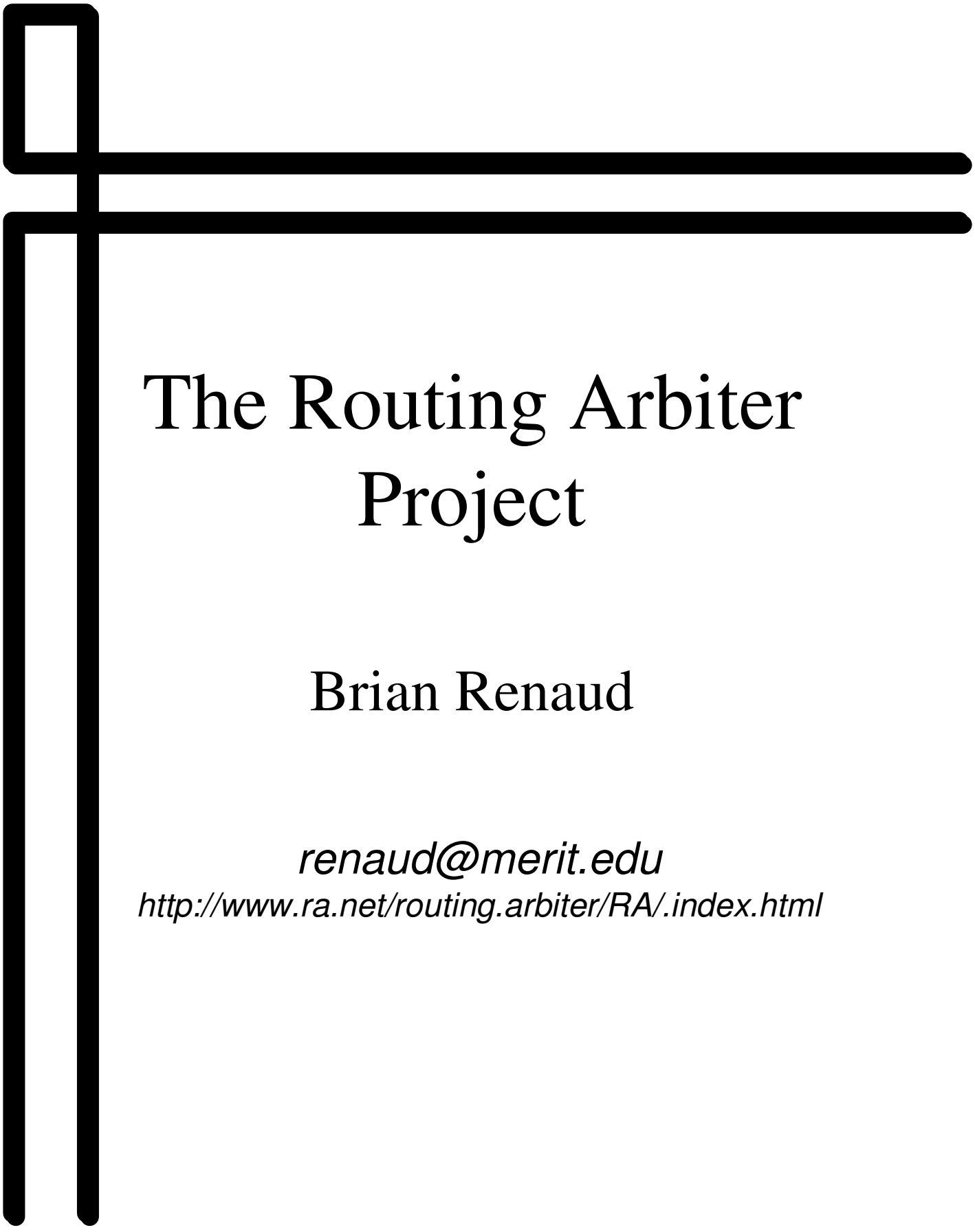

The Routing Arbiter Project

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The Routing Arbiter Project

- A Collaboration Between Merit and ISI
- Funded by the US NSF to provide routing coordination for the new NSFNET architecture
- Part of overall NSF effort which also includes:
  - vBNS - very high speed Backbone Network Services
  - NAPS - the three priority NAPS

The RA Project Overview

- Routing Arbiter Database--Successor to the NSFNET PRDB
  - Part of IRR (Internet Routing Registry), uses RIPE code
  - Registry of last resort
  - Used in the Route Server config file generation

