Message Queue Subsystem Design - Under Development

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This document is under development

Overview

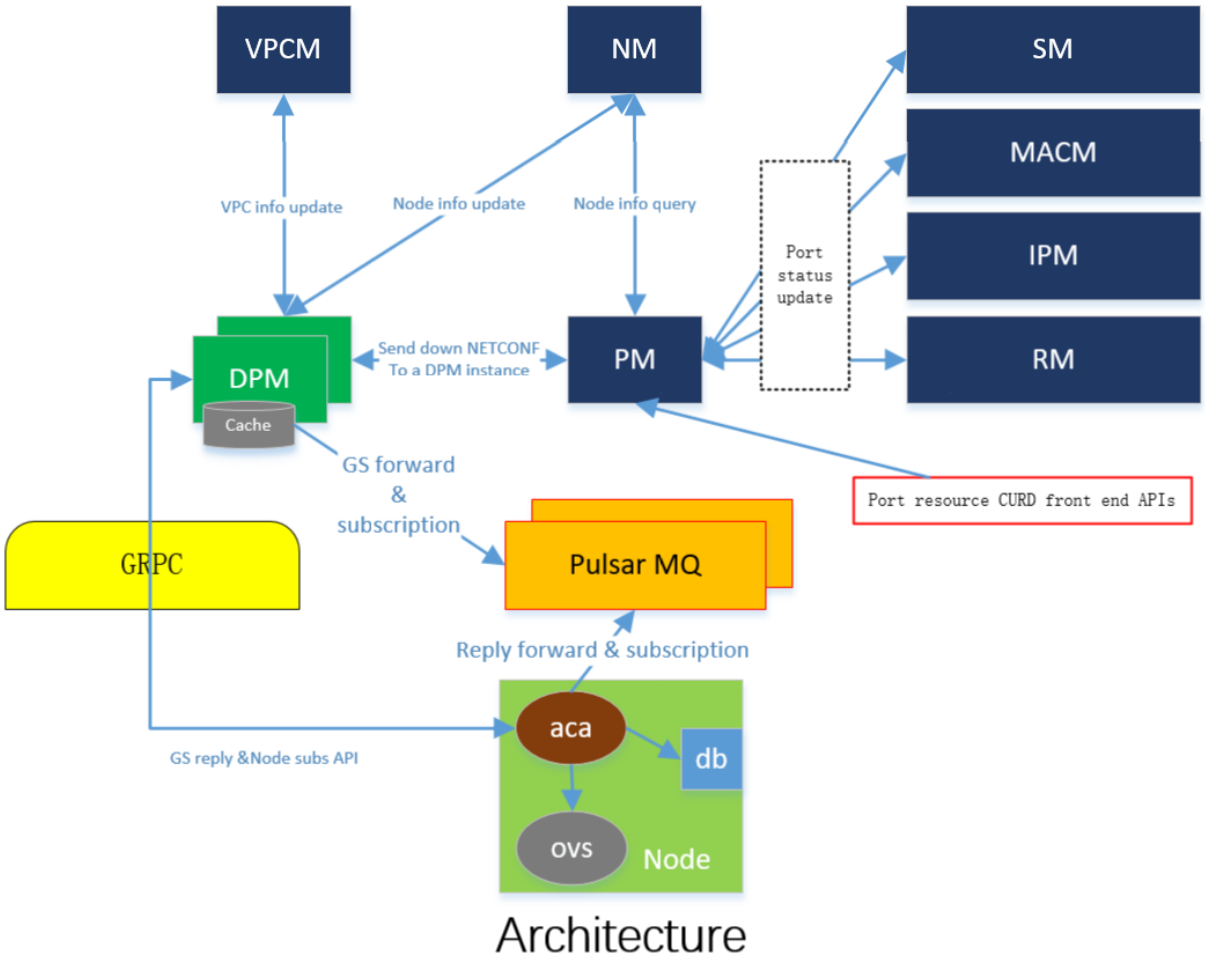
Alcor provides messaging services for controller and agent communication. Messaging services consists of two channels. GRPC and pulsar MQ.

