

Analysis of VPLS Deployment

draft-gu-l2vpn-vpls-analysis-00

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Motivation

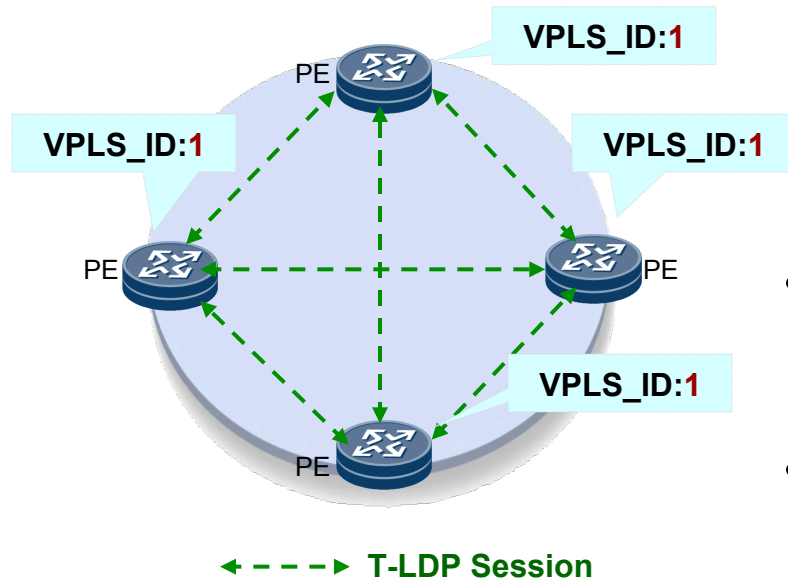
- Several options in deploying VPLS network
 - LDP-based VPLS
 - LDP-based VPLS with BGP A-D
 - BGP-based VPLS
- Operators need guidance in selecting suitable technology
- This document analyzes existing VPLS solutions
 - Help operators understand features of each solution
 - Help operators choose the right VPLS solution

Introduction

- VPLS becomes quite popular
 - Deployed in more and larger networks
 - Deployed in converged IP/MPLS network, along with other services, e.g. IP VPN etc.
- Two primary functions in VPLS service provisioning:
 - Discover all the member PEs that participate in a given VPLS service
 - Setup and maintain pseudowires that constitute the VPLS
- Operators' requirements on VPLS
 - Scalability
 - Simplicity in provisioning and maintenance
 - High efficiency
- There are some options of provisioning VPLS
 - Each has advantages and disadvantages

LDP-based VPLS

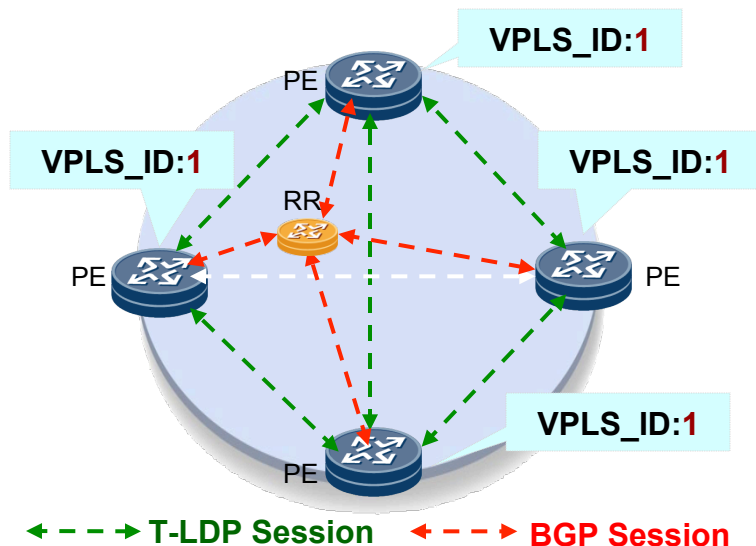
LDP VPLS (RFC4762)



- Full mesh T-LDP sessions need to be established, not scalable in large network
 - Signaling overhead
 - H-VPLS can alleviate the problem, at the cost of operational complexity
- Identities of all the peering member PEs in each VPLS need to be configured
- Unique VPLS_ID needs to be assigned for each VPLS instance
- Pseudowire labels are explicitly allocated for each peering member PE
- Some additional features:
 - MAC address withdrawal
 - Pseudowire status notification

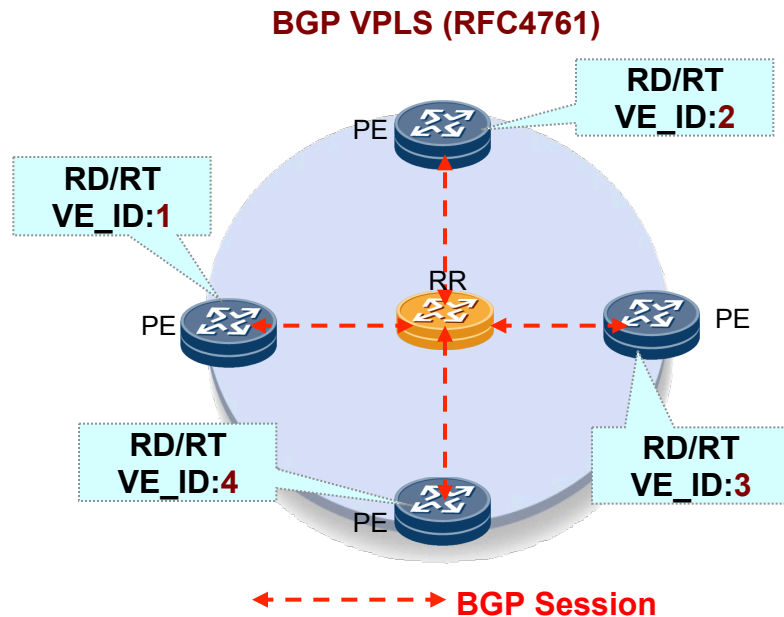
LDP-based VPLS with BGP A-D

BGP Auto-Discovery (RFC6074)