The RA Project Overview

- Route Servers - Sun workstations deployed at each NAP
  - RS exchange routing information with ISPs attached at NAP
  - RS do not do packet forwarding or switching
- Network Management System - monitors Route Server performance
  - “Distributed Rovers” run on each RS and collect various statistics

RADB

- RADB started by translation from the NSFNET PRDB
  - No routing information lost in transition
  - Missing maintainer objects
  - Stale information
  - Duplicated registrations
  - Overly specific routes
- http://www.ra.net/routing.arbiter/RA/RADB.tools.docs/.index.html

RADB Initiatives

- Continued cleanup of registry
- Usage and analytical reports
- Support RPSL extensions
- Support PGP authentication

RADB Initiatives

- Investigate Alternatives
  - Support for capture and storage of real-time routing flows
  - Alternative query interfaces (RADBserver, ...)
  - Using commercial database management system

Tools Recently Developed

- RSd - Route Server daemon
- Peval - Policy Evaluator
- RTConfig - Router configuration tool
- RADBserver - database query tool
- rrc2r/rrmerge - Cisco to RIPE-181 converter

Tools Recently Developed

- CiscoBGP - static analysis of Cisco routing information
- BGPCheck - dynamic analysis of routing information
- RouteFlap - route flap analysis tool
- IRRWeb - GUI interface into IRR

RSd

- Enhanced version of GateD
- Supports configuration and transparent passing of BGP MEDs
- BGP route flap dampening
- Multiple views with configurable AS-path option, plus other knobs for providers
- Soon: support for BGP destination preference attribute

Peval

- Inputs RIPE-181 policy expression
- Performs essential background calculations (symbolic evaluations and expansions)
- Outputs RIPE-181 policy expression used by other tools, such as RTConfig

RTConfig

- Providers generate router configs directly from RADB or other IRR registries
- In production use for RA Route Servers, ANSNET, CA*net
- Front-end tool that uses peval and RADBserver transparently
- Supports address/prefix and AS-path-based filters

RTConfig

- Currently only supports GateD configurations; Cisco configuration generation being implemented
- Peval/RTConfig available from:
  - ftp://ftp.ra.net/routing.arbiter/tools/RAToolSet/
  - (Peval included in RTConfig source code)

RADBserver

- Superset of RIPE whoisd server
- Simplifies queries and parsing
- Perform multiple queries,
- Supports single and multi-object queries, for example:
  - What are as-in and/or as-out lines of specified objects?
  - What origins are in all route=35/8 objects?

RADBserver

- Very rapid responses for common queries:
  - Which routes have origin=AS1800?
  - Which routes are in community=X?
  - Which routes have Country = France?
  - User can select which databases to search and in what order

rrc2r/rrmerge

- Converts Cisco configuration files into raw RIPE-181 AS objects
- Cisco access-list converted into set of nets embedded in AS object or represented a community
- Collects missing information IRR
- Alpha version available; send email to *lpj@merit.edu*

CiscoBGP

- Obtains, analyzes routing information from production Ciscos
- Compares Cisco “show ip bgp” data with routes in IRR
- Flags prefixes reserved by RFC1597
- Next release will check complete ASpath

BGPCheck

- Obtains, analyzes routing information in peering sessions with production routers
- Compares data in BGP updates with information in IRR
- Flags prefixes reserved by RFC1597
- Next release will check complete ASpath

RouteFlap

- Modelled on Curtis Villamizar's route flap tool
- Monitors and collects route flap statistics (uptime ,downtime, number of routing changes, etc.) from BGP peering session
- Provides history of routing updates

IRRWeb

- Allows point-and-click queries and updates
- Provides GUI monitoring and configuration tools

Tools Under Development

- MRS - Multi-threaded Route Server
- Distributed Rovers Package - remote monitoring toolset
- CIDR Assistant - CIDR utilities
- DTP - Develop Template Peering
- XPolicy - Policy visualization package

Tools Under Development

- XTopology - GUI interface to routing information
- Cisco/GateD GUI Config Generator
- What-If Engine

Next Steps

- Continued tool development (with feedback, we hope)
- More actively investigate RADB alternatives
- Support production use of the Route Servers
- Continued statistics gathering with greater distribution