

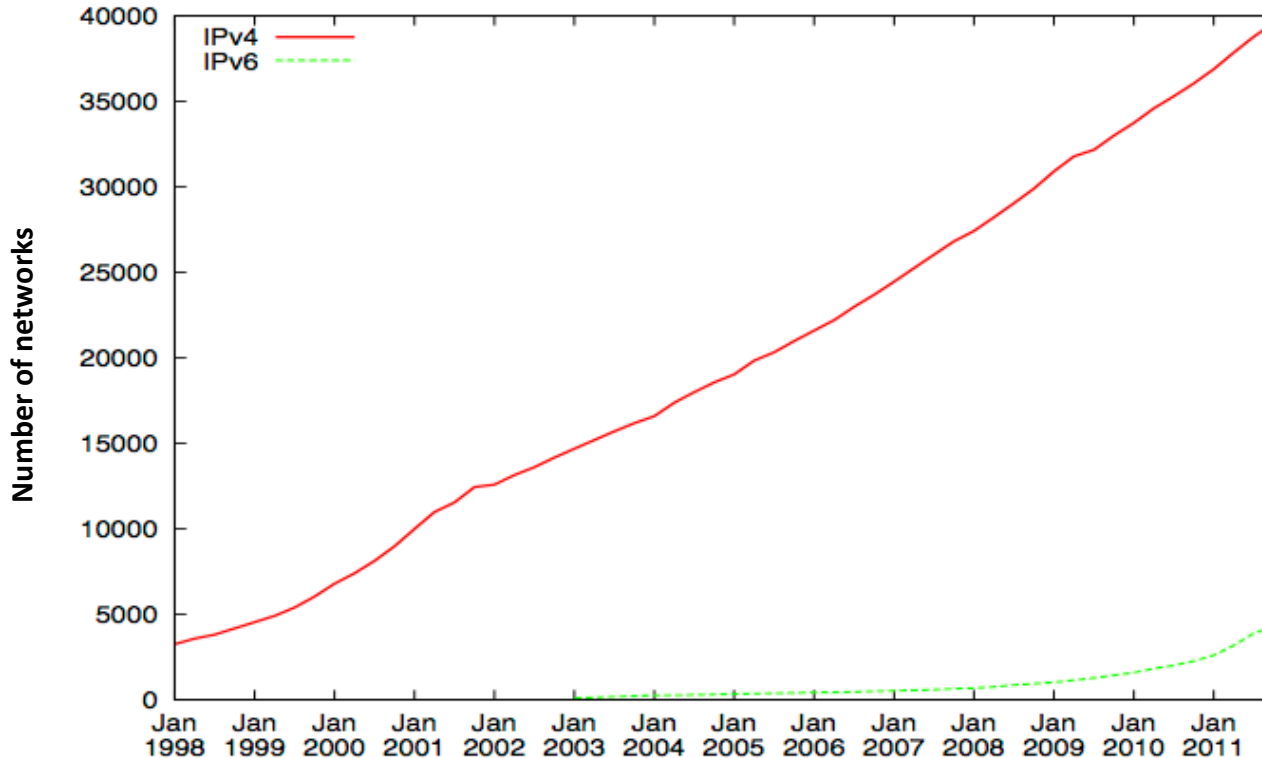
Leveraging IPv4 and IPv6 Multi-Connectivity

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Outline

- IPv6 and IPv4 deployment;
- IPv4 and IPv6 AS paths congruence;
- Measurement Setup;

