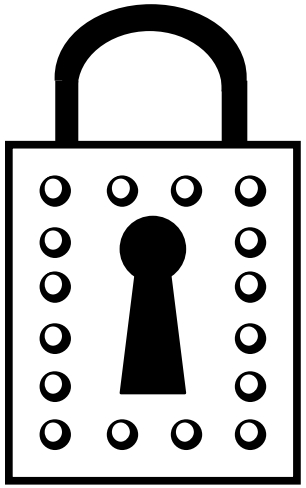
Access Control List (ACL)



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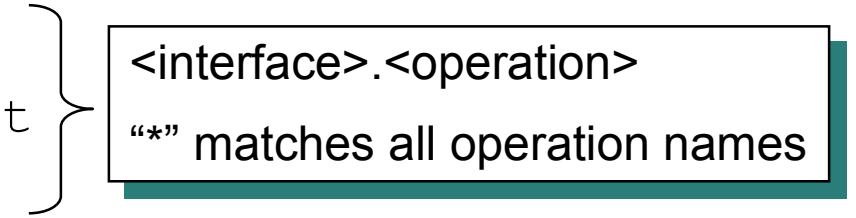
Access control list

- An *access control list* (ACL) is an *authorization* mechanism
  - Specifies what access permissions different users have for a resource
  - Examples of resources: a file, a printer, operations on an object in a server application
- Many systems provide ACLs, but the mechanisms vary
- Example using a pseudo-code syntax for an RPC system:

```
user Fred can execute:
  SessionManager.login
  SessionManager.logout
  Session.*
user Mary can execute:
  ...
```



Role-based access control

- Problem: some systems have thousands of users:
  - Tedious and error prone to specify ACLs for each user individually
- Solution: role-based access control (RBAC):
  - Assign each user to one or more roles
  - Then write ACLs in terms of roles rather than individual users
- Example using a pseudo-code syntax for an RPC system:

```
user Fred belongs to employee, manager;
user Mary belongs to employee;
user Sam  belongs to customer;
...
role employee can execute: ...
role manager can execute: ...
```

Role-based access control (cont')

- Benefit of role-based access control:
  - There may be thousands or even millions of users
  - But usually only a very small number of roles
  - So ACL maintenance is easy

Prerequisites for authorization

- A prerequisite for access control lists (or any other authorization mechanism) is *authorization*
  - No point in specifying what user Fred can do if we cannot verify whether or not a user *is* Fred
- Question: can a system provide authentication without (the overhead of) secure communications (such as SSL/TLS)?
- Answer:
  - Probably not, because…
  - Authentication is often done via username and password
  - If usernames and passwords are transmitted without encryption then a hacker can easily capture them

Summary

- Access control lists (ACLs) are widely used for authorization
- Can be tedious to specify an ACL for each of 1000's of users
  - Better to map many users to a small number of *roles*
  - Then define ACLs for the roles
  - This is called role-based access control (RBAC)
- Authentication is a prerequisite for authorization
  - And encryption is a prerequisite for authentication
    (so people cannot snoop on usernames and passwords)