Gulliver Project
- status update in 2009 -

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Gulliver Project

Introduction

- Gulliver Project
  - Active Measurement Framework
  - Performing DNS Active Measurement since 2006
  - **http://gulliver.wide.ad.jp/**
- Probes DNS reachability from worldwide locations
  - RTT, Query Timeout
  - Node ID (hostname.bind or server.id)
- 30 Probe Locations as of Feb. 2010
  - Including South/East Asia and Africa countries
- Targets
  - Root, ccTLD, in-addr.arpa DNS servers

Overview of Our Framework

Measurement Server

Management Server

(1)

(4)

(3)

(2)
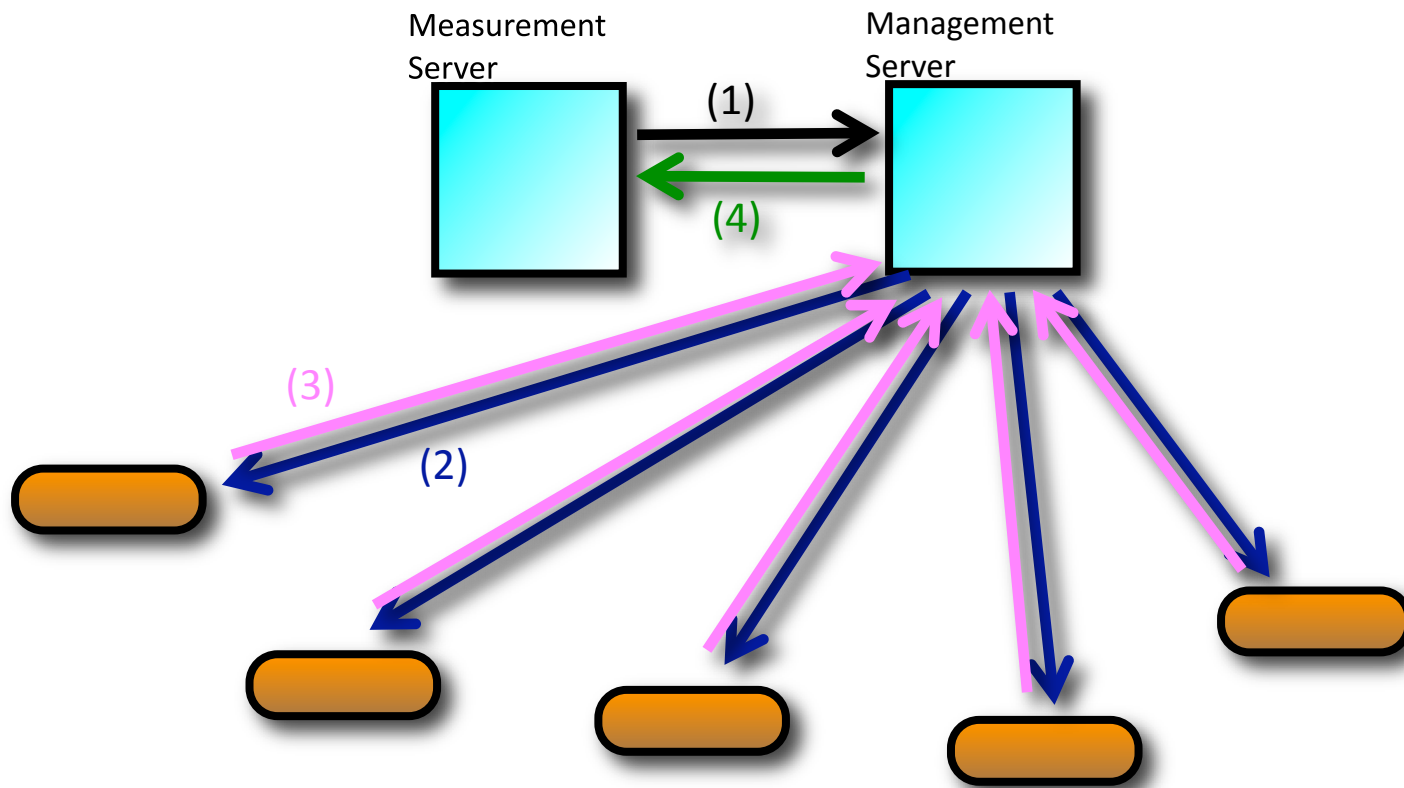
Measurement Boxes

(1) Measurement Requests
(2) Send commands to each node
(3) Upload Results
(4) Get Results

