

## Lecture 27 Outline (June 1, 2015)

**Reading:** §12, 15

**Assignment:** Homework 4, due June 3, 2015 (*no late assignments accepted*)

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1. Greetings and felicitations!
2. Challenge-response techniques
  - a. One-time passwords
  - b. Encrypted key exchange
  - c. Hardware support
3. Biometrics
  - a. Depend on physical characteristics
  - b. Examples: pattern of typing (remarkably effective), retinal scans, etc.
4. Location
  - a. Bind user to some location detection device (human, GPS)
  - b. Authenticate by location of the device
5. Access Control Lists
  - a. UNIX method
  - b. ACLs: describe, revocation issue
6. Capabilities
  - a. Capability-based addressing
  - b. Inheritance of C-Lists
  - c. Revocation: use of a global descriptor table
7. Lock and Key
  - a. Types and locks
8. MULTICS ring mechanism
  - a. Rings, gates, ring-crossing faults
  - b. Used for both data and procedures; rights are REWA
  - c.  $(b_1, b_2)$  access bracket—can access freely;  $(b_3, b_4)$  call bracket—can call segment through gate; so if  $a$ 's access bracket is  $(32, 35)$  and its call bracket is  $(36, 39)$ , then assuming permission mode (REWA) allows access, a procedure in:
    - rings 0–31: can access  $a$ , but ring-crossing fault occurs
    - rings 32–35: can access  $a$ , no ring-crossing fault
    - rings 36–39: can access  $a$ , provided a valid gate is used as an entry point
    - rings 40–63: cannot access  $a$
  - d. If the procedure is accessing a data segment  $d$ , no call bracket allowed; given the above, assuming permission mode (REWA) allows access, a procedure in:
    - rings 0–32: can access  $d$
    - rings 33–35: can access  $d$ , but cannot write to it (W or A)
    - rings 36–63: cannot access  $d$