

LISP-DDT

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Agenda

- DDT Draft Review
- Deployment Experience

LISP DDT

- LISP Delegated Database Tree
 - Hierarchy for Instance IDs and for EID Prefixes
- DDT Nodes are pre-configured with delegations
 - DDT Map-Resolvers sends (ECM) Map-Requests
 - DDT Nodes Return Map-Referral messages
- DDT Resolvers resolve the Map-Server's RLOC iteratively

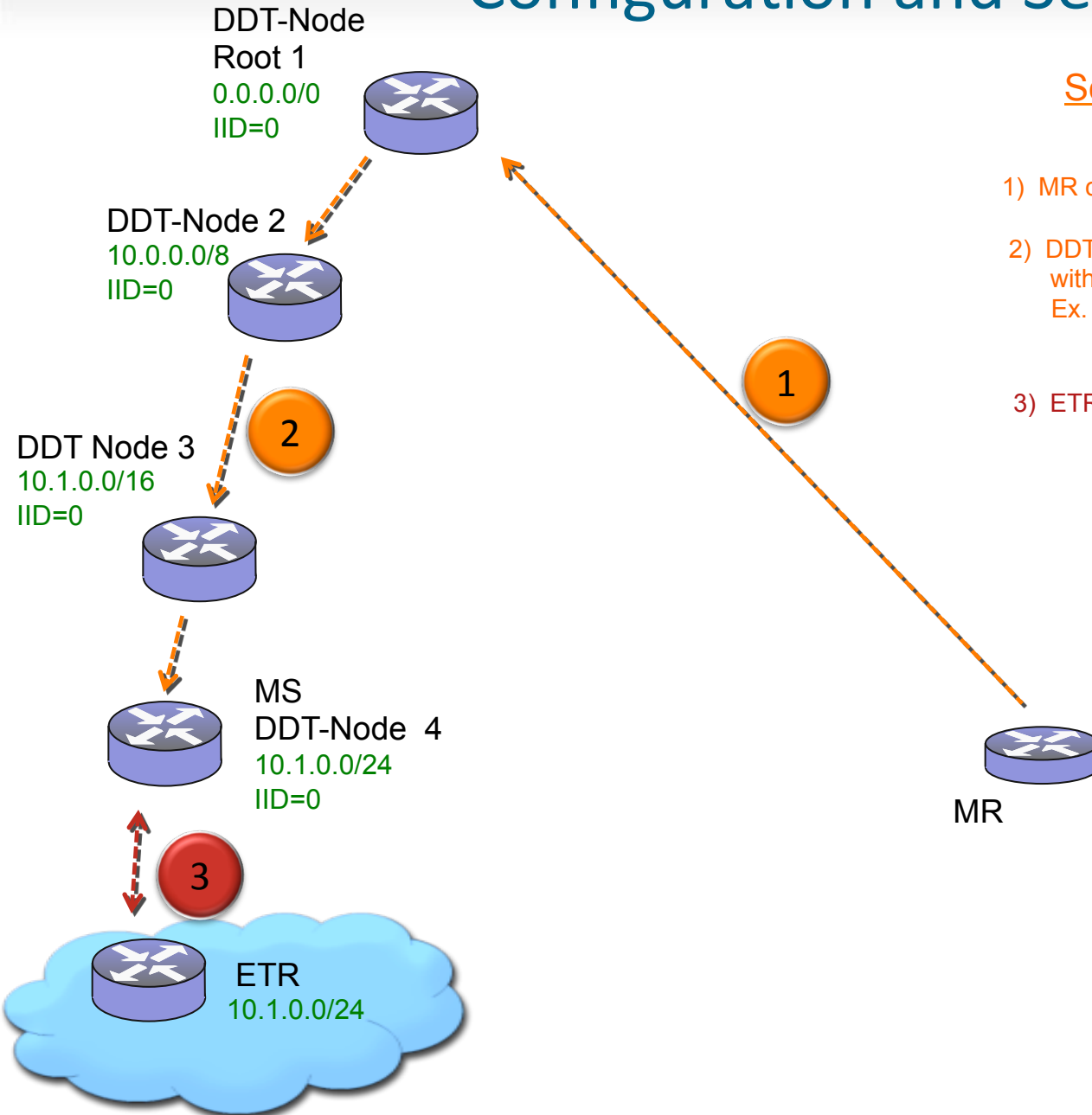
LISP DDT Map Resolvers

- DDT Map Resolvers
 - Cache Map Requests from ITRs
 - Query the DDT hierarchy iteratively
 - Detect Loops/Delegation Errors
 - Resolve the location of the DDT Map-Server
- DDT Map Resolvers thus have state:
 - Referral Cache
 - Map-Request Queue