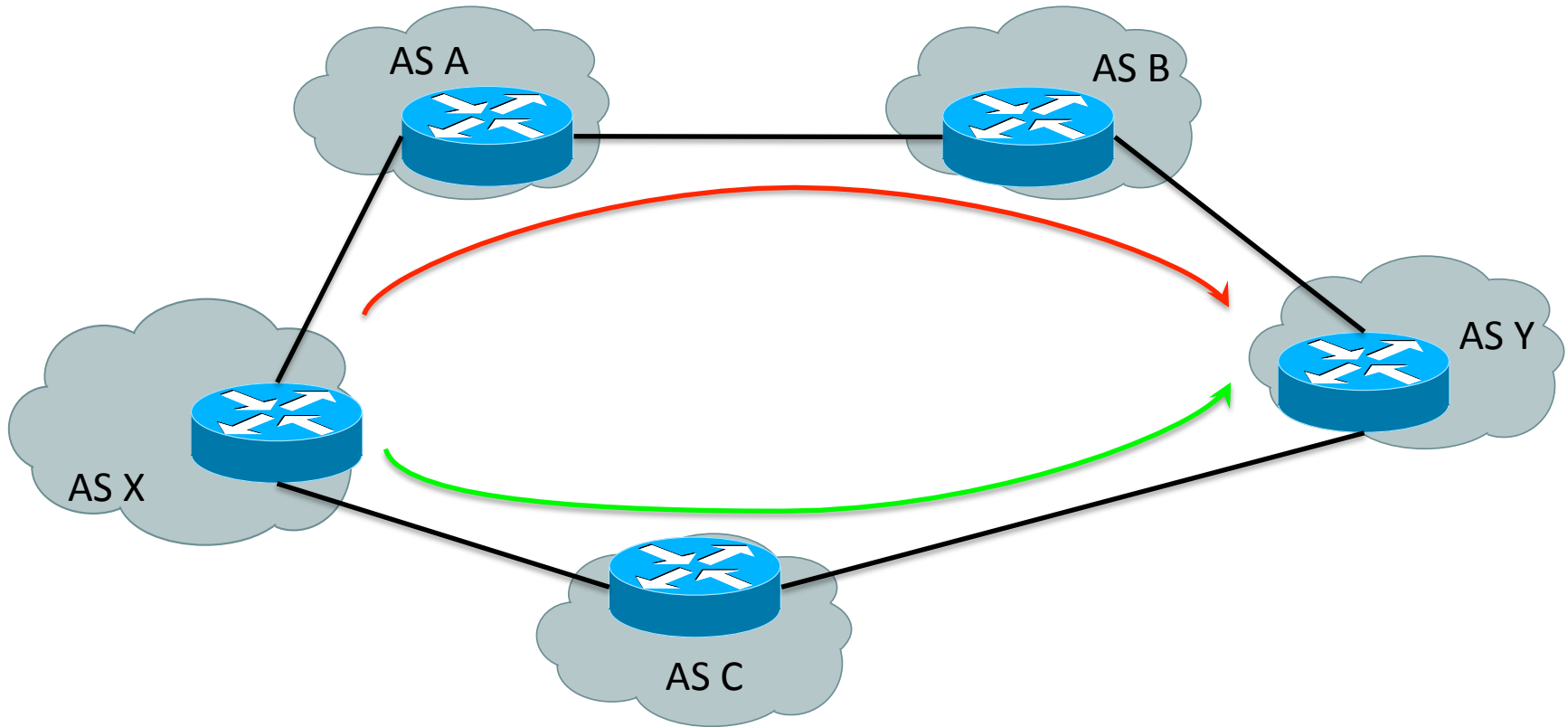
Can we leverage the IPv4 and IPv6 connectivity ?



- February 2011 : last IPv4 /8 allocated
- 17% of the networks deploy IPv6

Goal : *Use Multipath (MPTCP) protocols to test whether IPv4-IPv6 multi-connectivity increases robustness and performance*