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Management of measurement nodes

Analysis of DNS Measurements

- Span
  - From Jan. 2009 to Dec. 2009

- Targets
  - Root DNS Servers

- RTT distribution
  - We found there are 3 types of RTT distribution on Root DNS Servers

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Histograms of RTT
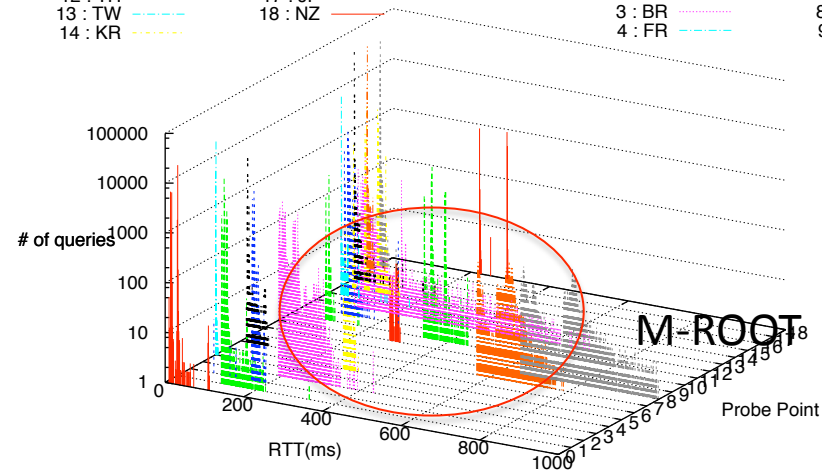
Categorize Root DNS Servers
by Anycasting deployment

- Root DNS Servers are categorized by its operation policy

  Type-1 : Non Anycasting
  - B(1) , D(1) , E(1) , H(1)

  Type-2 : Anycasting
  - A(6) , C(6) , G(6) , L(3) , M(6)

  Type-3 : Heavily Anycasting
  - F(49) , I(34) , J(70) , K(18)

