ENFORCEMENT OF PROTECTION* TOWARD CLARITY

Allen B. Goodrich February 8, 1974

Technical Memo

TM.74-6

A path from a name to an object has associated with it a triple.

(X,A,E)

Global Object Name X *Global meaning 'unique'

Access Name A

Environment Name E

A function f_E maps a name (N) given in environment E to a global object name (X), but performs no checks, it is defined solely to map names.

An expanded function $F_E(N,A)$ can be defined which performs f_E for some access and succeeds only if the triple (X,A,E) exists where X is the object accessed (via name N), A is the Access attempted, and E is the Environment from which the access was attempted. This function is the Enforcement of Protection.

If all possible triples were stored in a matrix a la Lampson each call of $F_{\rm E}$ would see if the appropriate triple existed and fail or allow the access. Jones states that such a matrix is impractical and says the triples may be encoded differently.

- 1. If each Environment has an associated table of pairs of the form (X,A) then all triples would exist, divided by Environments.
- If each <u>Object</u> has an associated table of pairs of the form (A,E), then all triples would exist, so divided by Object.
- 3. If each Access Name has an associated table of pairs of the form (X,E), then all triples would exist, subdivided by Access Names. Above are three possible encodings of the triples described earlier. Any particular call of F_E uses \underline{ONE} of the data structures.

- A. If $F_{\rm E}$ uses (1), it is called Execution Site Enforcement.
- B. If F_E uses (2), it is called Object Site Enforcement.
- C. If F_E uses (3), it is called Access Site Enforcement.

So, the different enforcements listed are simply defined by what particular data structure from which the protection information is accessed.

Conclusion

Jones also tried to say that each structure is better for certain groupings and not other types of grouping. But any particular grouping, encoding of lists as she calls it, is 'Policy', a function of \mathbf{F}_E which I thought was something she was trying to avoid. In any case, all she has done is to come up with three of the possible encodings of the Access Triples, and defined functions to use each, thereby departing from her role as Modeler, but possibly leading to her role as Comparer.