-policy"** : Set the service-policy table for traffic routing, the service policy-type includes affinity-based, service-metric-based, network-metric-based, and combined service-metric and network-metric-based.

# CATS Traffic-classifier Tree

- It could be can be used for **CATS-SBI** between the CATS-Control Center and the CATS-Forwarder.
- It defines the features of the service and to classify the traffic.

```
+--rw traffic-classifiers
|   +--rw traffic-classifier
|      +--rw cs-id              index,type cs-id
|      +--rw description        string
|      +--rw server-port        ushort
|      +--rw protocol           ushort
```

# CATS Service-metric Tree

- It could be used for **CATS-SBI** to forward service metric information from CATS-Control Center to CATS-Forwarder, as well as for **C-SMA API** to transmit service metrics information from the Cloud Management Platform to the CATS-Control center.

- It controls the delivery service metrics on the control plane, thereby generating the forwarding table on the forwarding plane in conjunction with network metrics.
- **"source-type" :** the source of service metric, such as Static or BGP.
- **"metric-type" :** such as Delay, Service-Capacity, Service-Availability-Ratio, Memory-Capacity and Memory-Ratio.

```
+--rw service-metrics
|   +--rw cats-service-metric
|      +--rw cs-id                index, type cs-id
|      +--rw cis-id               index, type cis-id
|      +--rw source-type          index, source-type
|      +--rw priority             uint
|      +--rw affinity             uint
|      +--rw location             inet:ip-address
|      +--rw metric
|         +--metric-type          index, type uint
|         +--metric               uint
```

# CATS Forwarding-paths Tree

- It could be used at **CATS-SBI** for the CATS-Control Center to distribute forwarding table entries to the CATS Forwarder.

- It is used for forwarding service traffic on the data plane. In scenarios with multiple paths, load balancing can be achieved based on the assigned weights.

- "dataplanetype" : the data plane type, such as mpls and srv6。

```
+--rw forwarding-paths
|   +--rw forwarding-path
|      +--rw cs-id                    index, type cs-id
|      +--rw cis-id                   index, type cis-id
|      +--rw policy-type              enumeration
|      +--rw weight                   uint32
|      +--rw forwarding-path-state
|         +--rw path-id                    index, type uint8
|         +--rw forwarding-path-info
|            +--rw next-hop-address  inet:ip-address
|            +--rw interface         if:interface
|            +--rw dataplanetype
```

# CATS Flow-entrys Tree

- It could be used at **CATS-SBI** for the CATS-Control Center to distribute forwarding flow table entries to the CATS Forwarder.

- It could also be used for the CATS Forwarder to report flow statistics information to the CATS-Control Center.

- It could be used for guiding the forwarding of a flow.

- "dataplanetype" : the data plane type, such as MPLS and SRv6.

```
+--rw flow-entrys
|     +--rw flow-entry
|        +--rw source-address      index, inet:ip-address
|        +--rw dest-address        index, inet:ip-address
|        +--rw source-port         index, inet:ip-address
|        +--rw dest-port           index, inet:ip-address
|        +--rw protocol            index, ushort
|        +--rw forwarding-path
|           +--rw cs-id            type cs-id
|           +--rw cis-id           type cis-id
|           +--rw affinity         type uint
|           +--rw forwarding-path-info
|              +--rw next-hop-address inet:ip-address
|              +--rw interface        if:interface
|              +--rw dataplanetype
|
|        +--ro flow-statistics
|           +--ro pkts      uint64
|           +--ro octets    uint64
```

# CATS Notify Tree

- It could be used at **CATS-SBI** for the CATS-Forwarder to report events to the CATS-Control Center.

```
+--n notify
|     +--ro entry-limit-reached  boolean
|     +--ro flow-limit-reached   boolean
```

- When the number of cats table entries reaches the maximum.
- When the number of entries goes from maximum to not being maximum,
- An event notification will be sent indicating the change in the number of cats table entries reaching the maximum.

# Next Steps

- **Request more review and feedback.**
- **Improve the YANG model based on CATS Practical Test.**
- **Comments and suggestions are welcome.**

***Thanks!***