SELinux Project Overview

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Outline

- SELinux Introduction
- Rationale and Design
- Project Milestones
- Current Work and Challenges

What is SELinux?

Security Framework

- Pluggable security models
- Clean separation of policy and mechanism
- Coherent stacking (composition)
- Fully analyzable

What is SELinux ?

Security Model

- Mandatory Access Control (MAC)
- Type Enforcement + RBAC + MLS
  - Least privilege
  - Enforces confidentiality and integrity
  - Strong isolation of applications
  - Information flow control
  - Limits exploitation of vulnerabilities

What is SELinux ?

Community Project

- Originated in 1980s security research
- Academic research prototype (Flask) 1990s
- Ported to Linux, released under GPL in 2000
- Distro adoption, upstream merge, certification
- Adoption and innovation by users

Why SELinux ?

- Existing MLS solutions:
  - Inflexible
  - Don’t meet general requirements
  - Hindered adoption
  - Niche products: expensive and weird

Why SELinux ?

- Better security for general computing:
  - DAC is not enough
  - Need to protect against software flaws
  - Flexibility
  - Meet general requirements
  - Ubiquitous

SELinux Design

- Retrofit into existing OS
- System-wide policy
- Labeling of all security relevant objects
- Policy applied in the kernel (AVC)

Milestones

- 2000 – 2003
  - GPL code release
  - Kernel summit presentation
  - LSM project
  - Port SELinux to LSM
  - Kernel 2.6 released Dec 03 with SELinux
  - Early community efforts, including Debian Integration

