

Access Control

Exercise 1: Techniques for Access Control

- Draw three arrows from the terms on the left to the corresponding explanations on the right:
Access Control List (ACL) stored with a subject (e.g. a process)
Access Control Matrix stored with an object (e.g. a file)
Capability stored in a central place

Exercise 2: Rights Management in a Pipelining System

- Given: A processing system with two stages
 - Process P_1
 - reads data from an input file INPUT
 - processes the data by executing the program in the program file $PROG_1$
 - writes intermediate results into the file INTERMEDIATE
 - Process P_2
 - reads data from the file INTERMEDIATE
 - processes the data by executing the program in the program file $PROG_2$
 - writes the final results into the file OUTPUT
- Questions:
 - What are the subjects, what are the objects in this system?
 - Which operations can be executed on the objects in principle?
 - What access rights must the subjects have for the objects ...
 - ... specified by an access control matrix?
 - ... specified by access control lists?
 - ... specified by capabilities?

p.t.o.

Exercise 3: Rights Management in a Client-Server System

- Given: A client-server system of processes. The processes offer and use services

- Processes P_A, P_B, P_C
- Services:
 - P_B offers the services S_1, S_2, S_3 .
 - P_C offers the service S_4 .
 - P_A uses the services S_1 and S_4 .
 - P_C uses the service S_2 .

- Ports:

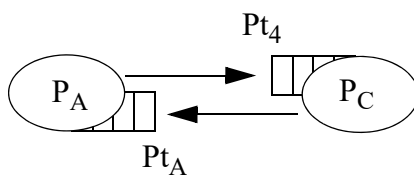
- For each service S_i : One request port Pt_i
 - All requests for service S_i are sent to port Pt_i .
- For each process P_X : One response port Pt_X
 - All responses to process P_X are sent to port Pt_X (no matter which of the servers is sending the response)

- Remember (from chapter 5, foils 6 and 7):

A port is a mailbox to which multiple processes may write data but from which only one process may read data – the process to which the port is attached.

Ports are e.g. used in client-server systems to transmit the clients' requests and the servers' responses.

- Diagram showing a part of the system:



Explanation:

P_C offers $S_4 \rightarrow Pt_4$ is attached to P_C

P_A uses $S_4 \rightarrow P_A$ sends messages to Pt_4

P_A receives replies $\rightarrow Pt_A$ is attached to P_A

P_C replies to $P_A \rightarrow P_C$ sends messages to Pt_A

- Do the following:

- Complete the diagram.
- Define the security model:
 - Which are the subjects, which are the objects?
 - Which operations can be executed on the objects in principle?
- Give the capability lists of the subjects.