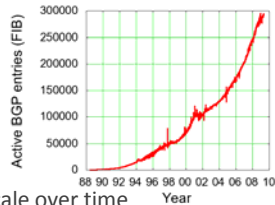


Problem: Scalability of BGP Routing Tables

Observation

- ▶ Default-free zone (DFZ) in the Internet: BGP routers do not have default routes to destinations
- ▶ Number of entries in BGP routing tables in the DFZ: recently strongly increasing
- ▶ Problem
 - ▶ Forwarding table sizes do not scale over time
 - ▶ More powerful routers required in the future



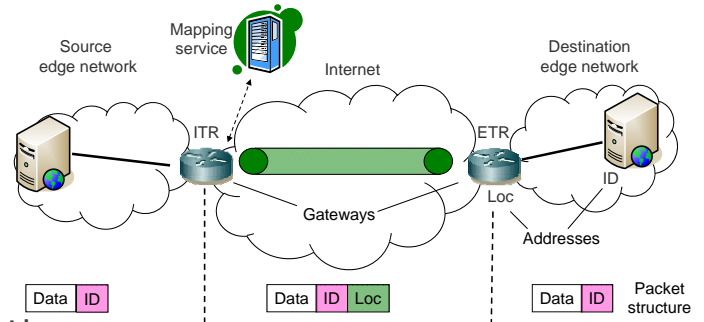
Reason & drivers

- ▶ Provider-independent (PI) and de-aggregated provider-aggregatable (PA) IP prefixes
- ▶ Multihoming, traffic engineering & facilitated provider change

General problem

- ▶ IP addresses used as identifiers and routing locators
- ▶ Two opposed options after provider change
 - ▶ Keep routing and assign new addresses for customers
 - ▶ Keep addresses & modify BGP tables => bad scalability

Solution: Locator/Identifier Split



Idea

- ▶ Addresses consists of decoupled locators (Locs) and IDs
- ▶ User processes communicate with IDs instead of IP numbers
- ▶ Mapping system provides ID-to-Loc information
- ▶ Network layer entities, e.g. gateways, add source and destination Locs to IP packets after mapping lookup

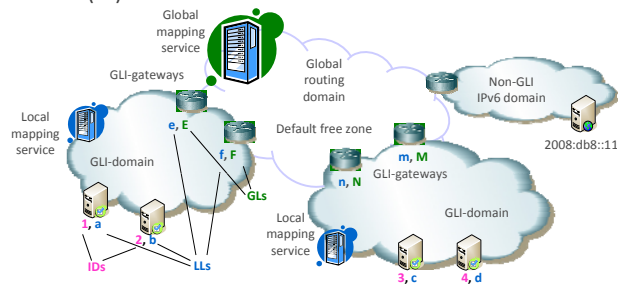
Global Locator, Local Locator, and Identifier Split

Motivation

- ▶ Implementations of Loc/ID split mostly require routing on IDs in edge networks
- ▶ Edge networks may be very large and also want to benefit from Loc/ID split

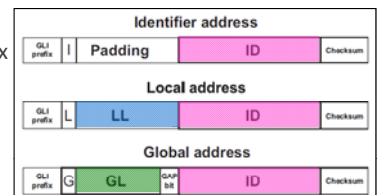
Idea

- ▶ Global locator (GL): globally routable address prefix of GLI-gateway
- ▶ Local locator (LL): locally routable address prefix within GLI-domain
- ▶ Identifier (ID): identifies host



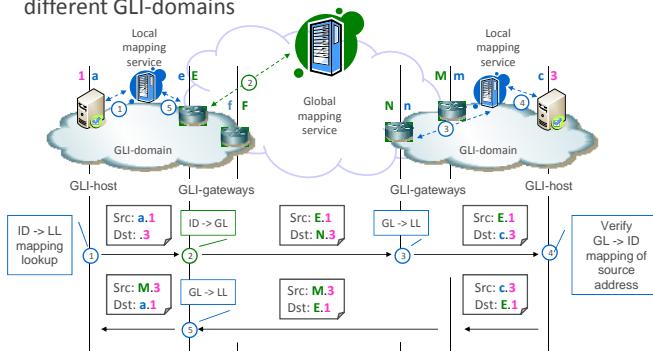
Integration in IPv6

- ▶ Address structure
 - ▶ GLI-Split specific prefix
 - ▶ Marker bit specifies address type
 - ▶ Checksum makes addresses neutral to TCP checksums => address rewriting without problem in TCP checksum
- ▶ Basic operation
 - ▶ Local and global mapping system required for ID-to-LL and ID-to-GL mapping
 - ▶ Hosts and GLI-gateways query mapping system and add appropriate locator information to addresses
- ▶ Benefits
 - ▶ Support for multihoming, multipath routing, mobility, traffic engineering, simplified renumbering
 - ▶ Interworking with classic IPv6 Internet possible
 - ▶ Incremental deployment possible



Communication between GLI-Domains

- ▶ Example for communication between upgraded GLI-nodes in different GLI-domains



Communication with Classic IPv6 Domains

- ▶ Global address preservation (GAP) bit indicates communication with classic IPv6 hosts