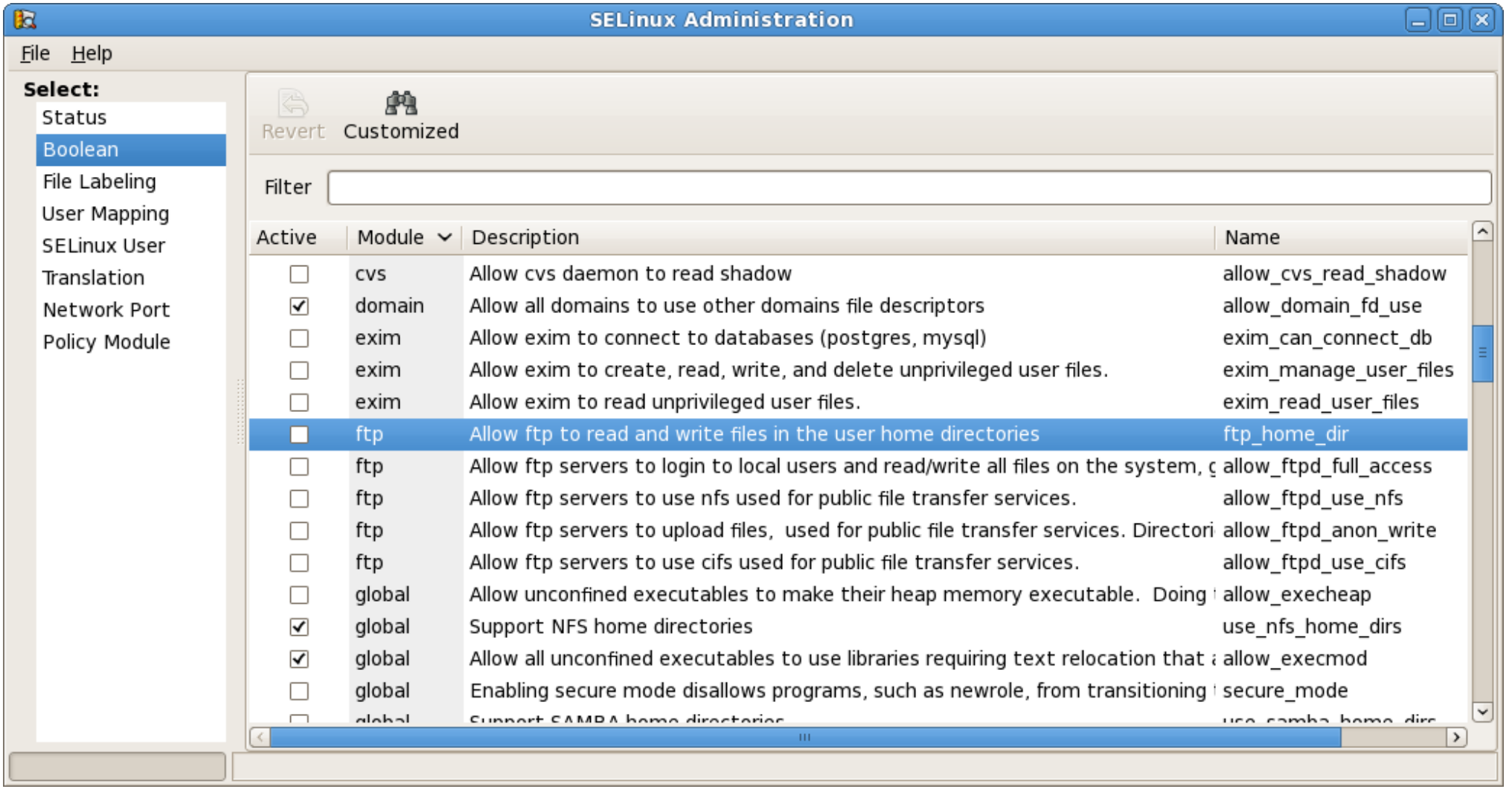
Milestones

- 2004 – 2005
  - Fedora integration
  - Targeted policy
  - RHEL integration (commercially supported)
  - Foundation for viable production model
  - SELinux Symposium, growth of community