- Any relation ???
  - Anycast Changes, RTT, and Query Timeout

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Mode values of RTT

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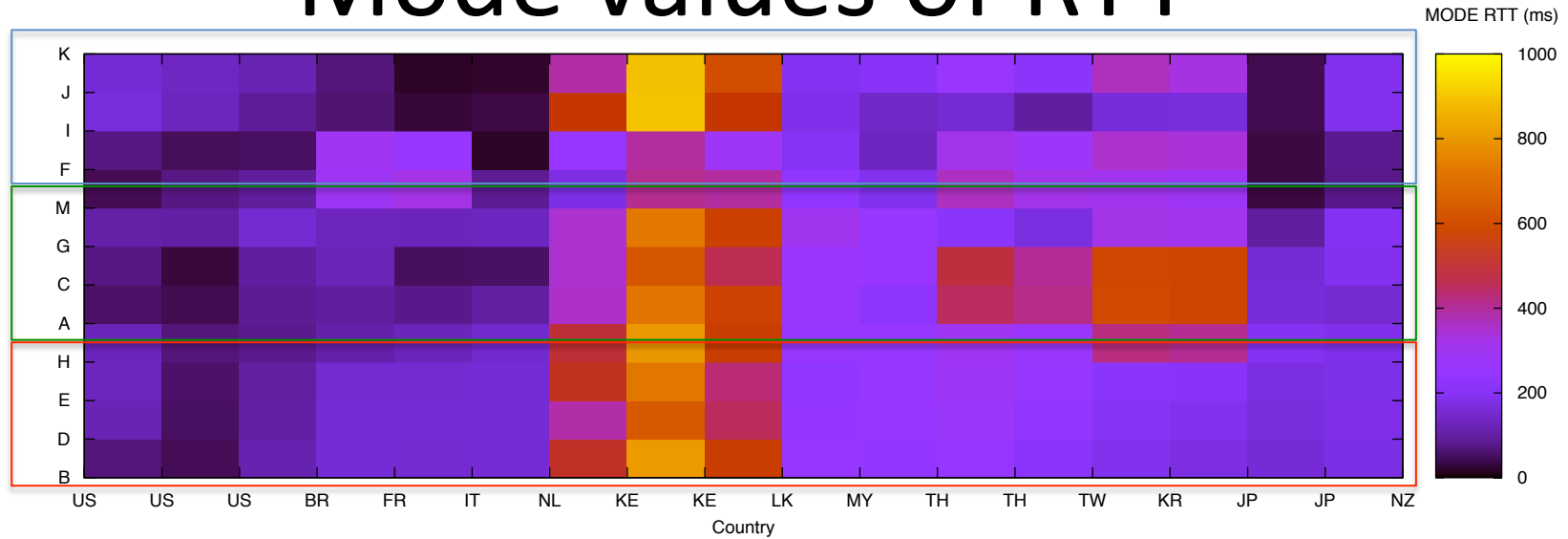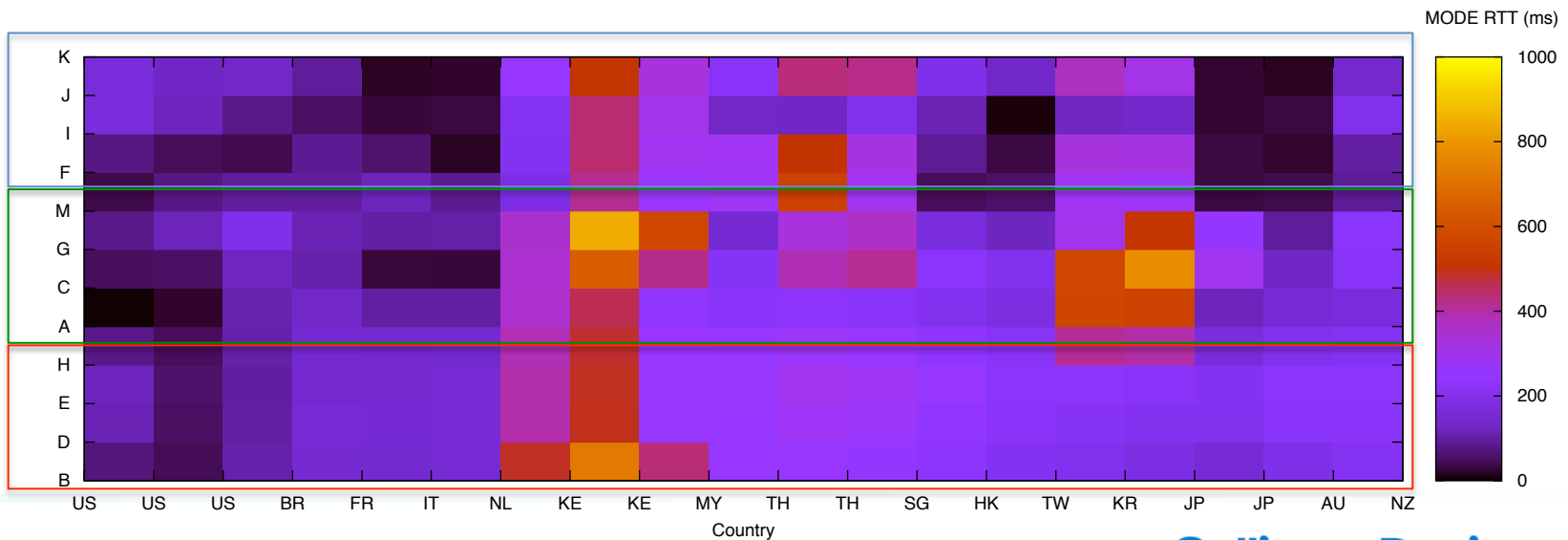
Standard Deviations of RTT

