

I. Capabilities

- A. a pair basic object, allowed operations
- B. certain operations on capabilities are permitted
 - 1) copy
 - 2) reduce allowed operations
 - a) parameters
 - capability O,A
 - set of allowed operations A'
 - b) result
 - A:=AnA'

II. Basic objects

Associated with each kind of basic object are a number of possible operations. Each possible operation has 1 or more parameters, the first of which must be a capability for an object of the proper kind, and one of the allowed operations of the capability must be the operation in question.

A. Permanent file

- 1) This is a scope file which is stored in a special area of the disk, or might be saved on tape.
- 2) Possible operations
 - a) read
 - b) re-write
 - c) destroy
 - d) append

B. Directory Page

- 1) This is a sequence of pairs
 - The 1st member of the pair is a BCD name
 - The 2nd member of the pair is a capability
- 2) Possible Operations
 - a) get entry
 - 2nd parameter is a BCD name
 - b) make new entry
 - 2nd parameter is a BCD name
 - 3rd parameter is a capability
 - c) delete entry
 - 2nd parameter is a capability
 - d) modify entry
 - same parameters as b)
 - e) destroy page

c. Accounting Block

- 1) This specifies who or what job number is to be charged for files and directory pages.
- 2) Possible Operations
 - a) more permanent file
 - b) more directory page
 - c) more accounting block

III. Special Considerations

- A) There will be a special directory page and a special action to get the entry in that page corresponding to the job number of the current job.
- B) An object will be removed from the system if either of 2 events occur.
 - 1) the object is destroyed
 - 2) No entries are left in directory page naming it, and no job contains a capability naming it.
- C) Any action on a non-existent object, or attempted action without the proper allowed operation is an error condition.
- D) The accounting blocks may contain a limit on amount of space they can be used to construct.
- E) The initial state of the system will have only one entry on the special directory page. That entry will be for a directory containing 2 entries. One will be for the special directory page itself, giving a full set of operations. One will be for the sub page giving a full set of operations. The third will be for an accounting block giving a full set of operations.

IV. A Language For Describing Actions in the System

Will consist of a sequence of statements.

Each statement will have the form

ACTION(P1,...,pu)

where action is the name of some action P1,...,pu are parameters for the action

Each Pi will be : a name of a capability
a BCD string in quote marks

The special action to get the initial directory page will be called directory.

The initial state of the system will have the one entry under Job number J1, and the 3 sub entries will have names:
D1,DS,A.

V. Control of the System

- A) The first job run will be: (under job number J1)
 - Directory (D)
 - Get entry (D,'DS',DS0)
 - Get entry (D,'A',A)
 - Make directory (A,D2)

Copy capability (D2,D2P)
Reduce capabilities (DLP,{Get entry})
Modify entry (DS,'J1',D2P)
Make entry (D2.'password',D1)
Make entry (D,'D2',D2)

This places control under password control, known only to the person who ran this job.

- B) To allow persons with job number JU to make files of up to H half tracks total, and make directory pages step to P sectors total:
- 1) Directory (D2)
Get entry (D2,'password',D)
Get entry (D,'A',A)
Make account block (A,AU,H,P)
Make directory page (A,DU)
Make entry (DU,'A',AU)
Make entry (DU,'D',DU)
Get entry (D,'DS',DS)
Make entry (DS,'JU',DU)
 - 2) The user can now place his accounting block under password control if he desires, similiar to the way directory D was placed under password control.
 - 3) This same directory could have been placed under several job numbers if desired.