AS path congruence



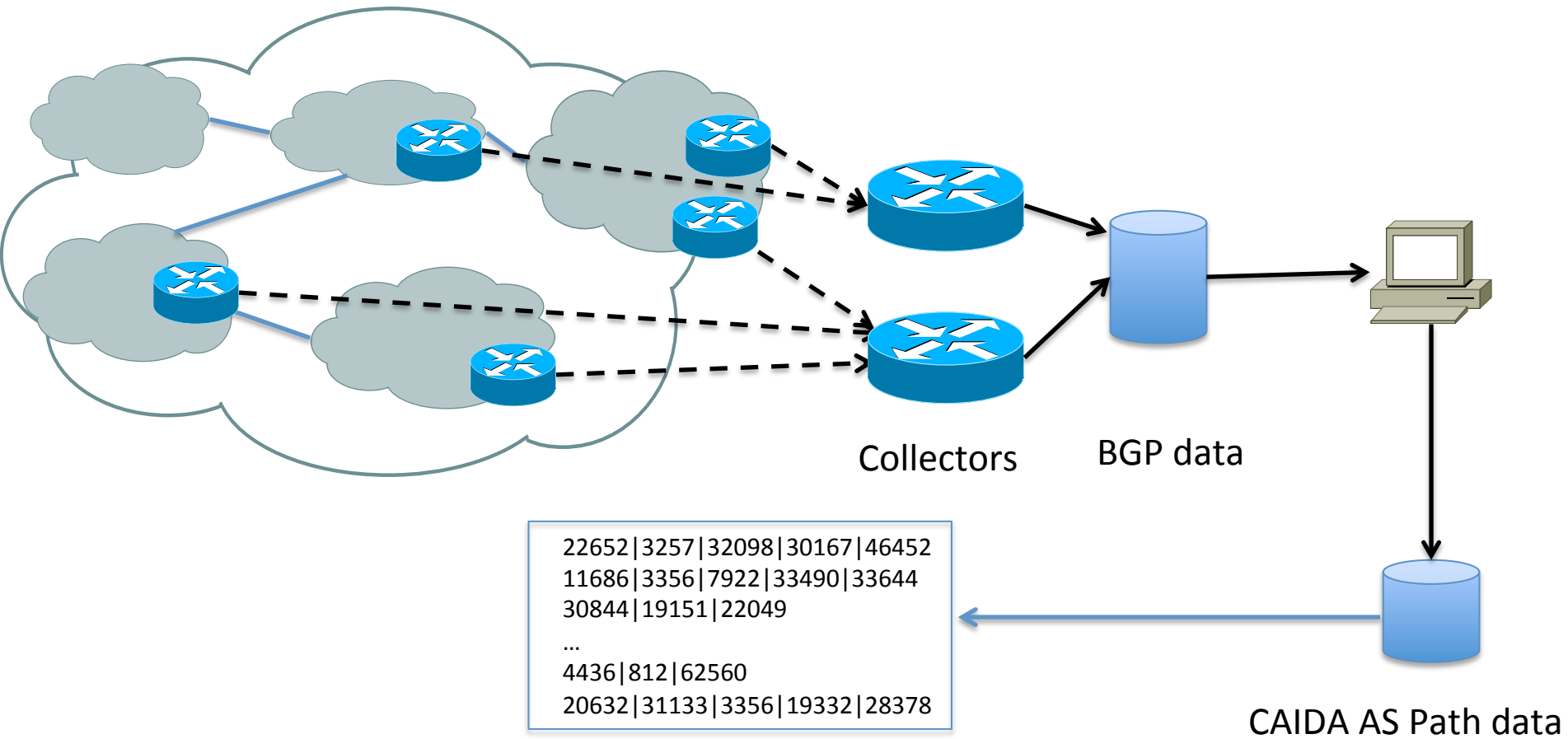
IPv4 : ASX -> AS A -> AS B -> AS Y

IPv6 : ASX -> AS C -> AS Y

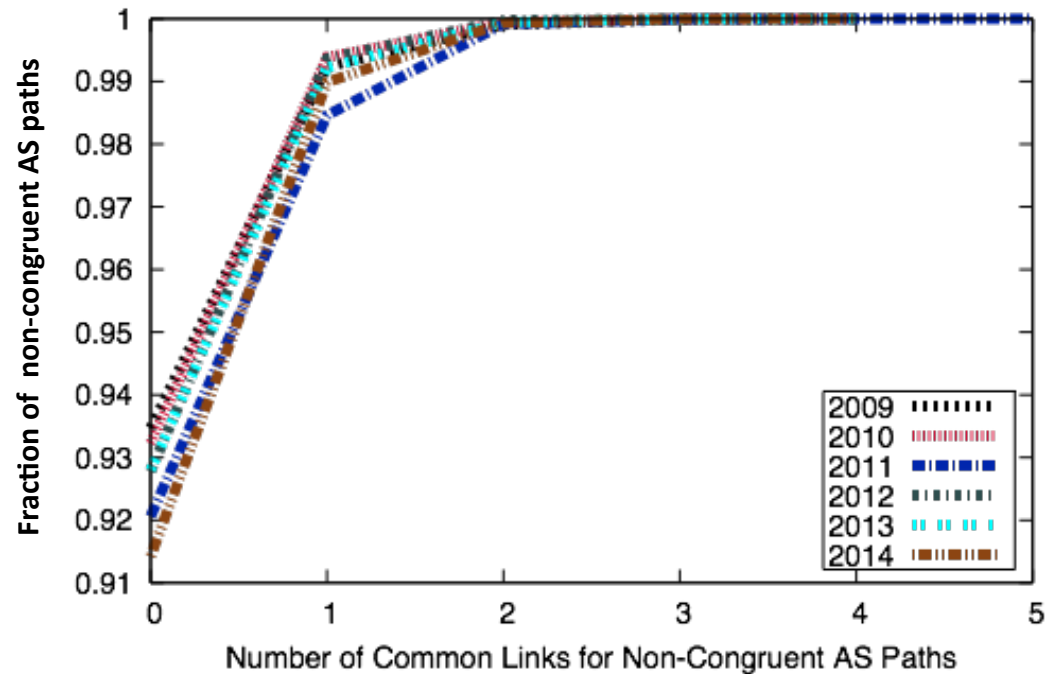
Congruent (XY_{v4}, XY_{v6}) = 0

CAIDA AS Path data

- AS paths data: BGP data collected from Routeview and RIPE(2009 - > 2014)



