OPEN FLOW Cheat Sheet

Standard based Layer 2 Protocol
Used on Southbound Interface
Manuplates Forwarding Plane devices

Open Flow Common Roles:
• Separation of Control and Data planes.
• Provide centralization of the control.
• Provide Flow based control mechanism

Open Flow supports three message types:
• Controller to Switch
• Asynchronous
OPEN FLOW Cheat Sheet

Control Plane
- Build (Programming)
- Storage (Policy, Topology)
- Decide (Destination)

Data Plane
- OPEN FLOW
- Open Flow API
- Forwarding Process

Southbound Interface
- Open Flow Protocol

Open Flow Switch
- Controller Channel
- Southbound Interface
- Port 1, 2, 3

Flow Table
- Flow Table 1
- Flow Table 2
- Flow Table X

Rule
- Action
- Stats

Switch Port
- VLAN ID
- MAC Source
- MAC Dest.
- IP Source
- IP Destination
- TCP S. Port
- TCP D. Port

Forward Packets
- Forward Controller
- Drop Packet
- Send Normal Processing
- Modify Fields
- Any Extensions...

Controller to Switch
- Controller to Switch
- Asynchronous
- Symmetric

Open Flow Messages
- Sent by Controller
- Sent by Switch
- To manage and configure switches
- To inform controller
- To diagnose problems

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<table>
<thead>
<tr>
<th>Message Category</th>
<th>Message</th>
<th>Message Type</th>
<th>Direction</th>
<th>Process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conf.</td>
<td>Hello</td>
<td>Symmetric</td>
<td>Controller-&gt;Switch</td>
<td>“Here is my Version Number!”</td>
</tr>
<tr>
<td></td>
<td>Hello</td>
<td>Symmetric</td>
<td>Switch-&gt;Controller</td>
<td>“Here is Version Number, that I support!”</td>
</tr>
<tr>
<td></td>
<td>Features Request</td>
<td>Control/Switch</td>
<td>Controller-&gt;Switch</td>
<td>“Which ports are available?”</td>
</tr>
<tr>
<td></td>
<td>Set Config</td>
<td>Control/Switch</td>
<td>Controller-&gt;Switch</td>
<td>“Could you send Flow Expirations?”</td>
</tr>
<tr>
<td></td>
<td>Features Reply</td>
<td>Control/Switch</td>
<td>Switch-&gt;Controller</td>
<td>“Here are the available ports / supported actions!”</td>
</tr>
<tr>
<td></td>
<td>Port Status</td>
<td>Asynchronous</td>
<td>Switch-&gt;Controller</td>
<td>Informing Controller about some features.</td>
</tr>
<tr>
<td>Flow</td>
<td>Packet-In</td>
<td>Asynchronous</td>
<td>Switch-&gt;Controller</td>
<td>“There is no match in Flow Table for this Flow!”</td>
</tr>
<tr>
<td></td>
<td>Packet-Out</td>
<td>Control/Switch</td>
<td>Controller-&gt;Switch</td>
<td>“Send packet out to these ports!”</td>
</tr>
<tr>
<td></td>
<td>Flow-Mod</td>
<td>Control/Switch</td>
<td>Controller-&gt;Switch</td>
<td>“Add this Flow to the Flow Table!”</td>
</tr>
<tr>
<td></td>
<td>Flow-Expired</td>
<td>Control/Switch</td>
<td>Switch-&gt;Controller</td>
<td>Flow timed out after being inactive for a period.</td>
</tr>
</tbody>
</table>