Scalable Hub and Spoke Topologies

draft-raza-ospf-stub-neighbor-02

K Raza
F Shamim
J. Cavanaugh
A. Kulawiak
P Pillay-Esnault

IETF 94 Yokohama November 2015

Draft version 2

- Previously presented
- This new iteration is to address comments from the wg:
  - to address detection of misconfiguration
  - Clarification on the handling and flooding of stub Router LSA

Problem Statement

- In one-level hub and spoke topologies, the spokes only possible next-hops are usually through the hubs.
- These spokes are:
  - leaf nodes and do not need the full topological information beyond their hubs
  - The spokes have usually limited capacity and still have to store unnecessary information and updates from the hub in their LSDB.
- Flooding of large database information to the spokes limit the number of neighbors a hub can handle.
- Today there is no mechanism to aggregate or filter intra-area information

Proposal

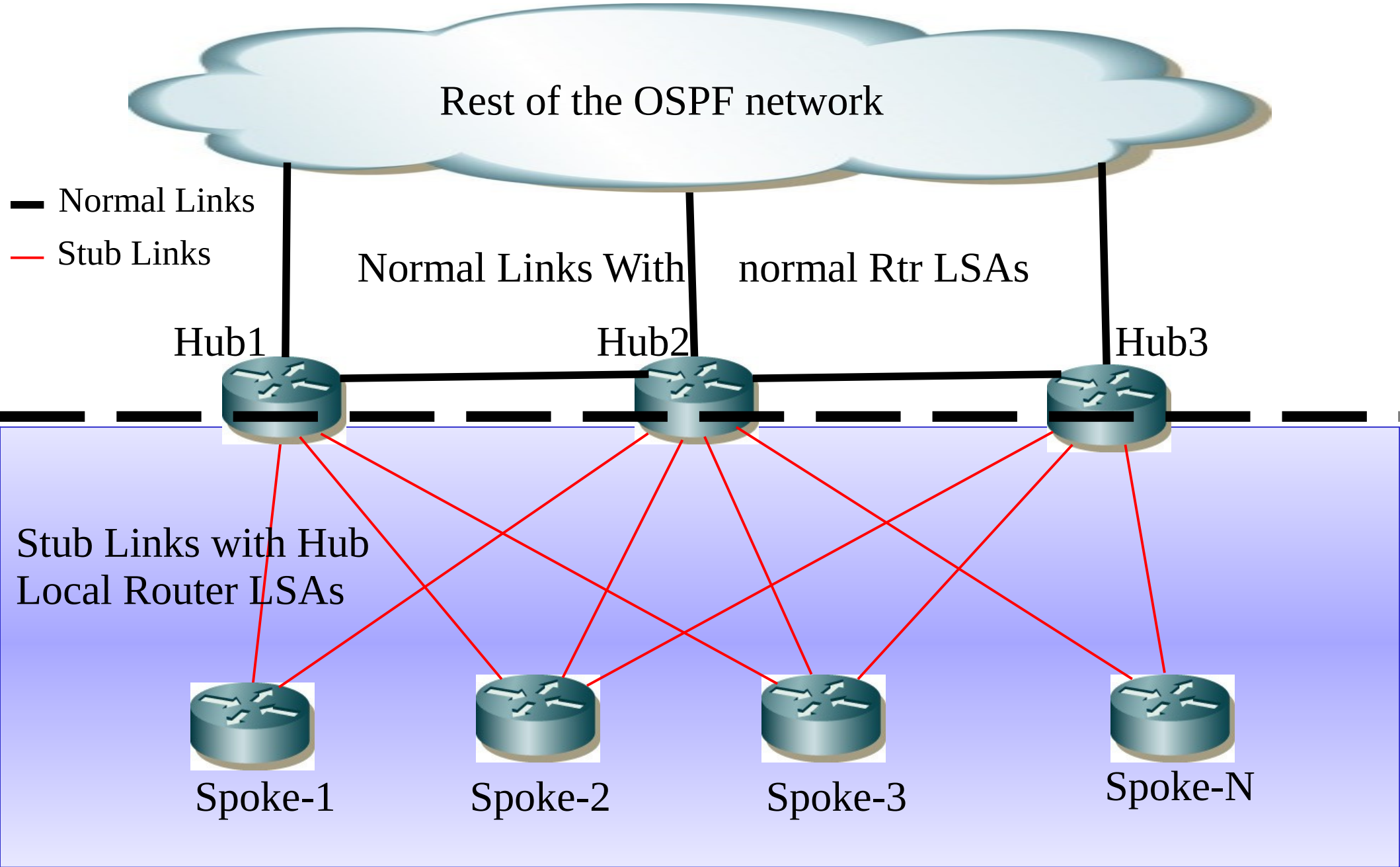
- Hub Routers supporting the stub neighbor functionality will advertise their capability using the OSPF Router Functional Capability Bits registry.
- Hub Routers will define a new type of neighbor relationship called stub neighbor over *stub* links.
- The hubs will then send a modified router LSA with only the default route (or aggregated routes by policy) to the spoke. It will then effectively mask all topological information behind it to the spoke.
- The modified form of the router LSA is called a Local Router LSA and will be ignored by the other hubs and must not be flooded back on a *normal* link.