LISP DDT Referrals & Their Actions

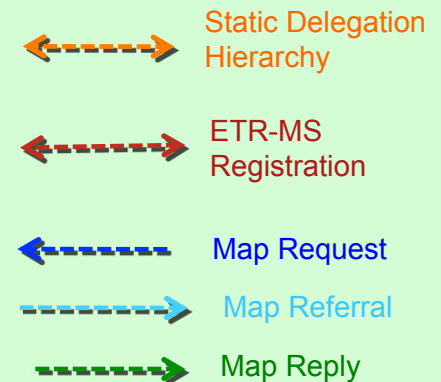
- ‘Positive’ Referrals are used to discover a DDT-node’s RLOC for a given EID Prefix
 - » Type 0, NODE-REFERRAL
 - » Type 1, MS-REFERRAL
 - » Type 2, MS-ACK
- ‘Negative’ referrals are used to indicate other actions:
 - » Type 3, MS-NOT-REGISTERED
 - » Type 4, DELEGATION-HOLE
 - » Type 5, NOT-AUTHORITATIVE

Configuration and Setup



Setup & Configuration

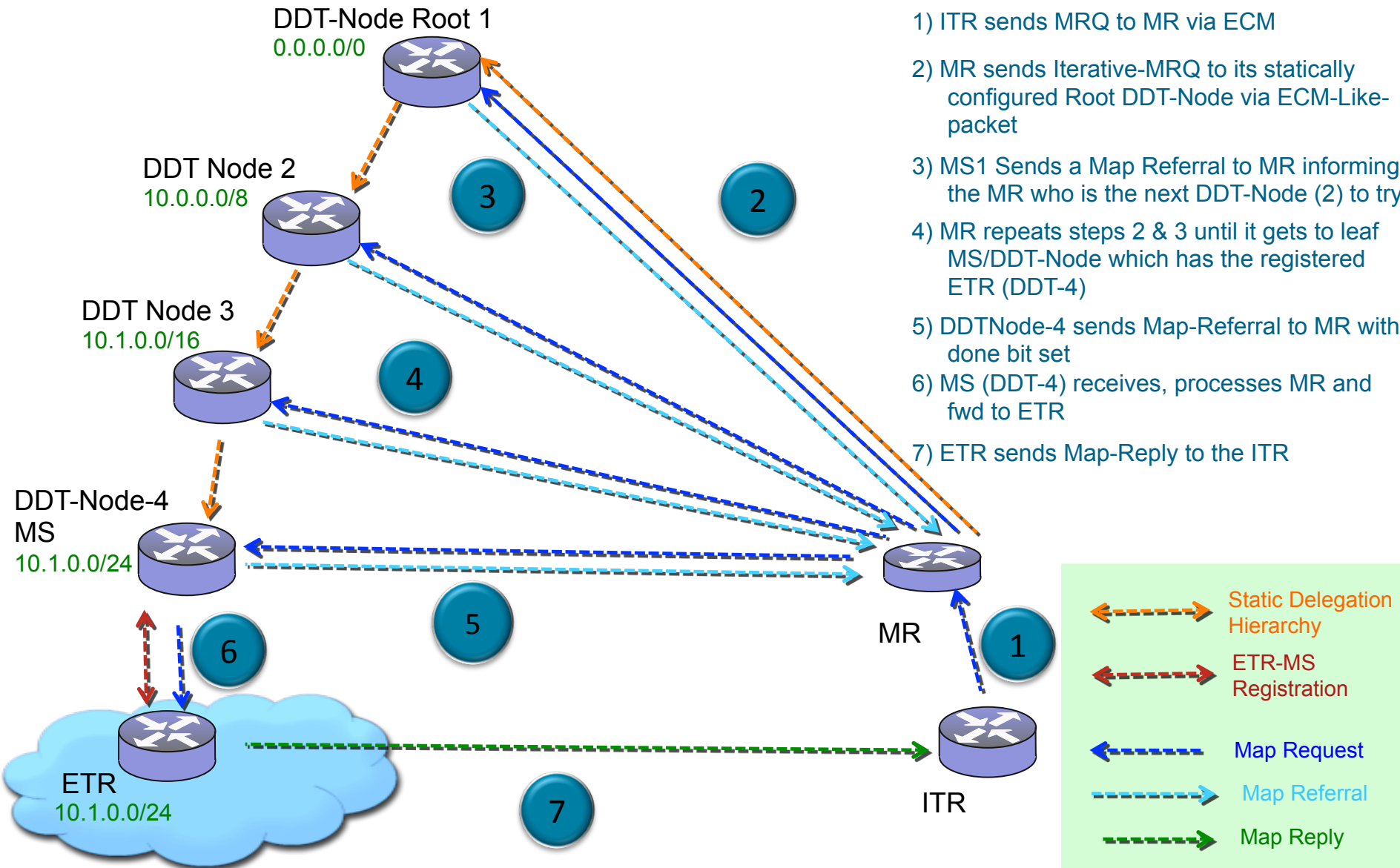
- 1) MR configured with Root, or MS1, RLOC
- 2) DDT-1, DDT2, DDT-3, DDT/MS-4 configured children with child prefixes, and authoritative prefixes
Ex. DDT-2 Delegates child 10.1.0.0/16 to MS3
DDT-2 configured authoritative for 10/8 in IID0
- 3) ETR is registering its EID to the Leaf MS



