NFSv4 MAC Attribute Interoperability

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Problem Statement

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- Multiple MAC models exist
  - MLS/Biba
  - Type Enforcement
- Multiple MAC policies exist
  - RHEL4/RHEL5/Fedora 9-11
  - RHEL MLS vs Trusted Extensions MLS
- Policy definitions must be flexible
- Accommodating everyone in one format is impossible

NFSv4 MAC Attribute

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- Contains two components
  - Opaque label data
  - Some sort of policy/model identifier
- How do we use the opaque data section?
- How do we use the policy/model identifier?

The Old Idea (DOIs)

- A DOI is a unique 32 bit unsigned value
  - Identifies a MAC model and a specific policy
- Problems?
  - DOI space explodes quickly
  - Difficult to manage
  - Makes implementation a nightmare

The New Idea (LFS)

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- LFS – Label Format Specifier
  - Identifies entry in Label Format Registry
  - Separates label format from label meaning
- LFR – Label Format Registry
  - Contains entries describing structure of the opaque field
  - Registry is managed by an external entity
  - Entry 0 reserved for keeping the field completely opaque

Label Format Registry

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- What is in an Entry?
  - Unique identifier for each entry (unsigned int?)
  - Description of the format
    - Colon separated string of strings
    - Description of binary encoding of label data
    - Comma separated key/value pairs
  - Reference to document describing format
- Each format is strongly recommended to contain a field identifying the specific MAC policy

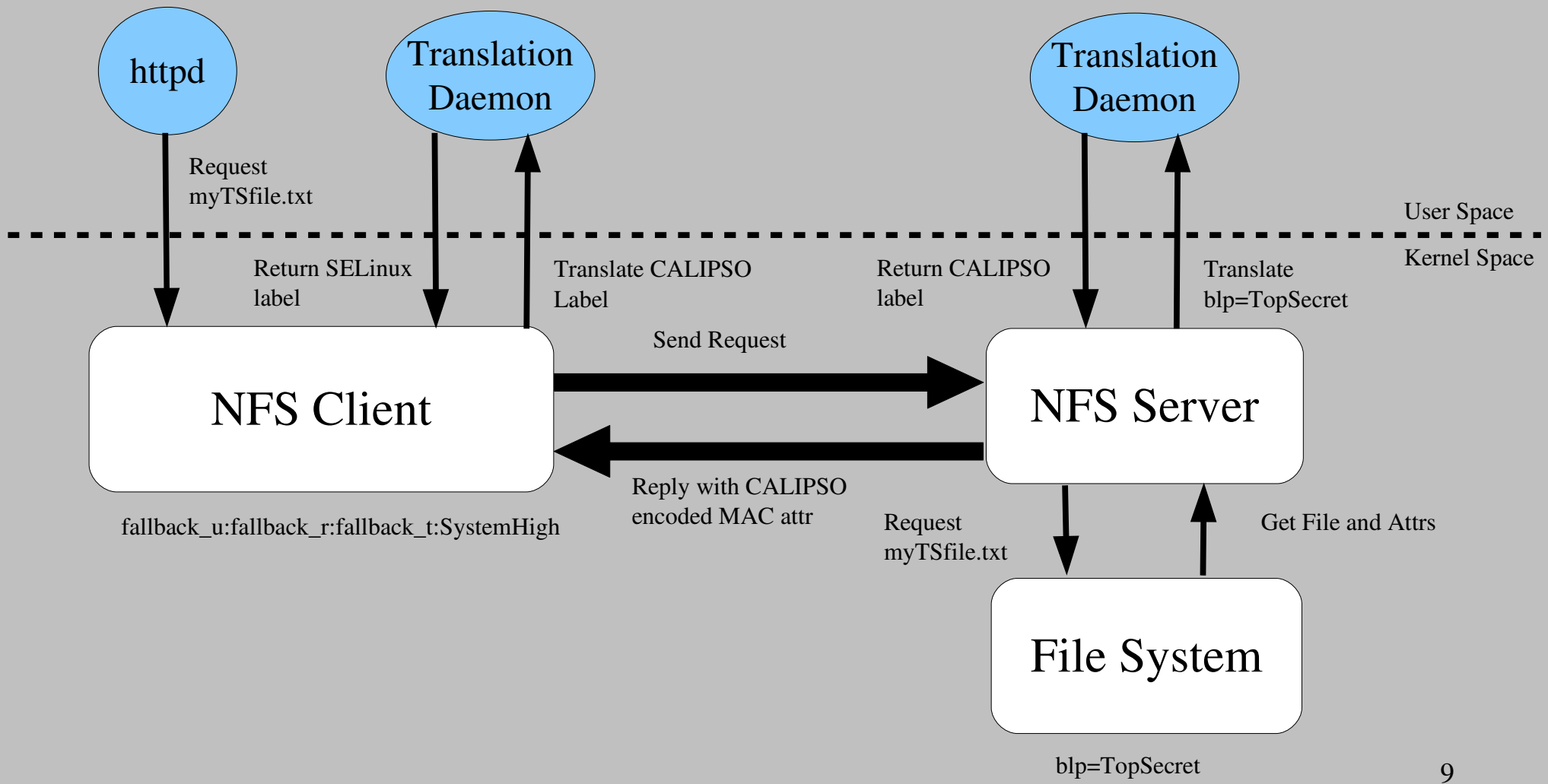
Example

- Deployment uses CALIPSO style MLS with Labeled NFS
- Registers LFS 1 as a CALIPSO label format
  - Places CALIPSO draft as label description
- Format Contains DOI to specify policies
- Label now has two identifiers
  - LFS@<DOI + Binary Label Encoding>

Interop Prototype

- Two Labeled NFS implementations
  - SELinux
  - FreeBSD
- Each end is running a MLS policy
- Each end is running a translation daemon
  - Each agrees on CALIPSO style labels
  - Each has its own local label represenation

Prototype Diagram



Questions?

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