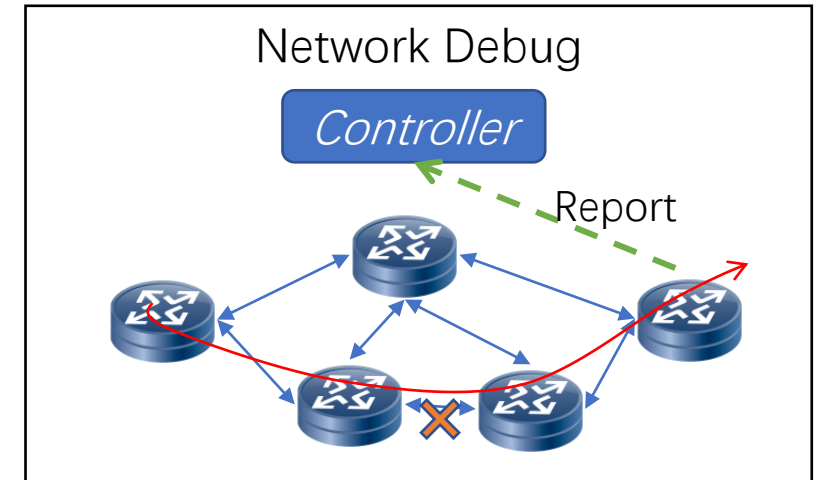
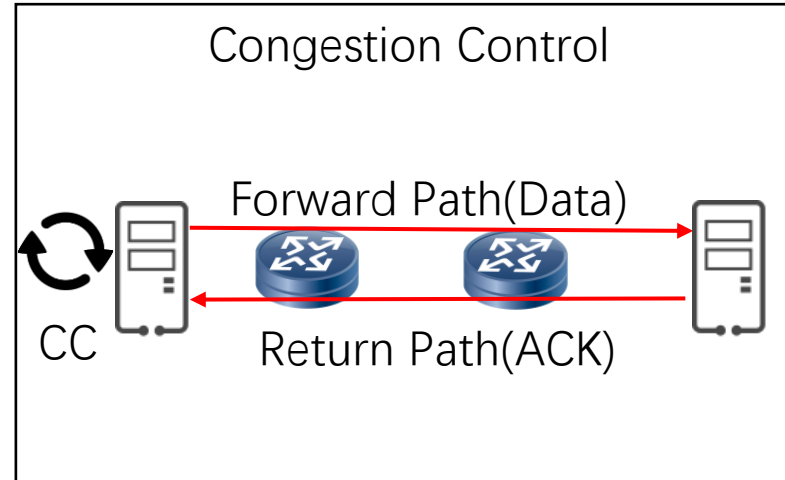
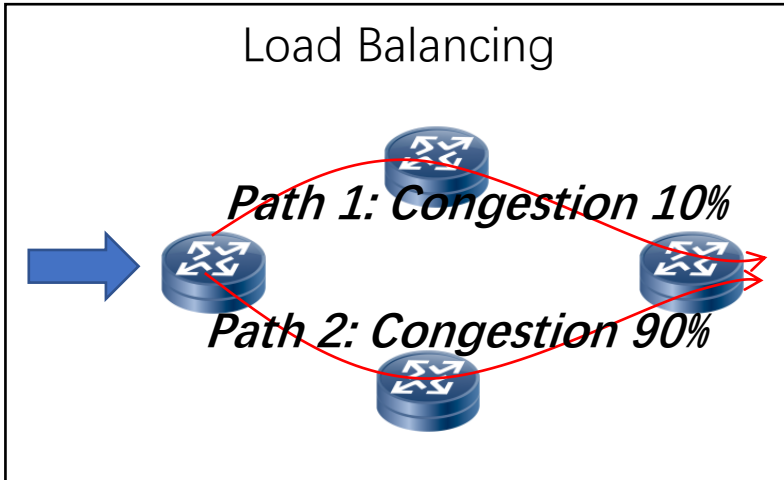


# Congestion Measurement

*draft-shi-ippm-congestion-measurement-data*  
*draft-shi-ippm-congestion-measurement-ipv6-options*