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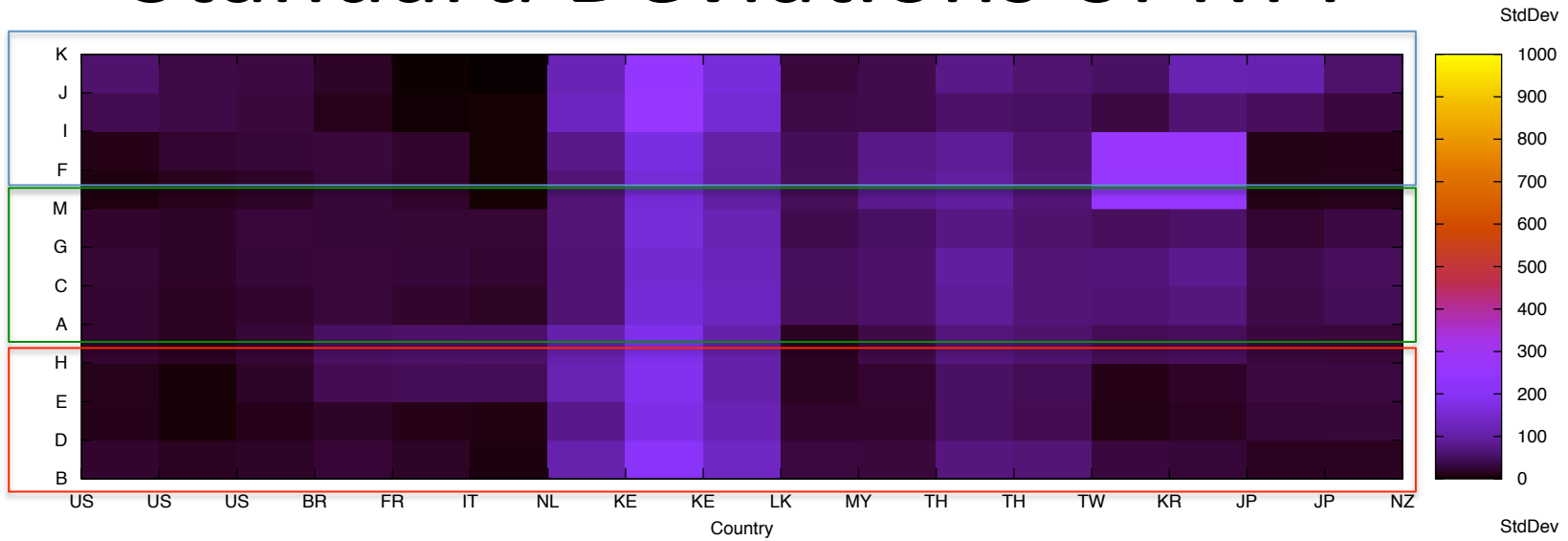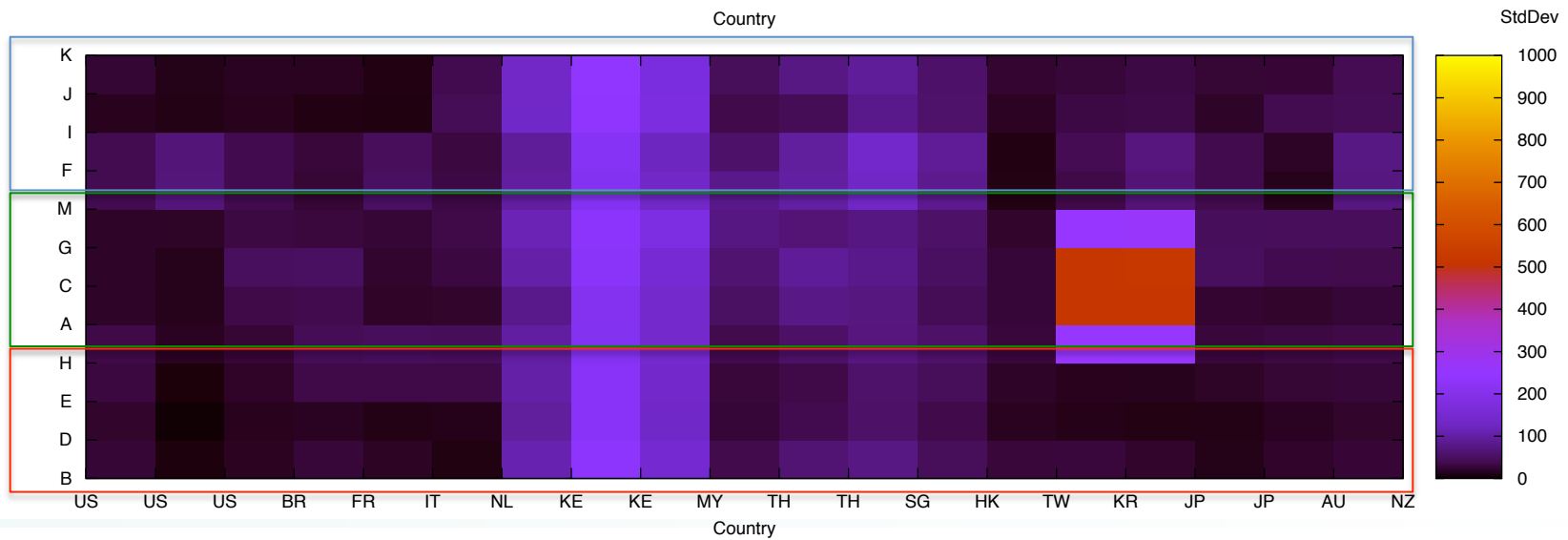