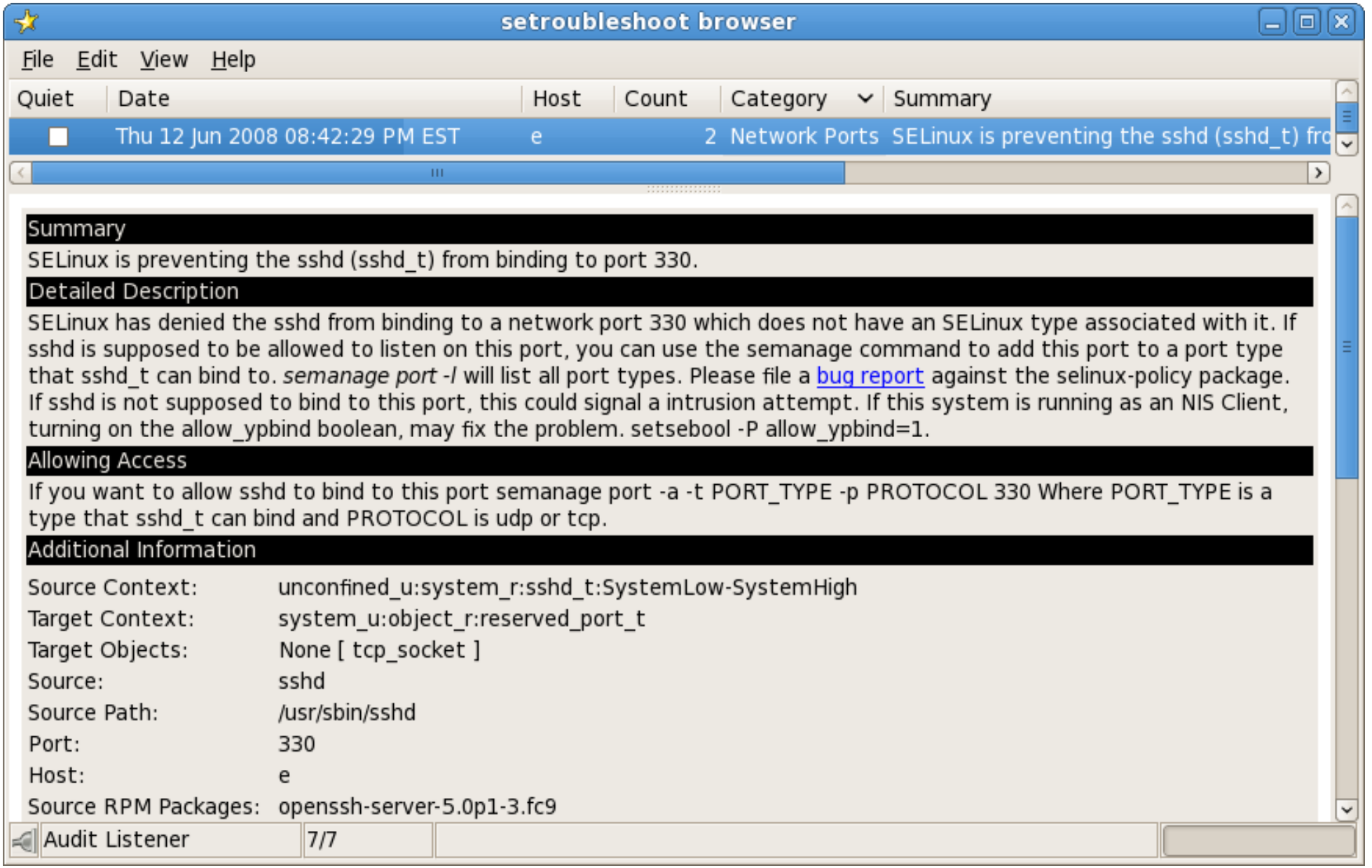
Milestones

- 2005 – present
  - Loadable policy modules
  - Reference policy
  - Booleans
  - Libraries
  - Tools
  - Setroubleshoot
  - SLIDE