Local Hub Router-LSA Format

```
LS age = 0                          ;always true on origination
Options =             ;
LS type = 1                         ;indicates router-LSA
Link State ID = 192.0.2.1      ;Hub Router ID
Advertising Router = 192.0.2.1 ;Hub Router ID
bit E = 0                           ;not an AS boundary router
bit B = 0                           ;not area border router
#links = 2
Link ID = 192.0.2.2       ;Spoke Router ID.
Link Data = 192.0.2.1     ;Hub IP interface to net
Type = 1                  ;connects to Point-to-point network
# TOS metrics = 0
metric = 1
```

```
Link ID = 0.0.0.0     ;Default prefix
Link Data = 0x0       ;Network mask
Type = 3                 ;connects to stub network
# TOS metrics = 0
metric = 100
```

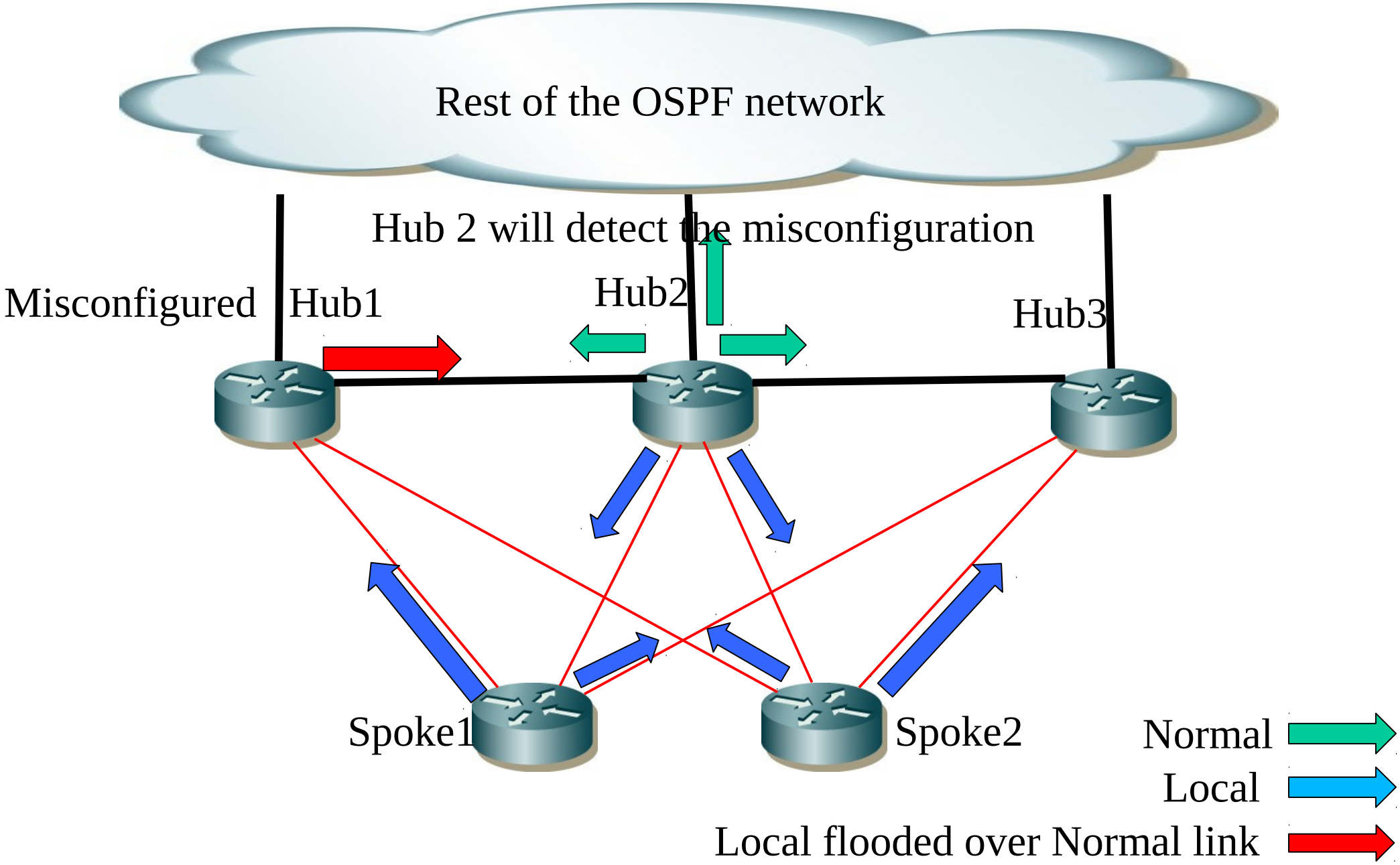
Local Router LSA Zones



Handling of Local Router LSA

- Local Router LSAs are only flooded in the stub link zones with spokes.
- A Hub receiving its own Local Router LSA through another hub can detect whether there is a misconfiguration and act upon it. It should either revert back to normal mode or log an error.
- A hub receiving another Hub’s Local Router LSA from a spoke should acknowledge it to being up the adjacency but should not flood it further nor use it for its normal spf calculations.
- A Hub should not normally receive a Local router LSA from

Misconfiguration Detection



Next steps

- **Request to become a WG document.**

- **Comments welcome.**