- With BGP Auto-Discovery, configuration complexity can be alleviated
 - Avoid manual configuration of peering member PEs
- At the expense of two control plane protocols for VPLS service (BGP and LDP)
 - Additional signaling overhead
 - Complexity in operation and maintenance
- Full mesh T-LDP sessions still needed

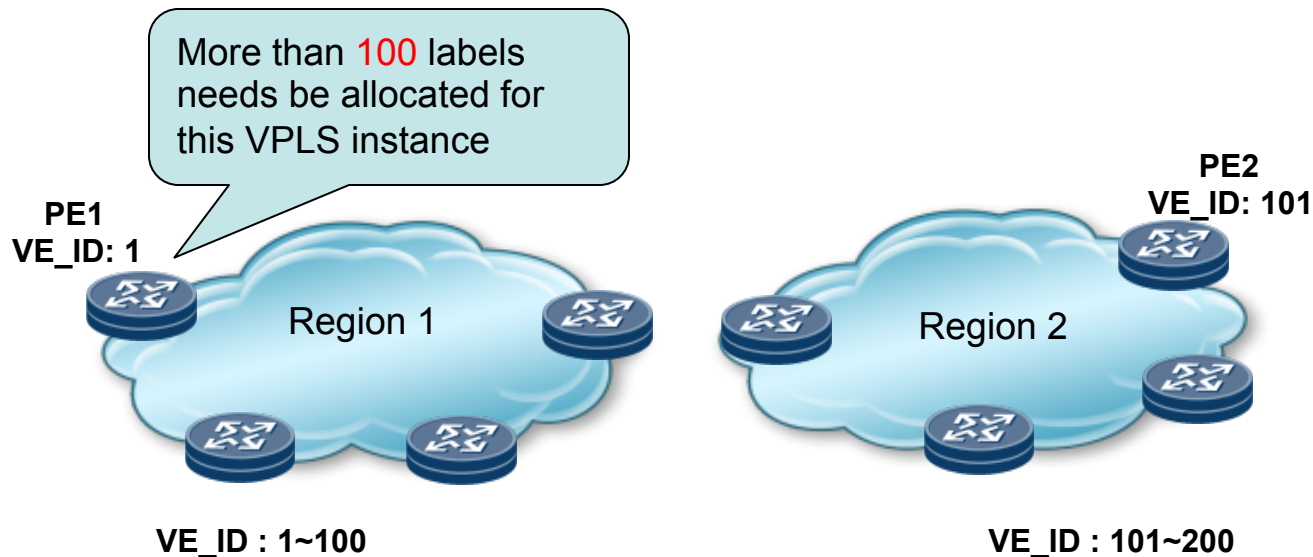
BGP-based VPLS



- Converged architecture with IP VPN
- Inherit scalability from BGP Route Reflector (RR)
- Combines membership Auto-Discovery and pseudowire signaling into one step
- Unique VE_ID needs to be assigned for each member PE in each VPLS instance
 - Management burden, especially in inter-AS scenarios
 - Value of VE_ID could affect label block allocation
- Over-provisioning of pseudowire labels through label block advertisement
 - Reduced signaling overhead
 - May cause waste of label resource
 - May be exacerbated by inappropriate VE_ID assignment

BGP-based VPLS (cont.)

- An example of VE_ID assignment and label block allocation
 - Different VE_ID blocks are allocated to different regions for management simplicity and future expansion
 - If PE1 in Region 1 needs to establish PW with PE2 in Region 2, it must allocate more than 100 labels even if there may be less than 10 PEs in each region.
 - The amount of wasted labels is proportional to number of VPLS instances in the network



Comparison of Existing Solutions

- Each solution has advantages and disadvantages

VPLS Solutions	Advantages	Disadvantages
LDP VPLS	<ul style="list-style-type: none">on-demand label allocationMAC withdrawal and PW status notification mechanism	<ul style="list-style-type: none">full mesh T-LDP sessionsmanual provisioningnon-convergence with IP VPN operation
BGP VPLS	<ul style="list-style-type: none">convergence with IP VPNmembership auto-discoveryscalability with use of RRreduced signaling overhead	<ul style="list-style-type: none">VE-ID management complexitywaste of label resourcelack of MAC withdrawal and PW status notification mechanism
LDP VPLS with BGP AD	<ul style="list-style-type: none">membership auto-discoveryon-demand label allocationMAC withdrawal and PW status notification mechanism	<ul style="list-style-type: none">overhead of two control plane protocolsfull mesh T-LDP sessions

Is There a Better Way for VPLS?

- Possible features of an enhanced VPLS solution
 - Membership auto-discovery
 - Convergence with IP VPN service
 - Scalability with use of BGP RR
 - Minimal control plane overhead
 - Avoid burden of VE-ID management
 - Efficient label allocation
 - MAC withdrawal mechanism
 - Pseudowire status notification

Next Steps

- Solicit more requirements & feedbacks
- Revise the analysis draft
- Enhanced solution in a separate draft

Questions?

Thank You!