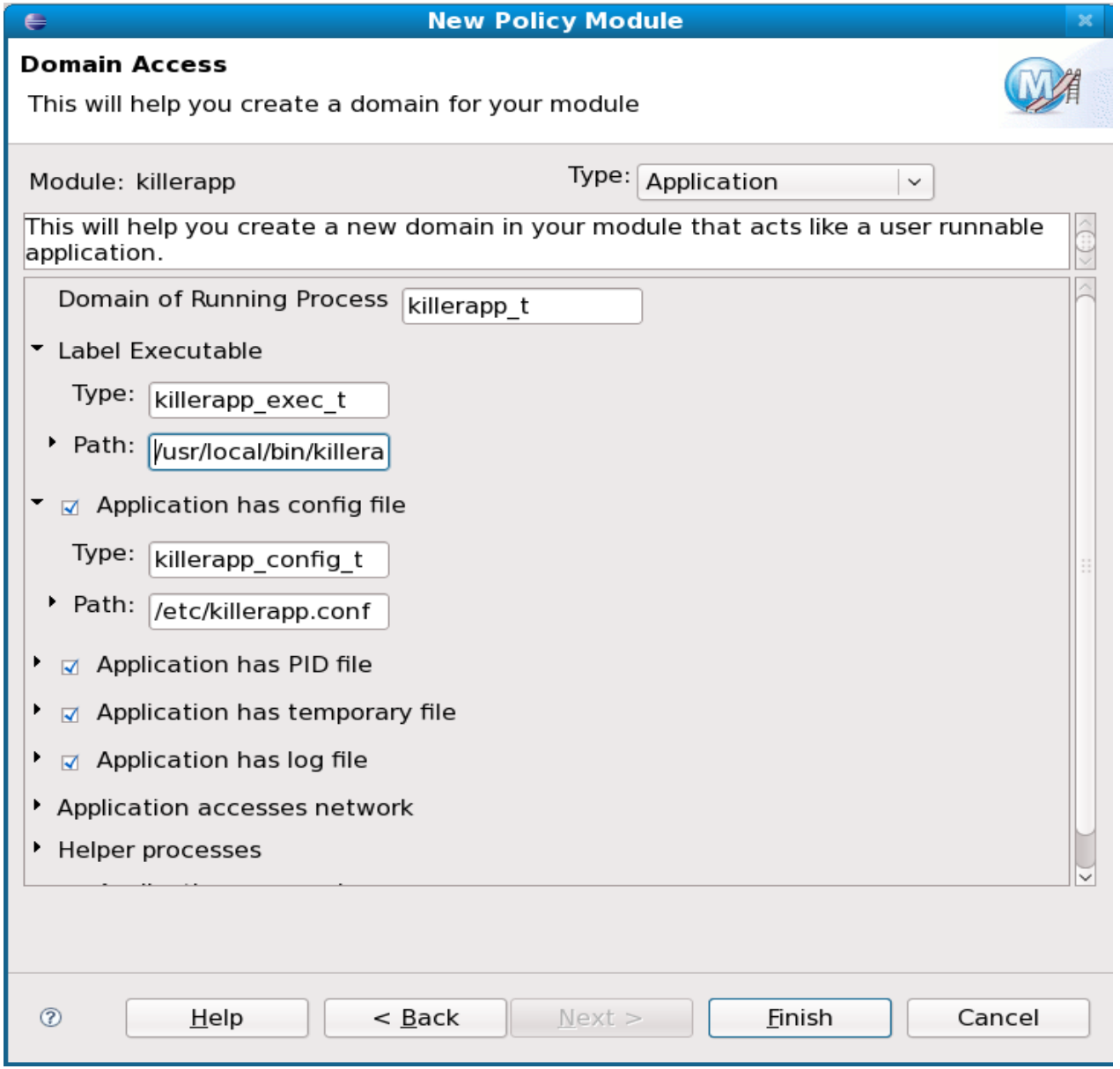
Modern SELinux



Modern SELinux



Modern SELinux



SELinux Adoption

- Widely adopted in Fedora
  - Smolt statistics show majority have SELinux **enabled.**
- RHEL adoption by military, govt, finance:
  - Factor in NYSE/Euronext adoption, handling over $140 Billion/day in trades.
  - US Coast Guard Intelligence case study.
- Embedded / consumer electronics:
  - MicroSELinux
  - Many improvements from Japanese developers

Threat Mitigation

“A security framework originally published by the US National Security Agency has begun to rack up an impressive list of protections against security holes.”

- *LinuxWorld, Feb 2008*

- SELinux has mitigated several serious security threats to everyday users of Fedora & RHEL.

- Tracked @ Tresys Mitigation News

Current Work

- Wider distribution support:
  - Ubuntu, Debian, Gentoo
- Beyond kernel:
  - Virtualization (XSM)
  - Desktop (XACE)
  - Storage (LNFS)
  - Applications (Database etc.)
- Beyond Linux:
  - OpenSolaris FMAC

Cool Stuff

- Flexible design leads to innovative ideas
- Xguest
  - “Kiosk Mode”
  - Anonymous desktop session
  - Protect system from user
  - Utilizes “military” technologies for general use
  - Conferences, training, demos, library, child-proof...
- Russell Coker’s Play Machine

Challenges

- Improved usability, as always!
- Documentation
- Keep community growing

How to Participate

- Install SELinux enabled distribution
- Join mailing lists
- IRC
- Ask questions
- Answer questions!

See Resources page for links.

Resources

- Official Home Page
  - http://nsa.gov/selinux/
- Inevitibility of Failure Paper
  - http://www.nsa.gov/selinux/papers/inevitability/
- Tresys Mitigation News
  - http://www.tresys.com/innovation.php
- Community Project Server
  - http://selinuxproject.org/