System Requirements

1. DPM can split the network configuration into multiple goal states. DPM can appropriately choose MQ or GRPC channel to send goal state to the corresponding ACA.
2. When ACA configures goal state successfully, it returns success reply. When DPM receives replies of all goal states for a network configuration, it returns successful configuration to the caller
3. Messaging services can support 1000,000 data plane nodes.
4. Working together with other services including Node, Port, VPC, Data Plane managers.
5. Fast, reliable and scalable

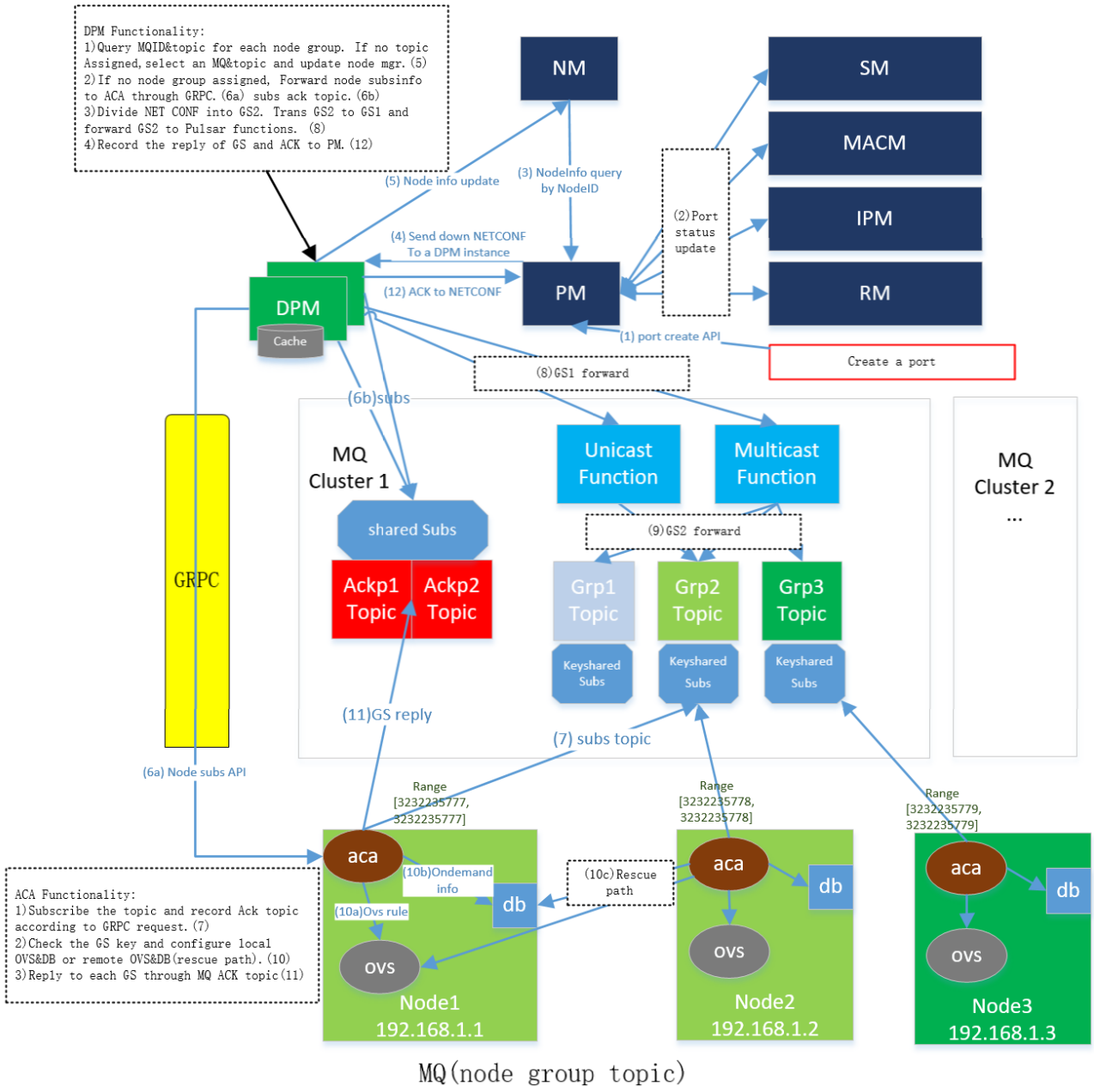
Design

Architecture



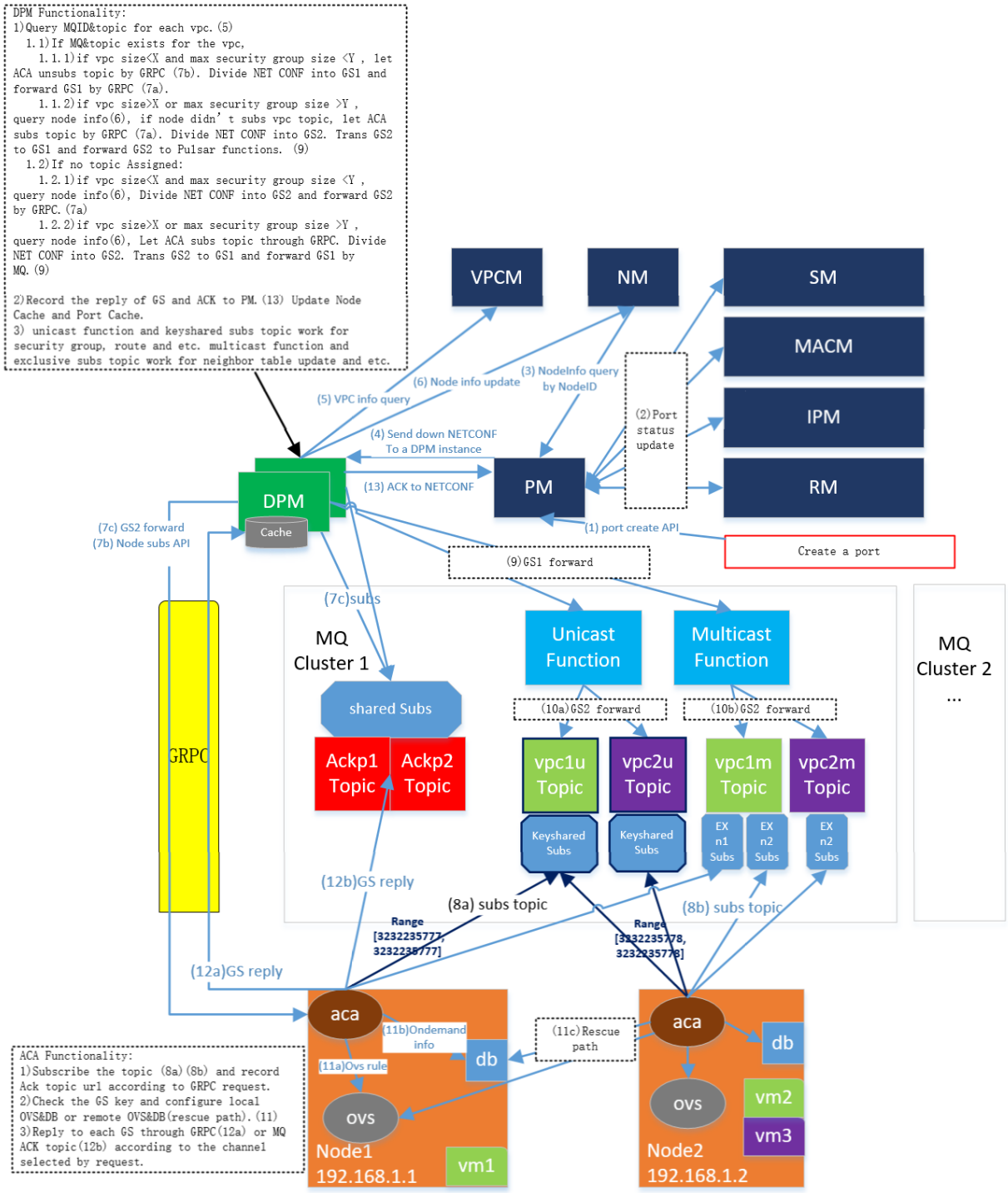
We have two architectural design options.