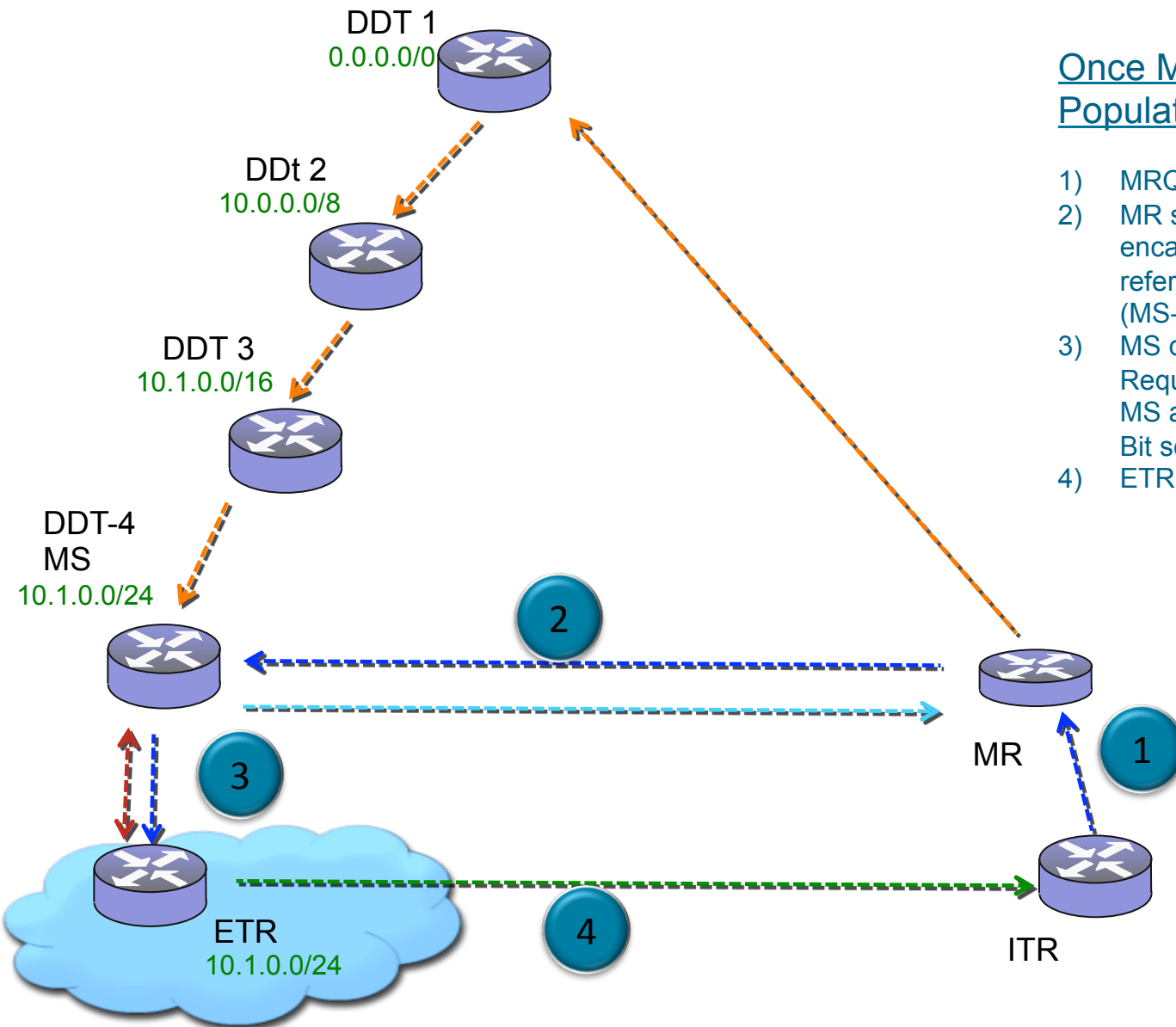
First Request Packet Flow

Map Request, Referral, & Reply

- 1) ITR sends MRQ to MR via ECM
- 2) MR sends Iterative-MRQ to its statically configured Root DDT-Node via ECM-Like-packet
- 3) MS1 Sends a Map Referral to MR informing the MR who is the next DDT-Node (2) to try
- 4) MR repeats steps 2 & 3 until it gets to leaf MS/DDT-Node which has the registered ETR (DDT-4)
- 5) DDTNode-4 sends Map-Referral to MR with done bit set
- 6) MS (DDT-4) receives, processes MR and fwd to ETR
- 7) ETR sends Map-Reply to the ITR

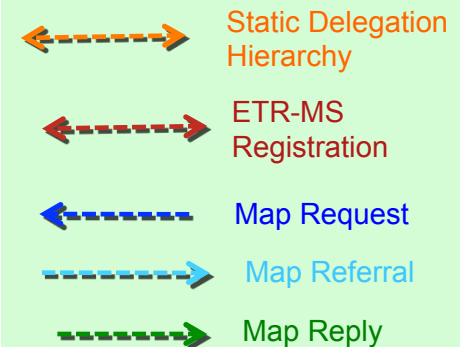


Steady State



Once MR's Referral-Cache is Populated

- 1) MRQ in ECM arrives on MR
- 2) MR sends MRQ in ECM (possibly double encapsulated if lisp-sec is used to secure referral path) to Cache'd Leaf-Map-Server (MS-4)
- 3) MS decaps ECM and then sends Map-Request in new ECM to ETR. MS also sends a Map-Referral with Done Bit set back to MR
- 4) ETR sends Map-Reply to ITR



DDT Implementation Status

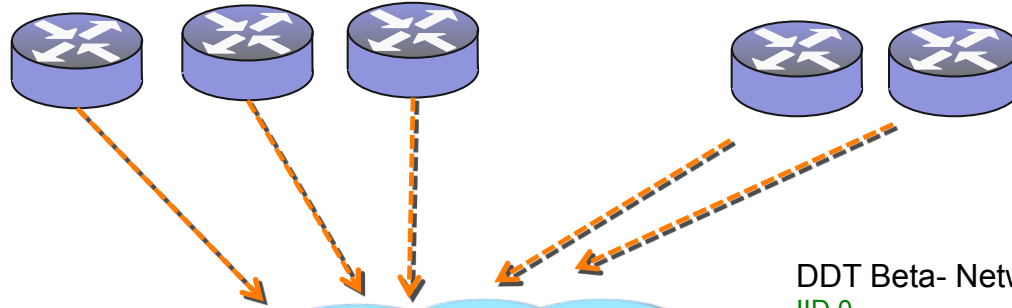
- IOS and NXOS implementations complete
- Development, and interoperability testing going on now
