

# IRNC NOC Performance Engagement Team

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# Background

- IRNC NOC funded to provide NOC services to IRNC infrastructure projects
- 24x7x365 service desk support, proactive monitoring, etc.
- Do not handle break/fix – network engineering lives in each IRNC infrastructure project
- Includes Performance Engagement Team (PET) function to help solve data transfer performance issues.

# Background

- As network technology becomes more complex and opaque, troubleshooting performance issues becomes more difficult for the layperson.
- Trends
  - Increased Layer2 infrastructure obscures network path
  - Heightened security removes public data metrics
  - Increased use of network firewalls at the campus level
  - Automated data transfer requires 24x7x365 support
- As infrastructure complexity increases, the researcher is left to determine how to solve performance issues

# IRNC PET: Three Charges

1. *Drive quick resolution of international inter-domain performance issues*
2. *Build a common performance troubleshooting playbook*
3. *Evolve perfSONAR as a tool for performance incident management*

# Drive resolution

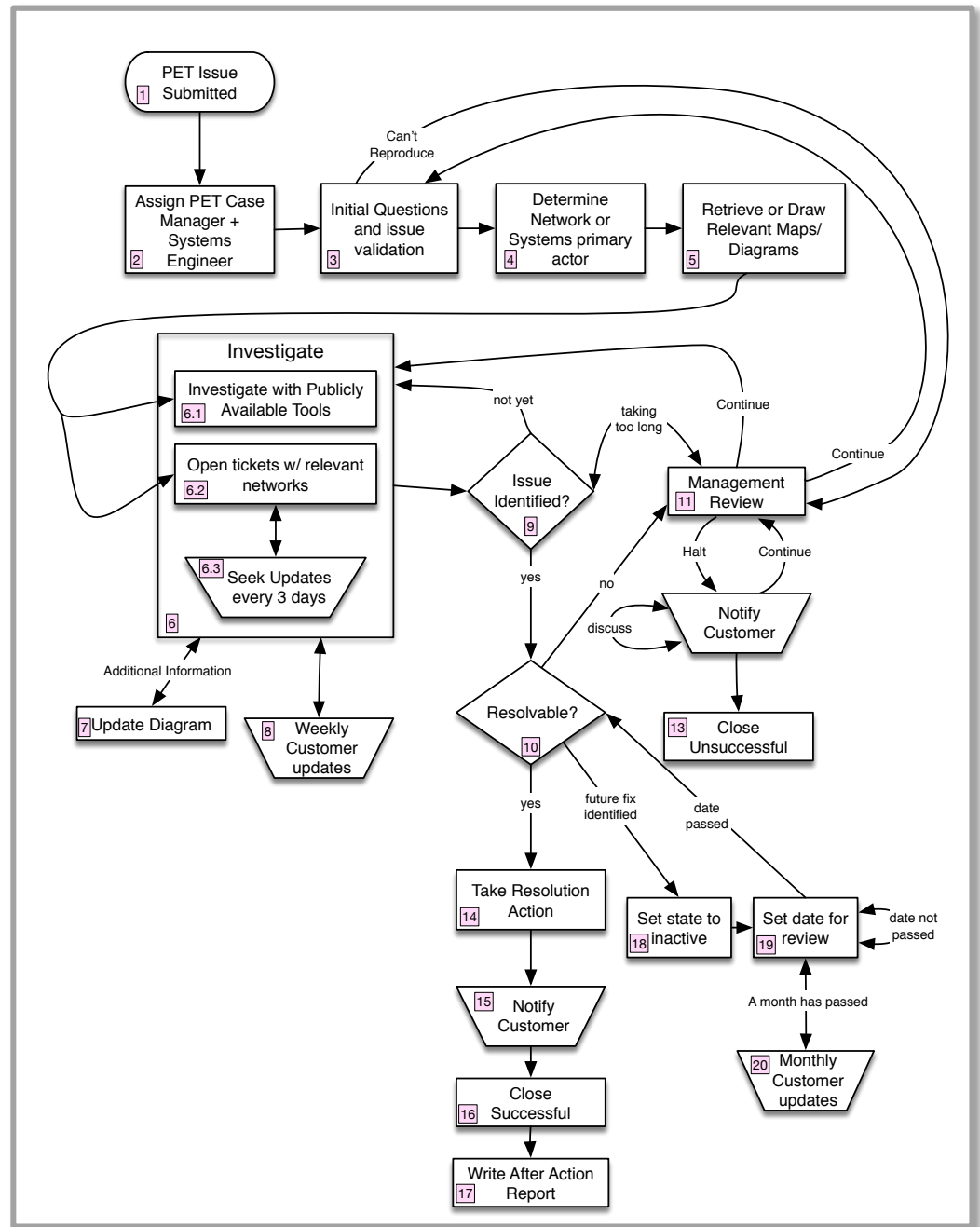
- ◎ Centralized POC to request network troubleshooting assistance
- ◎ PET will
  - Identify path
  - Investigate with network contacts
  - Test with available measurement points
  - Resolve problems that are resolvable (and acknowledge problems that aren't)
- ◎ Researchers *and* network engineers can involve the PET
- ◎ Issues are tracked in a ticketing system -> creates accountability, metrics, and centralized contact tracking

