LSVR @ RTGAREA

(Link State Vector Routing)

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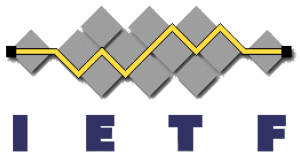


IETF113
23 March 2022
Hybrid Meeting

Agenda

- Where are we with LSVR?
  - LSVR WG Chartered schedule
  - LSVR milestone deliverables
- Understanding LSVR
  - Components
  - Motivation for LSVR to use BGP-LS
  - High level technology view
  - LSVR peering models
  - Route decision process (its simple and intuitive)
  - Advantages of LSVR using BGP-SPF
- LSVR Next Steps

Where are we?

- ~~IETF101 – first stab at the LSVR deliverables~~
- ~~Interim #1~~
- ~~IETF102 (July2018)~~
- ~~Interim #2 (Oct2018)~~
- IETF103 (November 2018)
- ….
- IETF113 (March 2022)

We are here

BGP-SPF considered ready for IESG

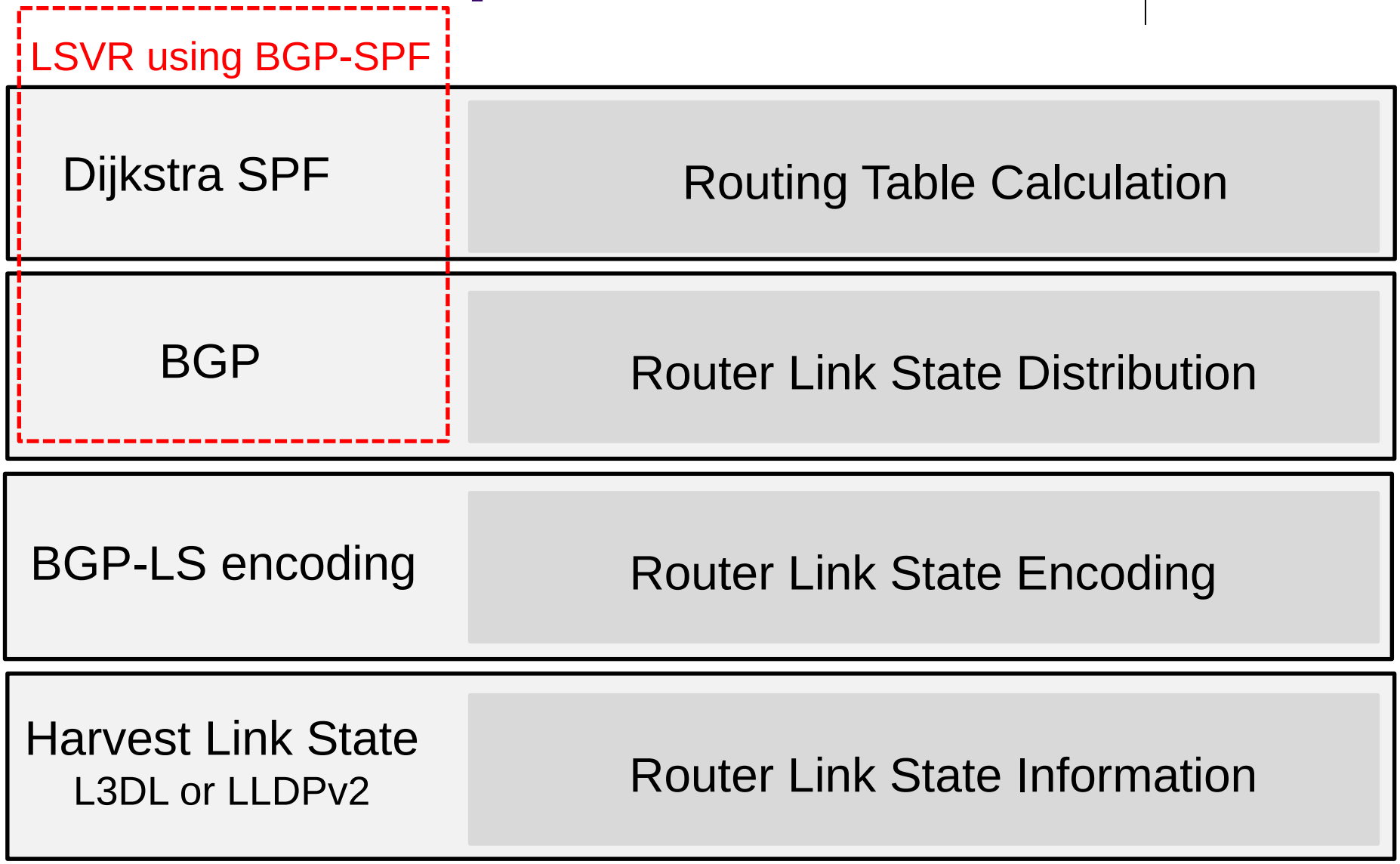
LSVR Milestones

- Missed deadline
  - Applicability state… …R in DCs **Adopted**
  - LSV distri… …GP transport **Adopted**
  - LSVR with …ard Dijkstra path selection **Adopted**
- July 2019
  - YANG specification for LSVR

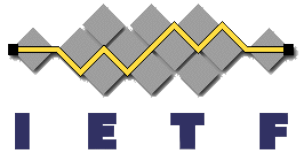
March 2022 Considered Ready

Pending IDR BGP YANG

LSVR Components



Why BGP-based Solution for LSVR?



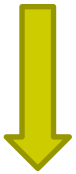
- BGP already widely deployed as sole protocol (see RFC7938) in MSDCs
- Robust and simple implementation
- Wide acceptance – minimal learning
- Reliable transport
- Guaranteed in-order delivery
- Incremental updates
- Incremental updates upon session restart
- No flooding and selective filtering
- Multiple peering models with/without using RR or controllers

High Level LSVR

- Target use-case: MSDC
  - Scale to BGP size massive networks
  - Keep topological view on all BGP speakers (LFA, SRLG, TE extensions, etc)
  - Original target is for underlay routing in MSDC
- Proven BGP-LS encoding is used for LSVs (Link State Vectors)
  - New SAFI proposed for backward compatibility
  - BGP MP capability and BGP-LS node attribute
- Proven re-use of BGP NLRI distribution
  - Route-reflector and controller setup supported