Query Timeout Rates
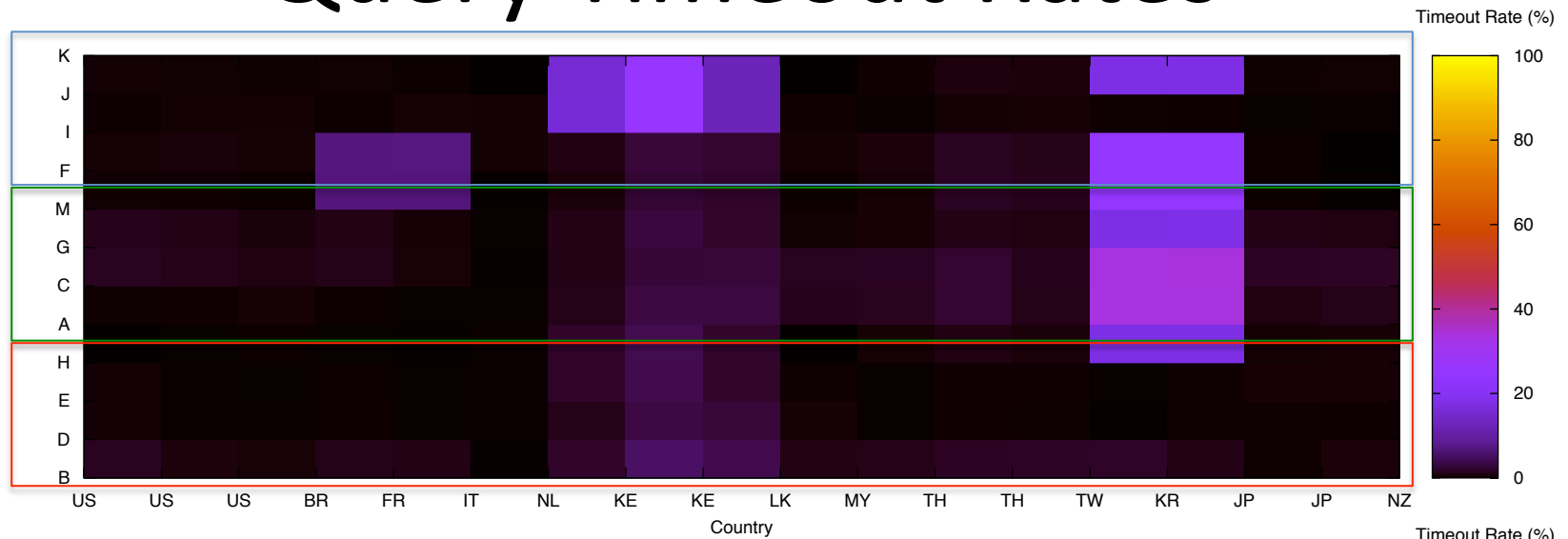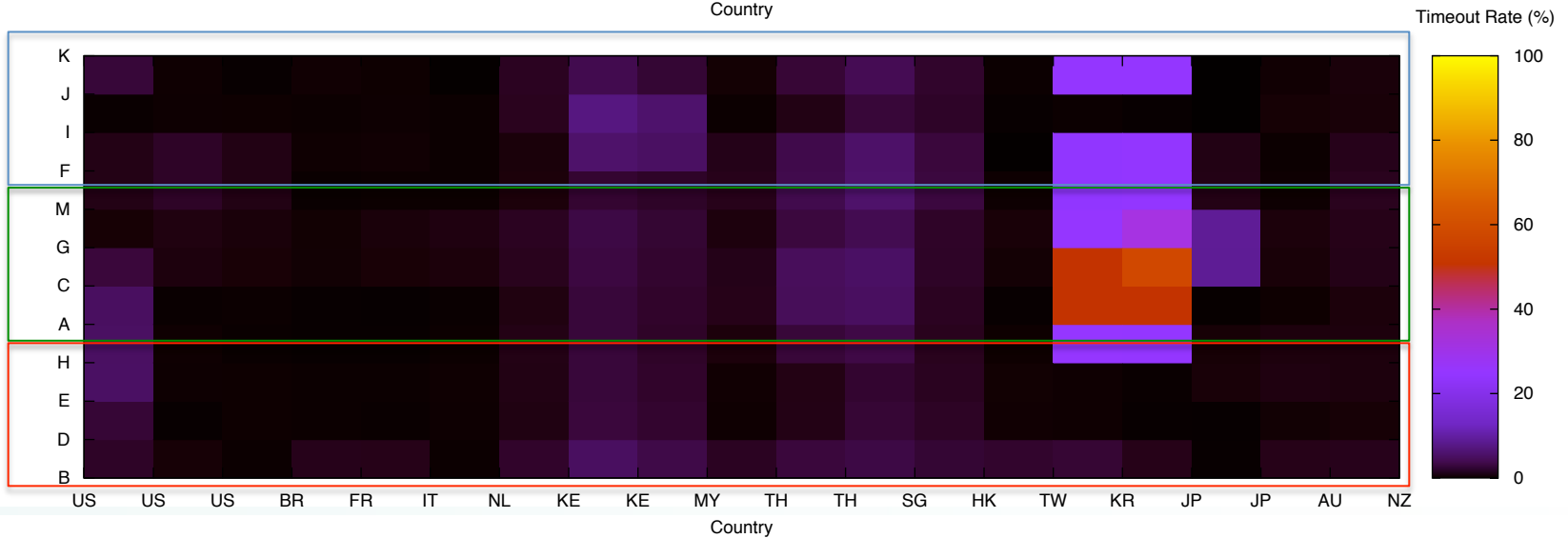
