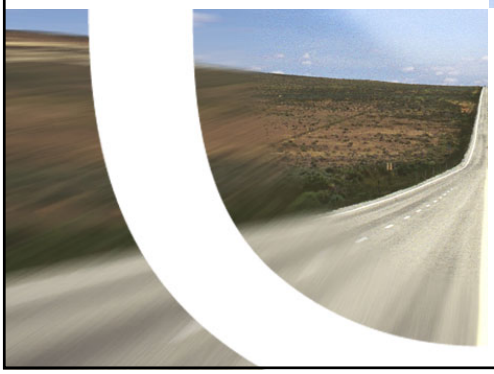
Triple Play transport options using MPLS

MPLScon 2006



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Flowing Downhill

CEOs and CTOs

- The Internet service threat
- Fixed Mobile Convergence
- Introduce Video Services

Network Architects

- Solve multicast Issues
- Introduce QoS
- Dramatically add bandwidth
- Increase reliability/availability
- …

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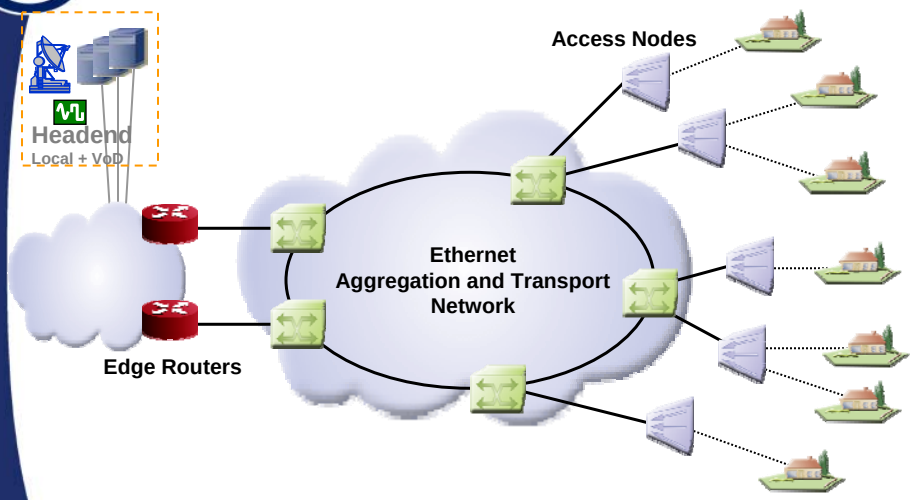
Typical Triple Play aggregation network



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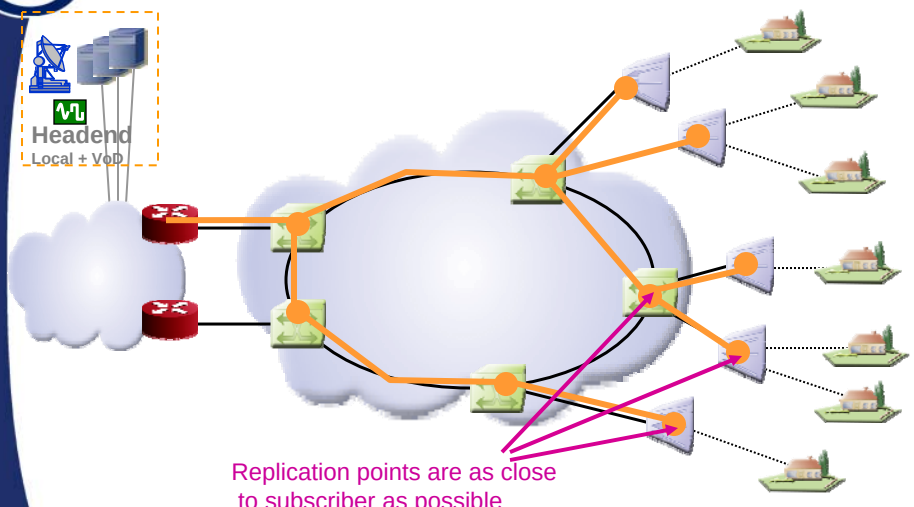
Ideal multicast distribution



