A Decentralized Model for Information Flow Control Andrew C. Myers and Barbara Liskov, 1997

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The result of this paper is a model for controlling information flow: Decentralized Label Model (DLM).

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It is not:

► Access Control



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CONGUSION

It is not:

- ► Access Control
- ► Authentication, Authorization, Confidentiality, Integrity.



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It is not:

- ► Access Control
- ► Authentication, Authorization, Confidentiality, Integrity.

This means that DLM will not ensure:



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Euture Works

It is not:

- ▶ Access Control
- ► Authentication, Authorization, Confidentiality, Integrity.

This means that DLM will not ensure:

secure communication between applications



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It is not:

- ► Access Control
- ► Authentication, Authorization, Confidentiality, Integrity.

This means that DLM will not ensure:

- secure communication between applications
- ► limited access to data once released



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It is:

Information Flow Control



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It is:

- Information Flow Control
- Decentralized



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3 It is:

- ► Information Flow Control
 - Decentralized

This means that DLM will help ensuring:



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CONGUSION

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lt is:

- ► Information Flow Control
- Decentralized

This means that DLM will help ensuring:

- ► not releasing sensitive data
- not implicitly releasing sensitive data



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) It is:

- ► Information Flow Control
- Decentralized

This means that DLM will help ensuring:

- ► not releasing sensitive data
- ▶ not implicitly releasing sensitive data
- ► not giving away hints of inner workings



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DLM differs from previous solutions as it is:

decentralized



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- decentralized
- less restrictive of allowed computations



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- decentralized
- less restrictive of allowed computations
- not completely disallowing inter-application communication



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How it differs

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- decentralized
- less restrictive of allowed computations
- not completely disallowing inter-application communication
- meant to extend current programming languages with data flow annotations



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DLM provides both static and dynamic checking of data flow.

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Principals represent users and other authoritative entities.



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Principals represent users and other authoritative entities.

Values are entities computations can manipulate.



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Principals represent users and other authoritative entities.

Values are entities computations can manipulate.

Slots are value-holders (e.g. variables, objects, and other storage locations).



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Input channels are read-only sources that allow information to enter the system.



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Output channels are information sinks that transmit information outside the system.



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Labels are attached to values, slots or channels (more to follow).



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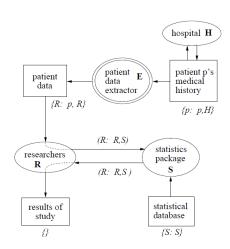


Figure 1: Medical Study Scenario



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```
pinfo = record [ names, passwords: string{chkr: chkr} ]
check_password (db: array[pinfo{\bot}]{\bot},
                 user: string \{\bot\},
                 password: string{client: chkr})
   returns (ret: bool{client: chkr})
   % Return whether password is the password of user
   i: int {chkr: chkr} := 0
   match: bool {client: chkr;
                 chkr: chkr} := false
   while i < db.length() do
     if db[i].names = user &
       db[i].passwords = password then %
          match := true
                                         % {client: chkr;
     end
                                         % chkr: chkr}
     i := i + 1
   end
   ret := false
                                              % ⊥
   if_acts_for(check_password, chkr) then
     ret := declassify(match, {client: chkr}) % \( \pm$
   end
end check_password
```

Figure 6: Annotated password checker



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Questions?