  - Simplified BGP decision process (more rapid)

High Level LSVR

Router Link State Description



= Link State Vector

(neighbor, cost, identity, etc…)

= BGP-LS NLRI Encoding

(new SAFI proposed)

R1

R2 R3

R4 R5

Peering Model

- BGP sessions with Route-Reflector or controller hierarchy
  - Link discovery/liveliness detection outside of BGP-SPF (WIP)
- RR hierarchy can be less then fully connected but must provide resiliency
  - Must not be dependent on SPF for connectivity
- Controller could learn the expected topology through some other means and inject it
  - SPF computation is distributed through
  - Similar approach as :Jupiter Rising: A decade of Clos Topologies and Centralized Control in Google’s Datacented Network)

BGP Decision Process

Classic BGP Decision Process

Path Vector Algorithm

Phase 1
Calculation of Degree of Preference

Phase 2
Route Selection

Phase 3
Route Dissemination

Simplified BGP Decision Process

LSVR Algorithm

Phase 1&2
SPF Algorithm
(BGP NLRI Selection & SPF (Route Selection))

Phase 3
NLRI Propagation
(simplified because NLRI is unique per BGP speaker)

Advantages of BGP-SPF

- Nodes have complete view of topology
  - Ideal when BGP is used as an underlay for other BGP address families
- Only network failures (e.g. link) need be advertised instead of all routes impacted by failure
  - Faster convergence
  - Better scaling
- SPF lends itself better for optimal path selection in Route-reflector and controller topologies

LSVR WG next steps

AD Reviewed, IANA code-points assigned – ready for IESG Submit

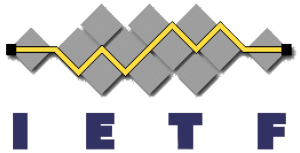
- draft-ietf-lsvr-bgp-spf-16 (updated 15-02 2022)

WG Documents

- draft-ietf-lsvr-l3dl-ulpc-02 (updated 10-14 2021)
- draft-ietf-lsvr-l3dl-signing-03 (updated 10-14 2021)
- draft-ietf-lsvr-l3dl-08 (updated 10-14 2021)

Pending Update LSVR charter

- Key deliverables completed
- L3DL work to be formal integrated into LSVR
- LSVR YANG spec pending upon IDR completion



THANK YOU!