SDN
Solution- or Problem-Based Research?

Bob Briscoe, BT
IETF-84 SDN-RG Jul 2012
IRTF is generally problem-focused

- Routing
- Congestion Control
- Network Complexity
- Delay-Tolerant Networking
- Network Management
- ...

one recent exception

- HIP (host identity protocol)
- SDN another exception?
  - aimed at sufficiently many different problems
  - solution-based r-g could make sense, but...
solution-focused or problem-focused?

solution-focused?

• assume SDN, then solve outstanding potential problems with it? e.g.
  • policy complexity
  • modelling scalability
  • inter-domain
  • validation of evolvability claims
  • ... see mailing list & other presentations (esp. Dave Ward’s IAB plenary) for dozens more suggestions

problem-focused?

• pre-standards convergence on best approach to solve a problem?
  • how does centralised FIB distribution compare vs decentralised vs hybrid?
  • is it best for forwarding isolation to be independent of performance isolation for virtual networks?
  • is it best to use the same architecture for FIB distribution and for config?
  • how best to do multipath & traffic engineering
boiling a small lake

• solution-focused
  • makes the work concrete
  • but answers will either be SDN OK or SDN not OK
  • not a good model of the real choices facing us

• problem-focused
  • preferred
  • but leads to ocean-boiling

• some thoughts on narrowing scope
  • for discussion…
3 Strategic Networking Paradigms for Network Operators

Networking Function Virtualisation
- Creates operational flexibility
- Reduces CapEx, OpEx, space & power consumption

Open Innovation
- Creates a competitive supply of innovative applications by third parties

Software Defined Networks
- Creates abstractions to enable faster innovation.
mapping of technologies to problems

<table>
<thead>
<tr>
<th>forwarding isolation</th>
<th>performance isolation</th>
<th>orchestration / config</th>
<th>obj models / schemas</th>
<th>network control APIs</th>
</tr>
</thead>
<tbody>
<tr>
<td>OpenFlow</td>
<td>OFconfig</td>
<td>Yang</td>
<td>ALTO</td>
<td></td>
</tr>
<tr>
<td>ForCES</td>
<td>NETCONF</td>
<td>SID</td>
<td>CDNI</td>
<td></td>
</tr>
<tr>
<td>MPLS</td>
<td>Diffserv</td>
<td>RESTful</td>
<td>XMPP</td>
<td></td>
</tr>
<tr>
<td>MPLS-TE</td>
<td>ConEx</td>
<td>Web UI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IPsec</td>
<td></td>
<td>CLI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>TRILL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SDN ocean</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- we could focus on solving a particular problem (column)
- we could also ask
  - is an integrated solution (multi-column) good?
  - or “do one thing and do it well” so operators can pick & choose rather than lock-in to an über-solution?
position

- solution-focused – too narrow
- problem-focused – too broad

- solution-prompted – just right
  - prefer to use SDN as a prompt to re-evaluate
  - provokes questioning of traditional approaches
  - doesn’t require us to assume SDN is the answer
SDN Solution- or Problem-Based Research?

Q&A