Design Option: MQ (Node Group Topic)

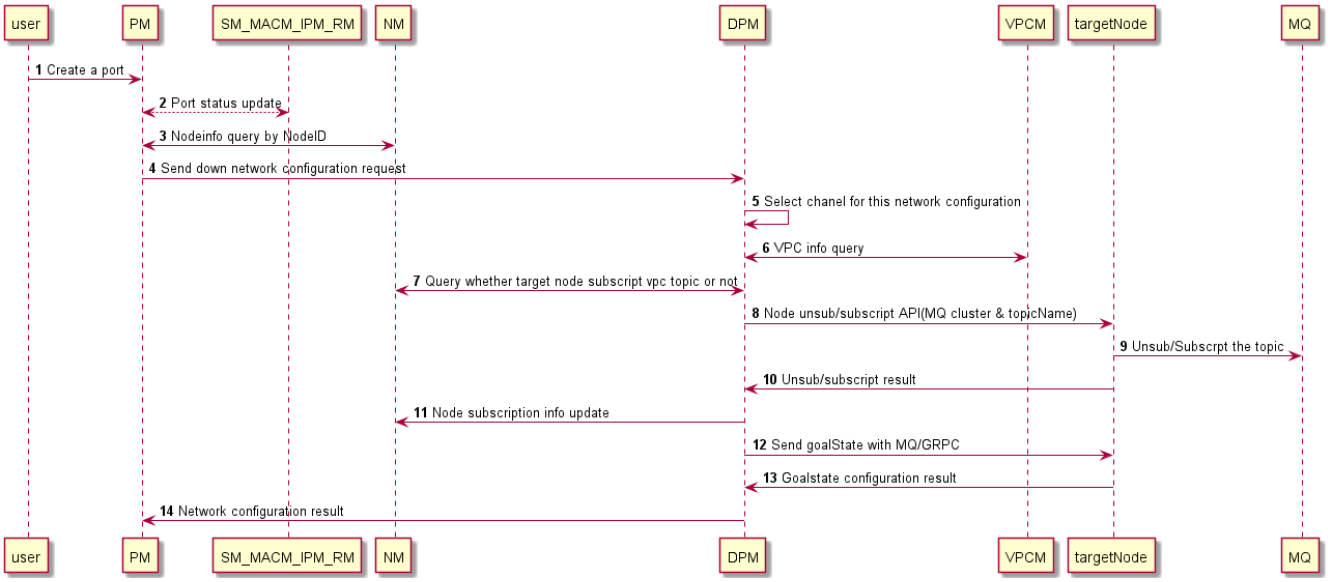


Design Option: MQ (VPC Topic) + GRPC

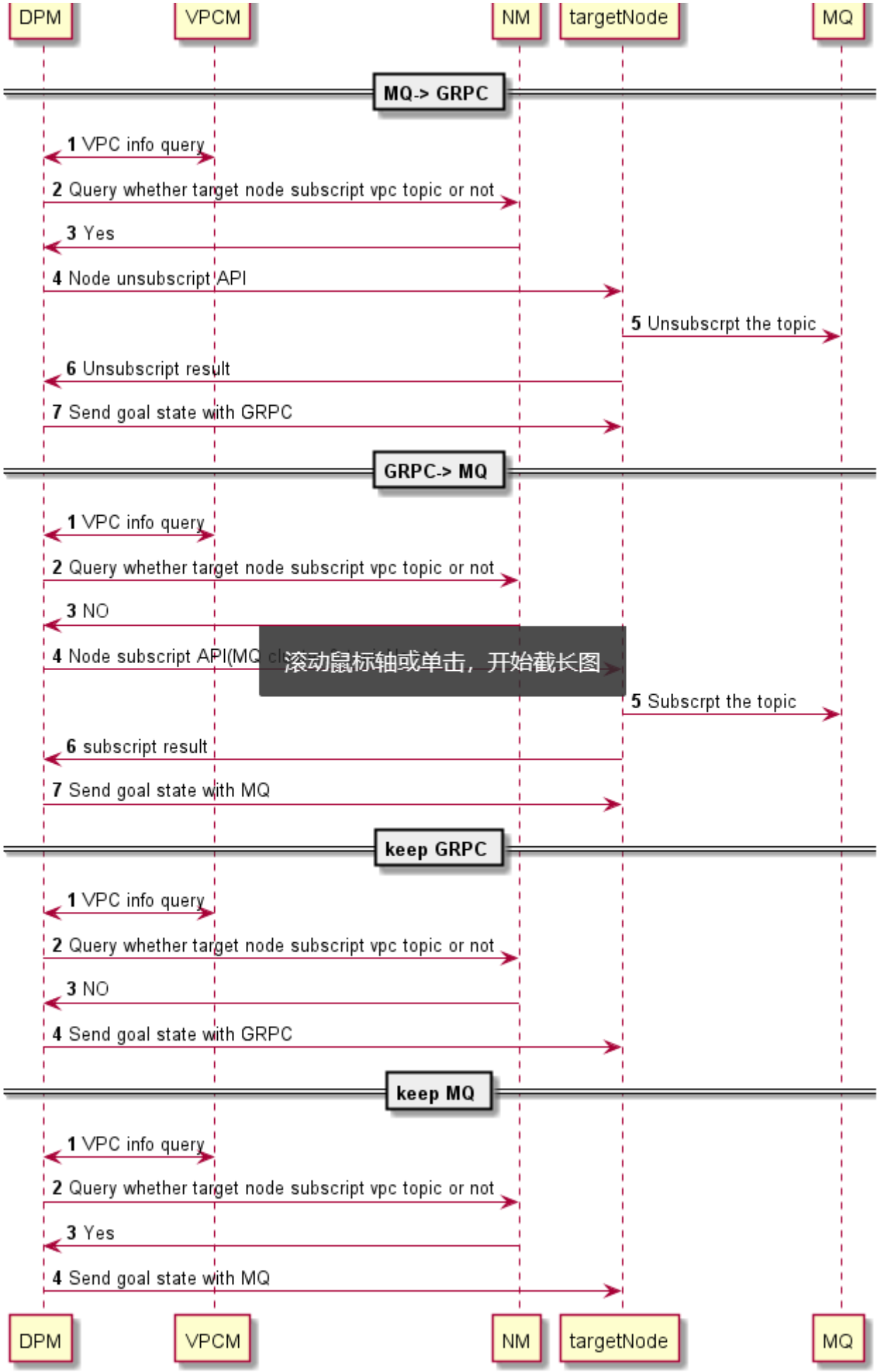
Workflow



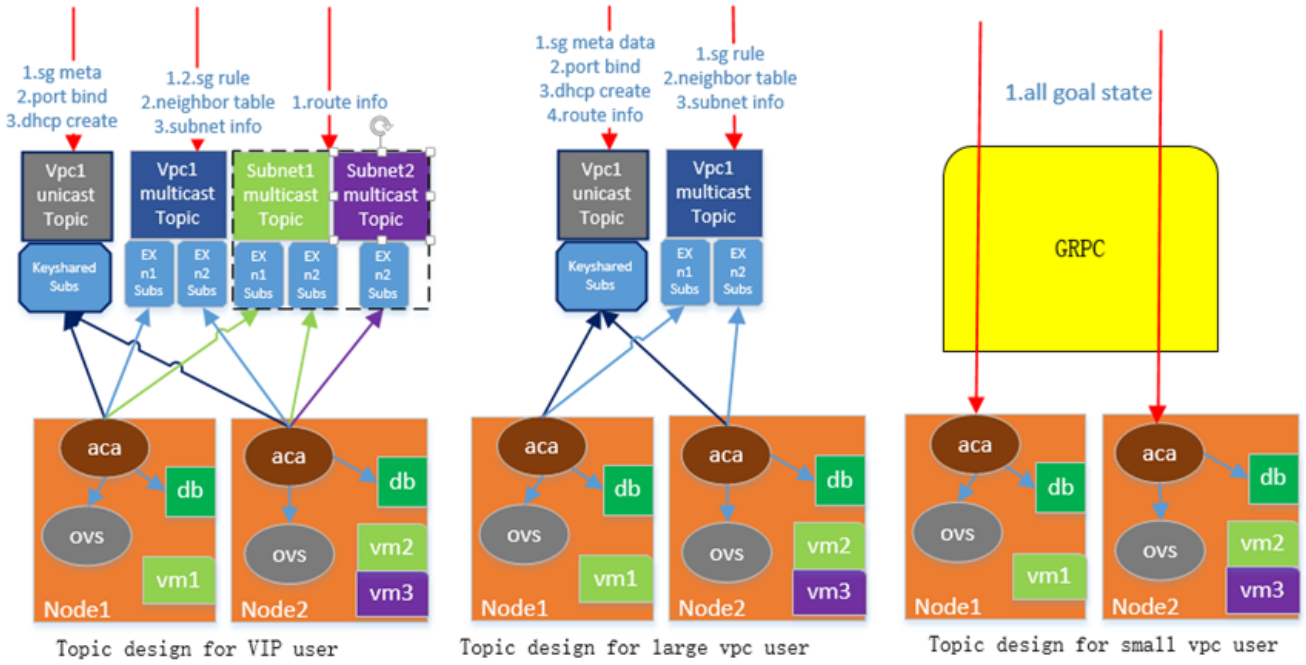
MQ(vpc topic) + GRPC



MQ topic subscription or unsubscription


DPM
VPCM
NM
targetNode
MQ
MQ-> GRPC
1 VPC info query
2 Query whether target node subscript vpc topic or not
3 Yes
4 Node unsubscript API
