

Interface to The Internet Routing System (IRS)

Framework documents

Joel Halpern

Drafts included

draft-atlas-irs-problem-statement-00

draft-ward-irs-framework-00

draft-atlas-irs-policy-framework-00

draft-dimitri-irs-arch-frame-00

Draft authors: Alia Atlas, Thomas Nadeau, David Ward

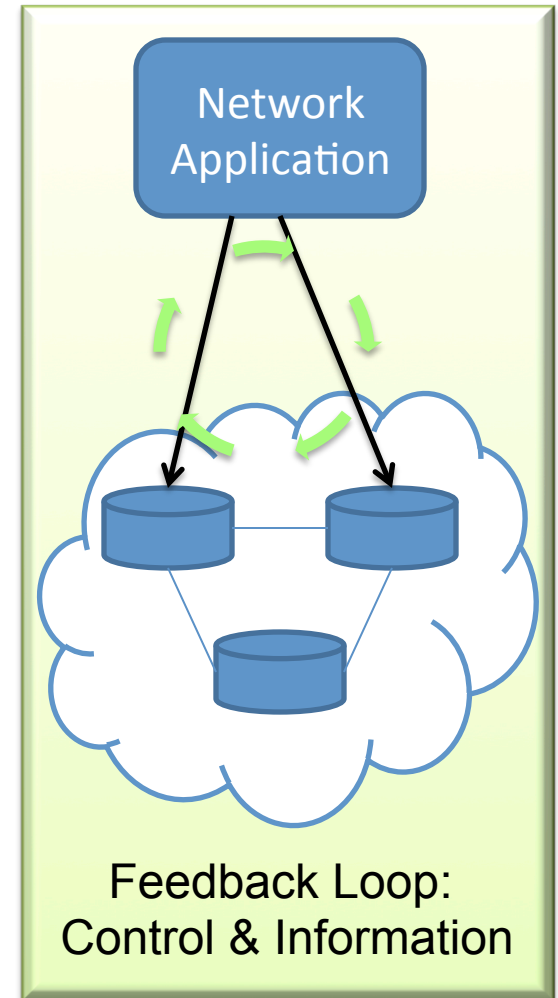
Susan Hares, Joel Halpern

Dimitri Papadimitriou Martin Vogourex

Wounter Taverneir, Didier Cole

What's the Problem?

- Applications Need To *Dynamically*
 - *And Knowledgeably*, based on:
 - Topology (active & potential)
 - Events
 - Traffic Measurements
 - Etc.
 - *Augment* Routing, based on:
 - Policy
 - Flow & Application Awareness
 - Time & External Changes



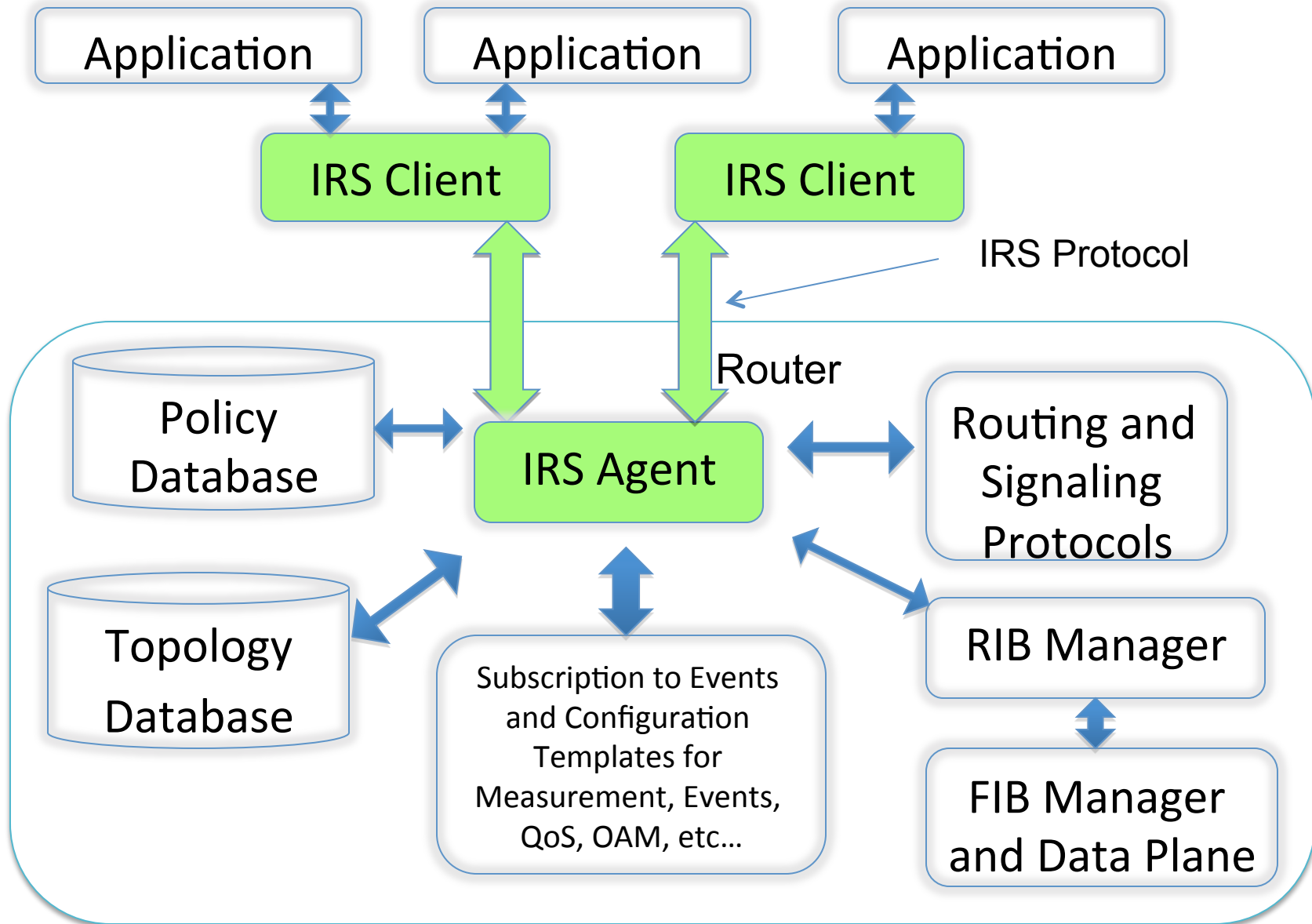
What's Needed for the Routing System?