88% of the AS Paths are non-congruent

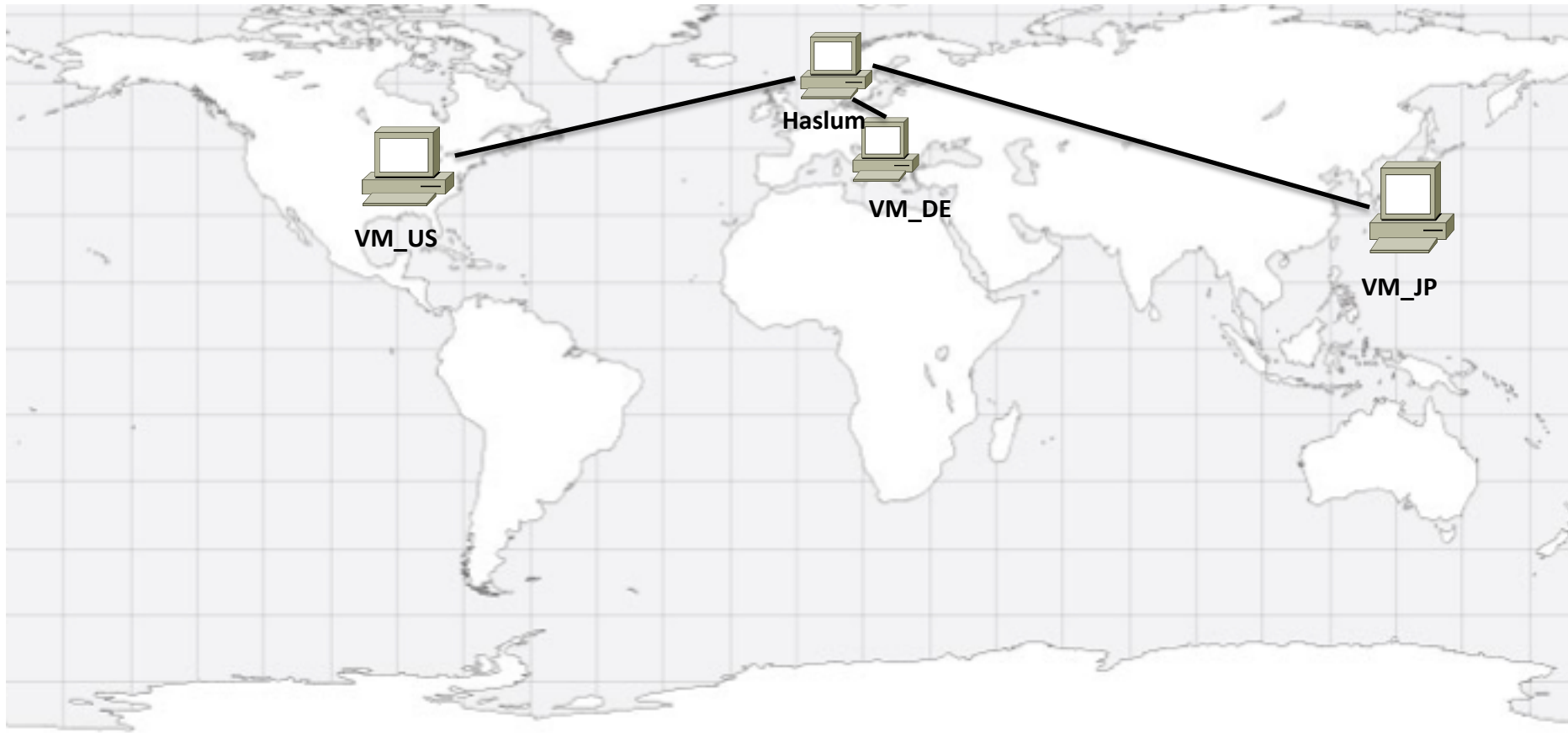


Method:

- Select the AS paths for dual-stack source and destination AS (AS S, AS D);
- $Congruent(S, D) \rightarrow Congruent \text{ and } Non-Congruent \text{ AS Paths}$
- Common links for Non-congruent AS Paths

90% of the non-congruent AS Paths have no common links

Measurement Setup



- Haslum (NorNet Core): multi-homed (Uninnet, Kvantel) ;
- Total : 12 Paths ;
- IPv4 and IPv6 AS Paths Haslum – VM_JP congruent ;

Questions ?