Node ID Changes
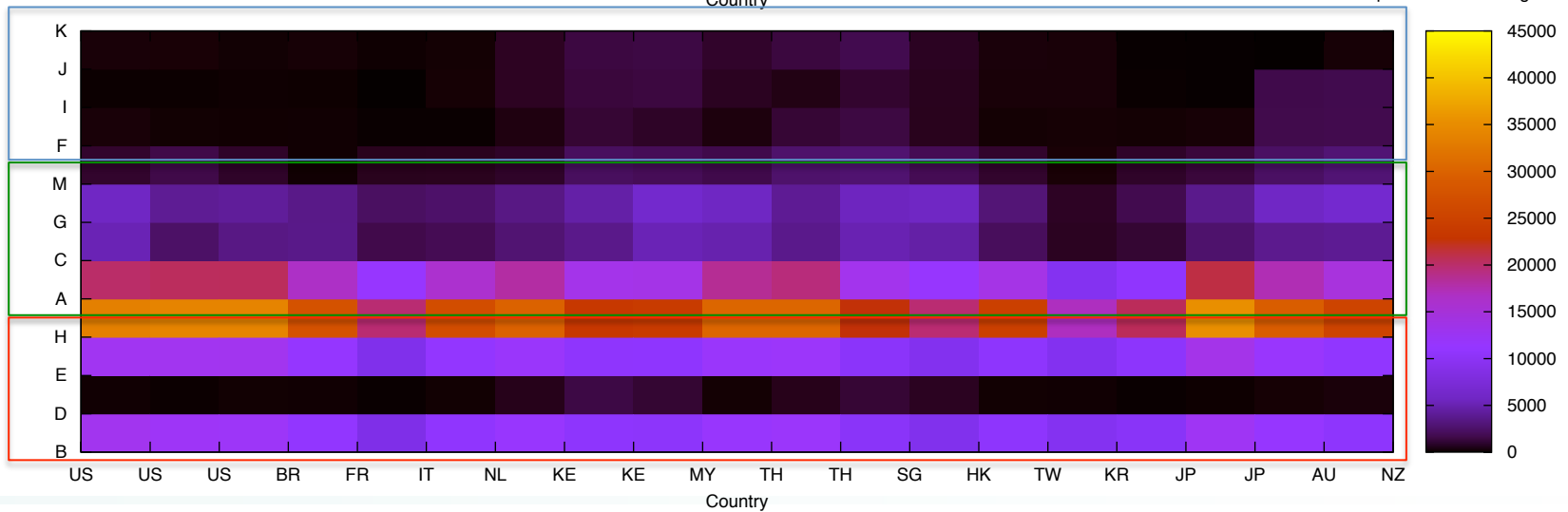
Relation with
RTT, Node Changes, and Timeout Rates