- Data Models for Routing & Signaling State
 - RIB Layer: unicast RIBs, mcast RIBs, LFIB, etc.
 - Protocols: ISIS, OSPF, BGP, RSVP-TE, LDP, PIM, mLDP, etc.
 - Related: Policy-Based Routing, QoS, OAM, etc.
- Framework of *Integrating* of External Data into Routing
 - Indirection, Policy, Loop-Detection
- Filtered Events for Triggers, Verification & Learning Changed Router State
- Data Models for State
 - Topology model, interface, Measurements, etc.
- Device-Level and Network-Level Interface & Protocol(s)

Main Concerns

- 1) Standard data-models
 - clear self-describing semantics
 - Sufficient coverage for use-cases needing feedback
- 2) Applications aren't routers – so can't need to implement a list of routing/signaling protocols
- 3) Good security, authorization, & identity mechanisms
- 4) Scaling and responsiveness:
 - Multiple applications
 - Many operations per second
 - Significant data to export, even when filtered

IRS Framework at IETF 84



3 Key aspects - P.A.L.

- **P**rogrammatic interface – asynchronous and fast
- **A**ccess to information – IRS gives access to information and state that is not usually configured or modeled.
- **L**earn additional filtered Events

IRS Interface Key Aspects

- Multiple Simultaneous Asynchronous Operations
- Configuration - is not reprocessed
- Duplex Communication
 - Asynchronous, Filtered Events
 - Topologic Information (IGP, BGP, VPN, active/potential)
- High-Throughput
- Highly Responsive
- Multi-Channel (readers/writers)
- Capabilities Negotiation/Advertisement (self-describing)