5 Unsubscrpt the topic
6 Unsubscript result
7 Send goal state with GRPC
GRPC-> MQ
1 VPC info query
2 Query whether target node subscript vpc topic or not
3 NO
4 Node subscript API(MQ cl
滚动鼠标轴或单击，开始截长图
5 Subscrpt the topic
6 subscript result
7 Send goal state with MQ
keep GRPC
1 VPC info query
2 Query whether target node subscript vpc topic or not
3 NO
4 Send goal state with GRPC
keep MQ
1 VPC info query
2 Query whether target node subscript vpc topic or not
3 Yes
4 Send goal state with MQ
DPM
VPCM
NM
targetNode
MQ

Channel & MQ topic Selection for each goal state

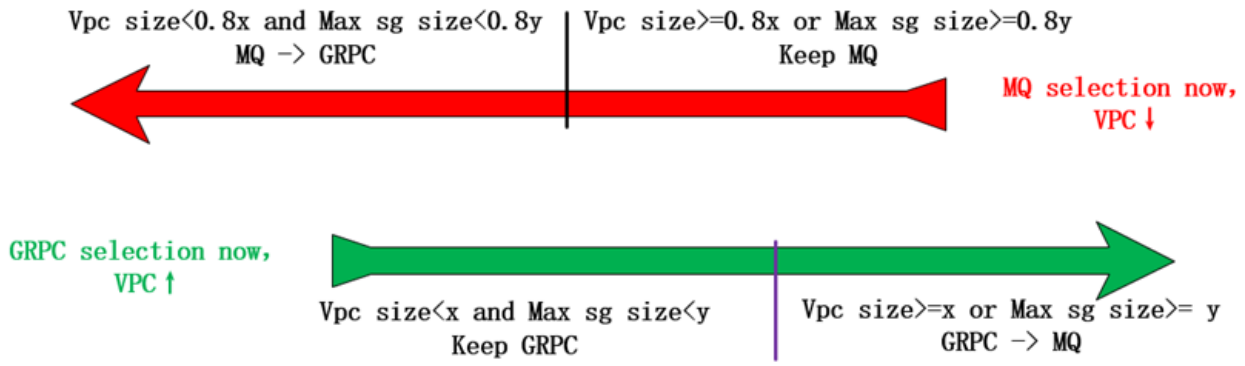


Category	Topic	Examples
Unicast goal state	unicast topic	port bind□dhcp create□route info
Multicast goal state	multicast topic	neighbor table
Group multicast goal state	unicast topic & multicast topic	security group metadata & rule