# Performance Playbook

- IRNC NOC PET will collaborate on, design and maintain a centralized troubleshooting process with major partner networks
- PET will maintain a website with network troubleshooting resources and references
  - <https://irncnoc.globalnoc.iu.edu/>
  - Have worked 10+ performance issues to refine our internal process and understanding of where external collaboration is necessary
  - Performance process on next slide
  - Will be working with similar performance-focused efforts (eduPERT, Esnet, GEANT, etc.) to help define standards for collaboration, shared troubleshooting and knowledge capture

# IRNC PET Performance Troubleshooting Principles

- Investigate as much as you can using publicly available monitoring systems and data
- Provide centralized store of troubleshooting information (maps, ticket documentation, findings, etc.)
- More frequent updates to interested parties
- Likely lots of external collaboration required



# Evolve perfSONAR

- perfSONAR will be the measurement tool of choice for the IRNC NOC.
- The more perfSONAR-enabled test points, the more successful the IRNC PET will be in assisting researchers without involving the individual network owners
- perfSONAR collaboration with ESNNet, Internet2, and GEANT will be the primary vehicle for tool enhancements



# Year 1 Findings

- Early involvement in performance troubleshooting process – We're more effective the earlier we're brought in
  - This largely comes down to awareness of the IRNC NOC PET and its charge
- Personar deployments into the campus
  - Issues tend to be local and the closer to the user the monitoring deployments, the more troubleshooting work the IRNC NOC PET can do without involving regional and campus resources
  - Visibility into network topology, traffic monitors and other data is sometimes restricted for security reasons
- Cooperation from peer and campus network engineering who may not see external user performance issues as a priority over their daily workload
  - We attempt to get around this by being squeaky wheels on behalf of the researchers, but still....

# Year 1 Findings (cont.)

- Identifying “invisible” infrastructure (Layer2 switches and Firewalls)
- Collaboration within the community is hugely important
  - Documentation of findings will support that
  - We need a shared database of performance-focused contacts for large (and small) networks
- Understanding what network performance should be
  - When performance has been bad for a long time, it’s difficult to know what the researcher should be getting
  - Researchers sometimes lack the vocabulary or understanding to explain what they expect (e.g. “It just feels wrong”, “The graph looks off”)

# Next Steps

- ◎ Create performance-focused contact database
  - Question: should we publish that? How open?
- ◎ Outreach to science communities and R&E networks to make them aware the IRNC NOC PET exists as a resource
- ◎ Continue to gather more experience
  - Assisting NSF-funded NetSage project in isolate problems on their perfsonar mesh
  - May do more generalized perfSONAR mesh monitoring beyond those in the IRNC project

# Questions?

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