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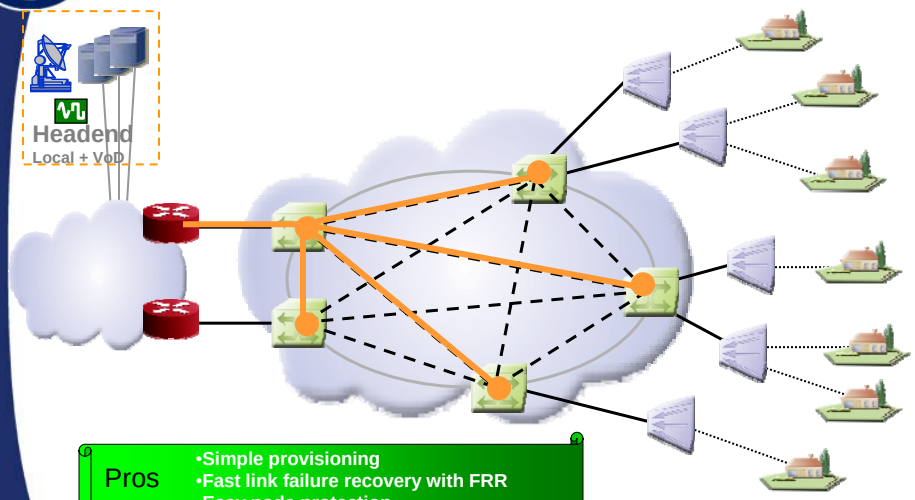
Full Mesh VPLS option



Pros
- Simple provisioning
- Fast link failure recovery with FRR
- Easy node protection

Cons
- Horrible replication efficiency
- May deliver groups to PEs with no listeners

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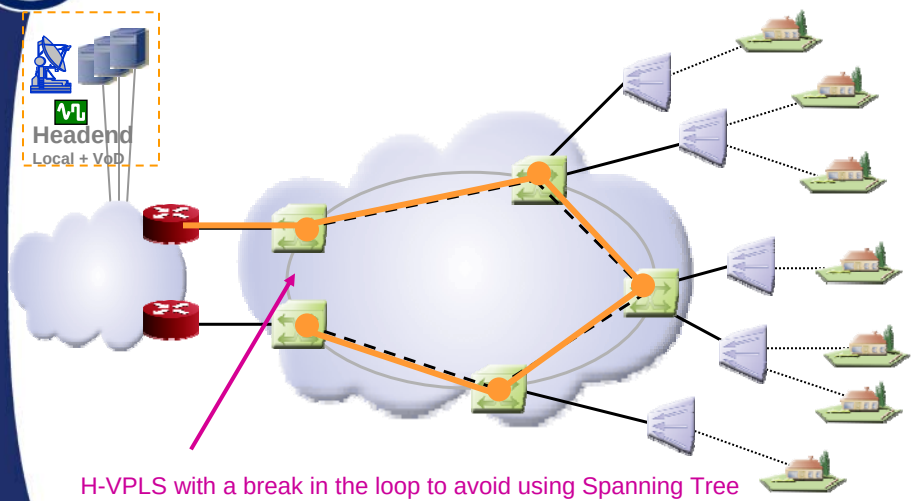
Partial mesh VPLS option



H-VPLS with a break in the loop to avoid using Spanning Tree

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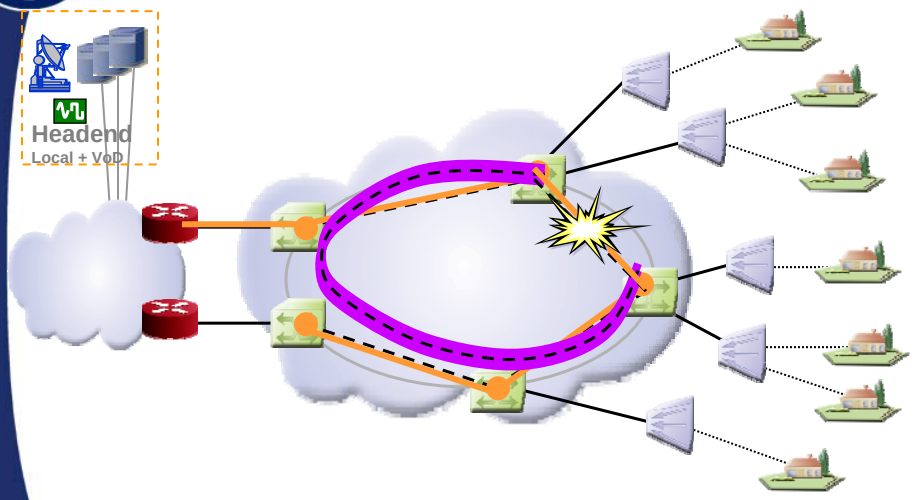
Partial mesh VPLS option – link failure