Channel Selection Algorithm

Algorithm 1 CSA: Channel Selection Algorithm for Alcor

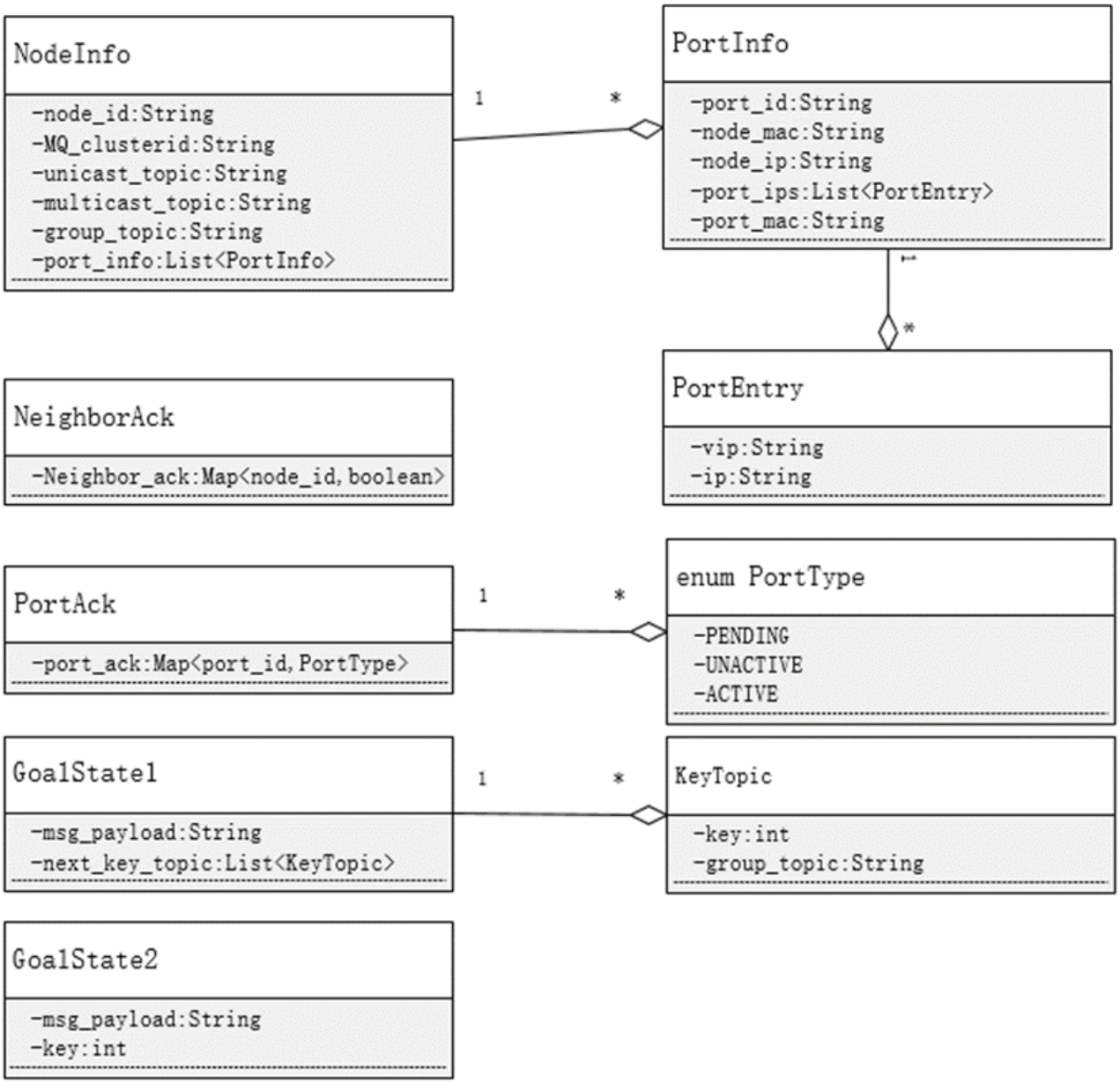
X and Y are two constants.
if The topic of vpc-1 already exists in MQ. **then**
  if Size of vpc-1 is greater than $0.8X$ or a security group is mapped to more than $0.8Y$ ports **then**
    Sending goal state of vpc-1 with MQ.
  if Size of vpc-1 is smaller than $0.8X$ and no security group is mapped to more than $0.8Y$ ports **then**
    Send goal state of vpc-1 with GRPC.
    Close the topic of vpc-1, let related ACA unsubscript the topic when at the right time.
if There is no topic of vpc-1 in MQ. **then**
  if Size of vpc-1 is greater than X or a security group is mapped to more than Y ports **then**
    Create topic of vpc-1, let related ACA subscript the topic.
    if Create topic failed **then**
      Send GS with GRPC.
    else
      Send GS with MQ.
  if Size of vpc-1 is smaller than X and no security group is mapped to more than Y ports **then**
    Sending goal state of vpc-1 with GRPC.