What IRS is not

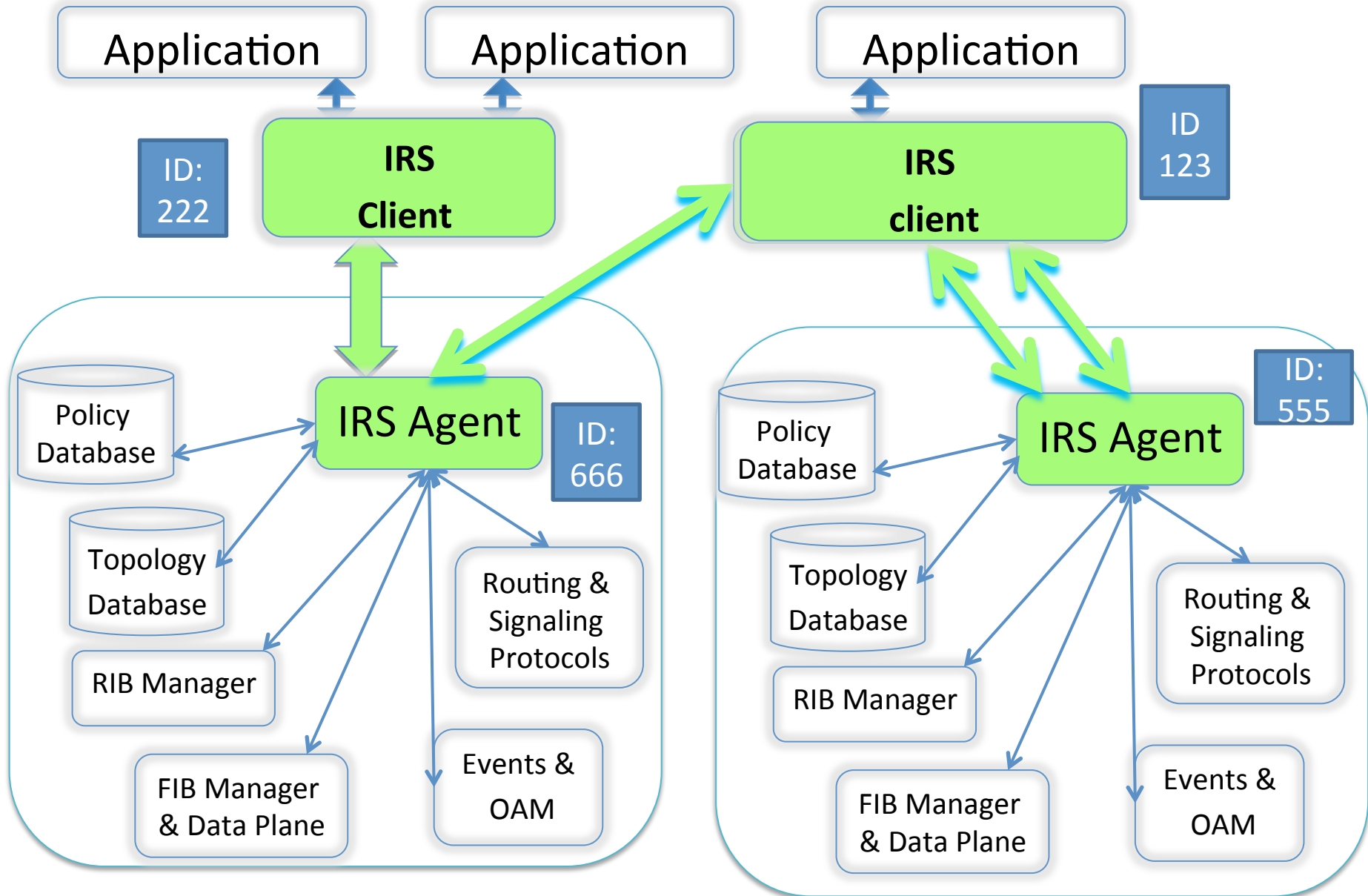
IRS is **NOT**:

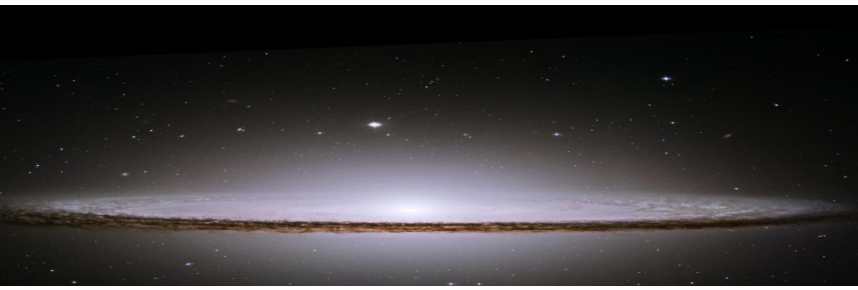
- the only configuration mechanism a router will ever need,
- a direct replacement for existing routing/signaling protocols,
- the only way to read topology and router data that will ever be needed,
- solely limited to a single network device.

IRS: Focused Scope

- Start with a defined scope:
 - Small set of data-models (RIB layer) for control
 - Set of events to support related use-cases
 - Data-model for topology
 - Investigate protocol options for the interface
 - Consider application-friendly paradigms
 - Consider extensions as well as new definitions
 - Define set of motivating use-cases to drive this scope.

IRS Policy Framework





Policy Framework

101

Policy Definitions

- Identity
 - Not tied to a single channel
 - One per commissioner
 - One per agent
- Role
 - Each commission has a security role
- Scope - what I can read
- Influence – what I can write
- Resources
 - what agent can consume
 - Example: # of installs, # of events, # operations
- Policy – explicit and implicit
 - Explicit: what you configure
 - Implicit: What's implied in protocols or “doing the right thing” in configuration

Policy Actions

- Connectivity
 - No need for active connection
- State
 - Tied to Actions such as get this topology;
- Priority
 - Commissioner gives 3 tasks:
 - pull routes,
 - status on interface 2,
 - turn on interface 3
 - What's the order
- Precedence Decisions
 1. Assume configured a route 192.165.2/24
 2. Multiple people use IR to move traffic for 192.165.2/24 short term
 - Who gets to install
 - what happens when they get done
 - What happens on a reboot

Q&A

Why Policy Framework

- Help to take Use cases → Data Models
 - What is the scope and influence policy specified for a data model?
 - How does implicit policy in associated routing system effect what IRS can do?
 - AKA - Don't break implied policy
 - What explicit policy does model need?
- Why: KISS approach (Keep it simple stupid)
 - Best default – because complexity costs
- Some IRS may require
 - 3 phase commit or Time related commits