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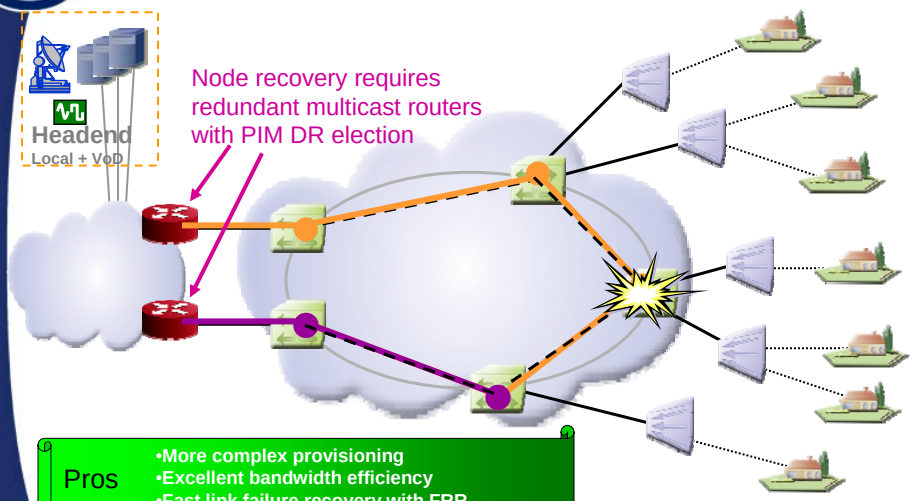
Partial mesh VPLS option – node failure



Pros
- More complex provisioning
- Excellent bandwidth efficiency
- Fast link failure recovery with FRR

Cons
- Bandwidth efficiency depends on topology
- Node protection requires completely different (slower) recovery mechanism

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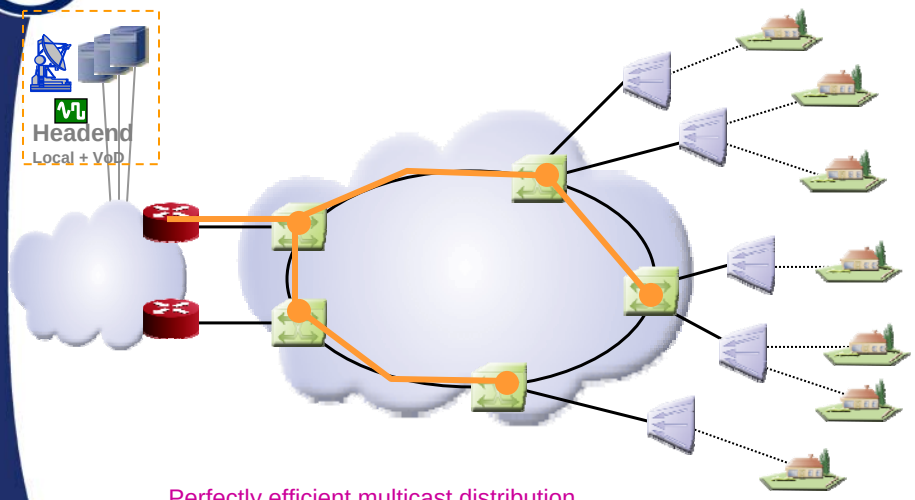
PIM-SM option



Perfectly efficient multicast distribution

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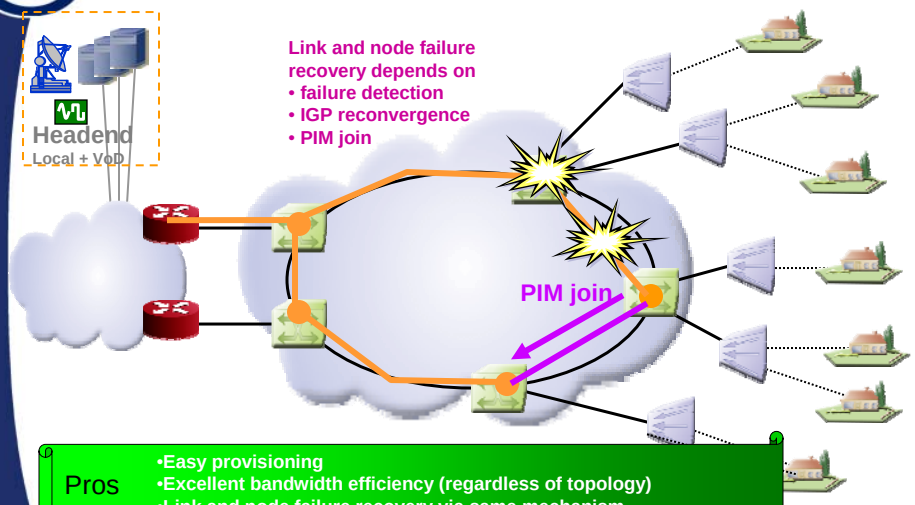
PIM-SM option – link and node failure