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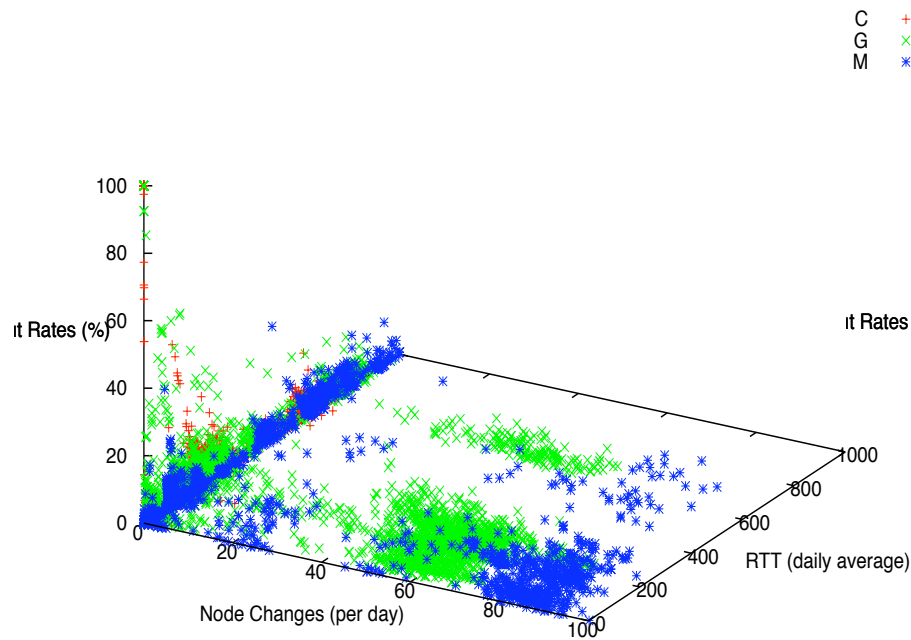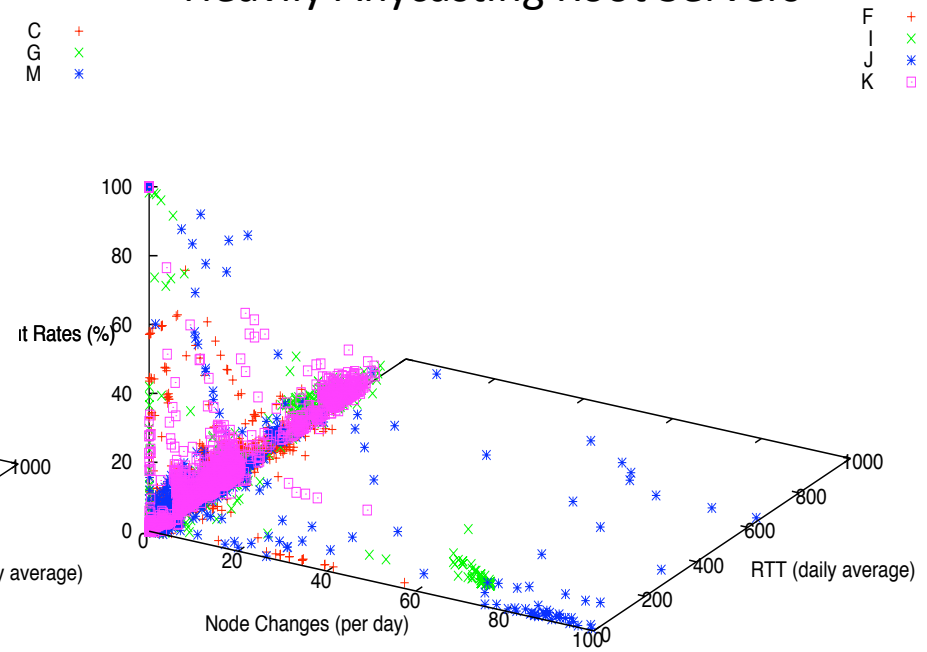
Further works