Channel selection

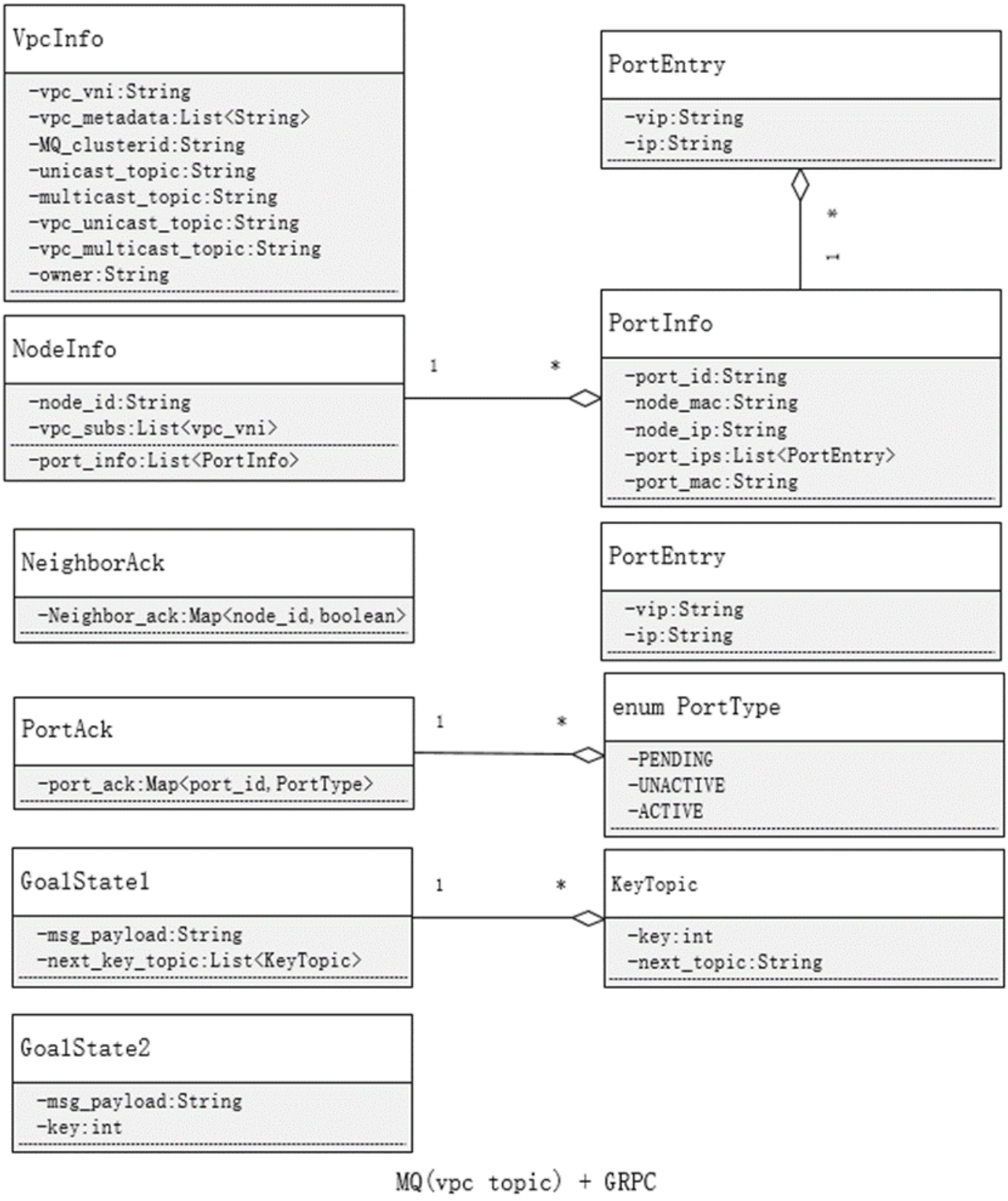
Data schema

Design Option: MQ (Node Group Topic)



MQ(node group topic)

Design Option: MQ (VPC Topic) + GRPC



Architectural Design

Based on System Requirements and Channel & MQ topic Selection for each goal state,

References

- [1] Apache Ignite: https://ignite.apache.org/
- [2] Apache Pulsar: http://pulsar.apache.org/