Pros
- Easy provisioning
- Excellent bandwidth efficiency (regardless of topology)
- Link and node failure recovery via same mechanism

Cons
- Failure recovery slower than MPLS FRR
- No good way to virtualize multicast to multiple business VPLS customers

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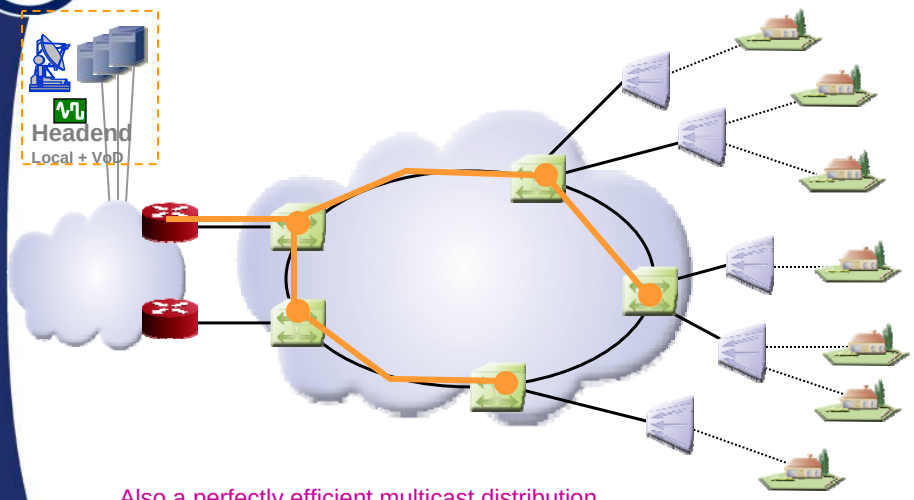
P2MP MPLS option



Also a perfectly efficient multicast distribution

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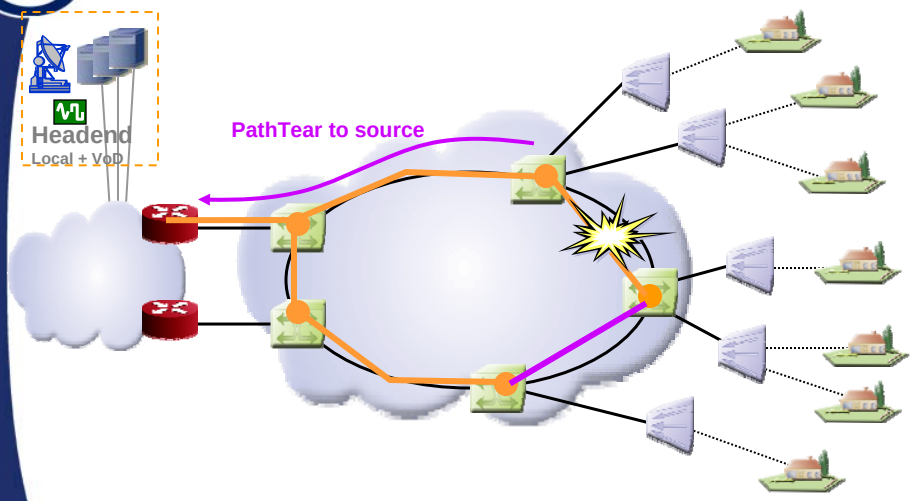
P2MP MPLS option – link failure



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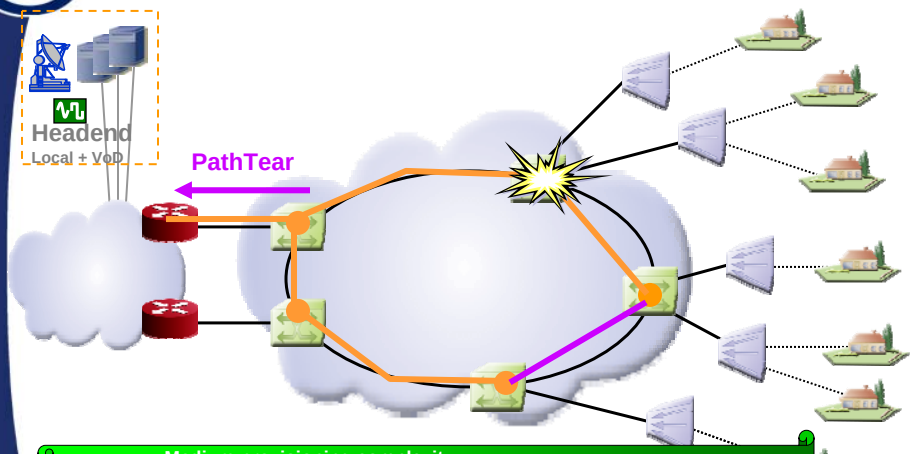
P2MP MPLS option – node failure



