Poster: A Cloud-enabled Coordination Service for Internet-scale OMG DDS Applications

8th ACM DEBS 2014
May 28, 2014, Mumbai, India

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Data Distribution Service (DDS)

- DDS is an OMG standard specification for data-centric publish/subscribe middleware

- DDS is deployed in many IoT application domains, including Aerospace & Defense, Healthcare, Energy, Transportation, Control Systems

- Interoperability
- Scalability
- QoS support

Challenges

- The current OMG specification does not define coordination and discovery services for DDS message brokers

- Why DDS message brokers needed?
  - DDS uses multicast for discovery
  - Network Address Translation (NAT)
  - Network firewalls

Challenges

- Some DDS broker solutions exist
  - DDS Proxy developed by A. Hakiri et al.
  - DDS Routing Service by Real-Time Innovations
- A middleware solution to discover and coordinate DDS brokers for internet-scale applications does not exist

Solution

- **PubSubCoord: Cloud-enabled discovery and coordination service for Internet-scale DDS applications**
  - **Automatic discovery mechanism**
  - **Mobility support**
  - **Scalability by load balancing**
  - **Fault-tolerance**

PubSubCoord Architecture

- A two-tier architecture like BlueDove system
  - Edge broker: Directly connected to DDS endpoints in a LAN to behave as a bridge to other networks
  - Routing broker: Links to edge brokers to deliver data between edge brokers
- Reduces the need for maintaining states for edge brokers
- Failed brokers do not affect others
- Routing brokers may be overloaded, but can be scaled by cloud infrastructures

PubSubCoord Architecture