- IPv6 measurements
  - Only a few probe locations support IPv6
- DNS packet size measurements
  - EDNS0
  - TCP query

Problems of management

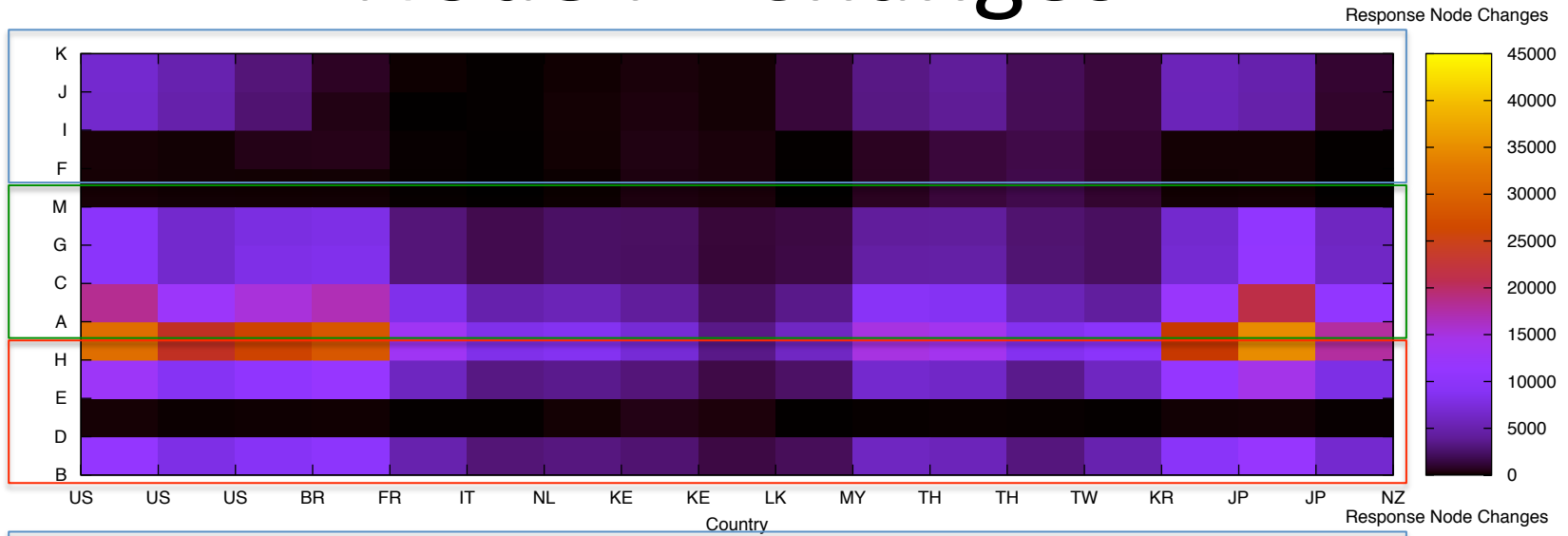- Have been continued the measurements about 3 years…
- Measurement nodes in developing countries often lost connectivity
- Can not control measurement nodes
  - Affects results of long-term measurement
- Our measurement node does nothing under uncontrollable situation
  - For safety of measurement traffic
  - But lack of measurement data

Future Plan

- It is too costly to deploy and manage measurement framework.

- Collaboration with Other Measurement Frameworks
  - Data exchange
  - Interconnection of Measurement Mechanism
  - Planning to interconnect with TopHat