Pros

- Medium provisioning complexity
- Excellent bandwidth efficiency (regardless of topology)
- Link and node failure recovery via MPLS FRR
- Can be used to virtualize multicast to multiple business VPLS customers

Cons

- Bandwidth inefficient during failure
- P2MP LSPs are relatively new

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Summary

	Full Mesh VPLS	Partial Mesh VPLS	PIM-SM	P2MP LSPs (RSVP-TE)
Bandwidth efficiency	Horrible	Excellent	Excellent	Excellent
Restoration time	Fast	Fast	Slower	Medium fast
Restoration bandwidth efficiency	double copies on failure	double copies on failure	optimal, no extra copies upon failure	optimal, no extra copies upon failure
Provisioning complexity	Low	High	Low	Medium
Topology	Bad for rings	Good for ring topologies	Agnostic	Agnostic
Virtualization	good	good	bad	good

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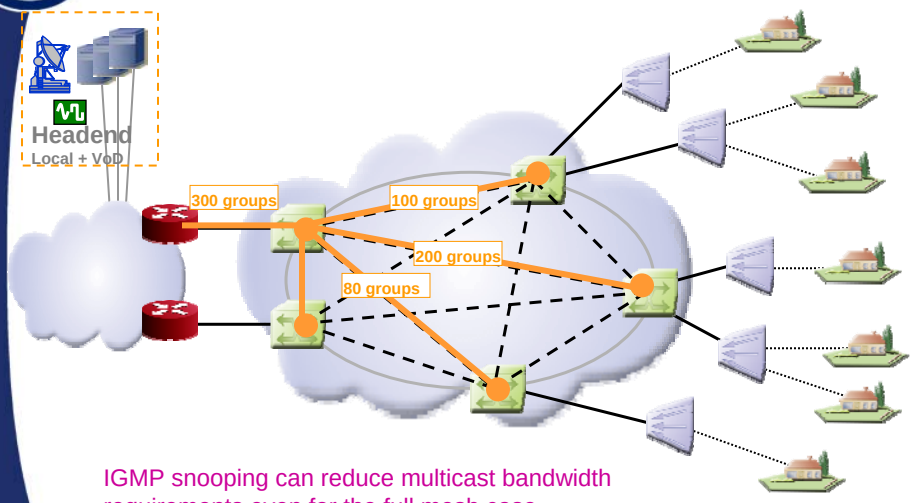
Extra slides

Full Mesh VPLS with IGMP snooping



IGMP snooping can reduce multicast bandwidth requirements even for the full mesh case

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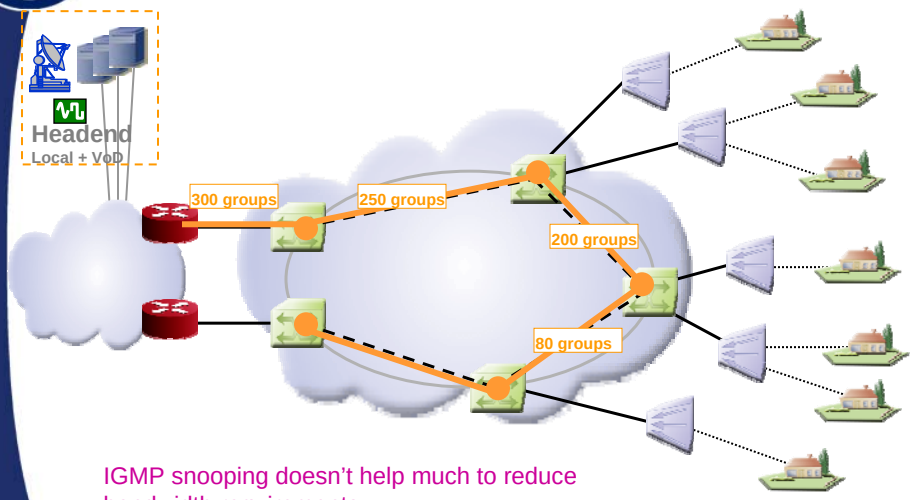
Partial mesh VPLS with IGMP snooping



IGMP snooping doesn't help much to reduce bandwidth requirements

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