- Beta Network running DDT code
- Configuration is pretty simple
- Does not include proposed DDT-SEC extensions

DDT Beta (IID0) Network Deployment

Cisco's DDT Roots:
(Iota-Root)

IID: *
EID: *
arin-ddt.rloc.lisp4.net
ripe-ddt.rloc.lisp4.net
vxnet-ddt.rloc.lisp4.net

Iota- root Servers



Other DDT Roots

IID *
EID: *
root-verisign.ddt-root.org
mu-ddt-root.org



DDT Beta- Network TLDs

IID 0
v4-EID: 153.16.0.0/16
v6-EID: 2610:D0/32
uninett-ddt.rloc.lisp4.net
sj-ddt.rloc.lisp4.net
msn-ddt.rloc.lisp4.net



MR/MS:
EID Aggregates:
153.16.0.0/19
2610:D0:1000::/36
2610:D0:FACE::/48
153.16.21.0/24 TO MN
153.16.22.0/24 TO MN
isc-mr-ms
asp-mr-ms
cisco-sjc-mr-ms1
eqx-ash-mr-ms

MR/MS's
153.16.21/24
153.16.22/24
2610:d0:1219::/48
2610:d0:120e::/48
asp-isis
isc-isis
intouch-isis

MR/MS:
EID Aggregates:
153.16.32.0/19
2610:D0:2000::/36
I3-london-mr-ms
tdc-mr-ms
intouch-ams-mr-ms
intouch-ams-mr-ms

MR/MS:
EID Aggregates:
153.16.64.0/19
2610:D0:3000::/36
apnic-mr-ms

MR/MS:
EID Aggregates:
153.16.128.0/19
2610:D0:5000::/36
lacnic-mr-ms

DDT Node with 'child referrals'

Static Delegation Hierarchy