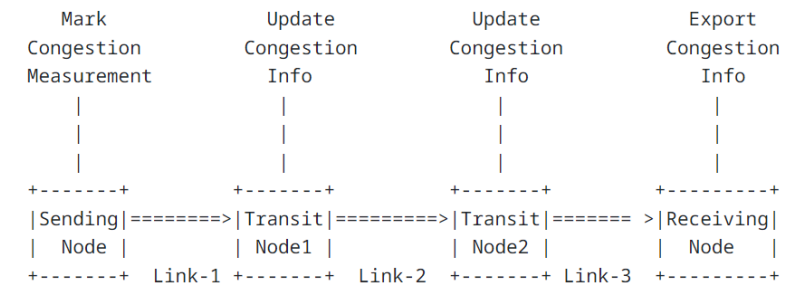
**Hang Shi**, Tianran Zhou @Huawei  
Ying Liu, Mengyao Han @China Unicom  
Zhenqiang Li @China Mobile

# Detailed path congestion status is useful for...



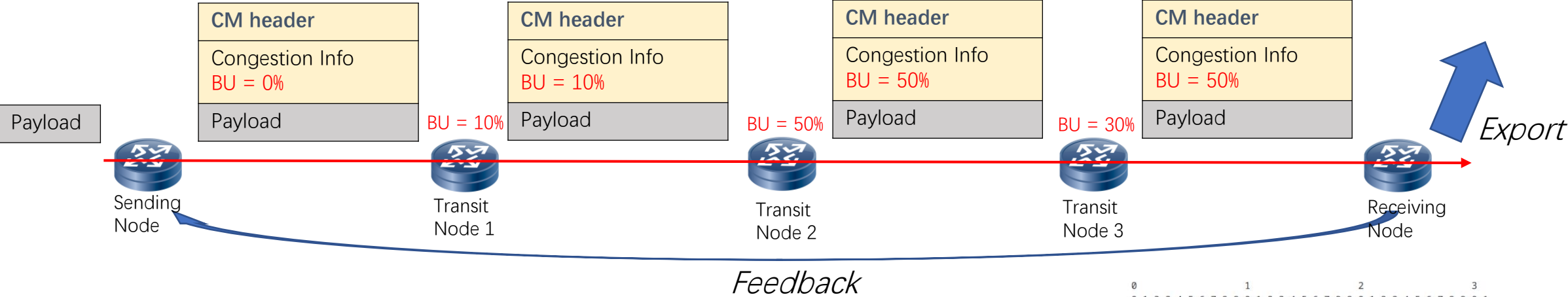
Metric of congestion of a path includes bottleneck bandwidth/queue utilization, total queuing delay, etc.

1. Sending node marks the congestion measurement header
2. Transit node updates the congestion status metric
3. Receiving node exports the congestion status result



# Example

- Measure the path bottleneck bandwidth utilization(BU)



- Various congestion info field and its per hop operation is defined in [draft-shi-ippm-congestion-measurement-data](#)
- Congestion info type is a bitmap, allowing **collecting multiple congestion info** at the same header.
- Per hop update in forward path: **Fixed header size**
- Feedback in return path: U=0 to indicate no modification
- Can be encapsulated in various dataplane: NSH/Geneve/IPv6 header. DoH/HHB header encap is defined in [draft-shi-ippm-congestion-measurement-ipv6-options](#)

```

0 1 2 3
0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1 2 3 4 5 6 7 8 9 0 1
+-----+-----+-----+-----+
|U| Reserved |C| Congestion Info Type |
+-----+-----+-----+-----+
| Congestion Info Data |
+-----+-----+-----+-----+
~
-----
| Bit | Congestion Info Data | Length | Operation |
+-----+-----+-----+-----+
| 0 | Inflight Ratio | 8 | Max |
+-----+-----+-----+-----+
| 1 | DRE | 8 | Max |
+-----+-----+-----+-----+
| 2 | Queue Utilization Ratio | 8 | Max |
+-----+-----+-----+-----+
| 3 | Queue Delay | 8 | Add |
+-----+-----+-----+-----+
| 4 | Congested Hops | 8 | Add |
+-----+-----+-----+-----+

```

# Next steps

- Comments and suggestion are welcomed
- Open to new congestion information metric and encapsulation
- WG adoption?