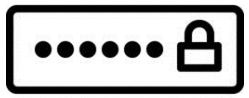
Reconciling Information-Flow Control and Database Access Control

Daniel Schoepe

joint work with Marco Guarnieri, Musard Balliu, David Basin, Andrei Sabelfeld

(work in progress)

Sensitive data



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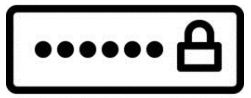
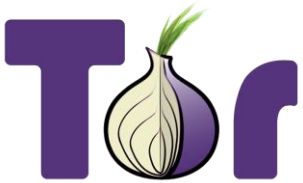


Untrusted code



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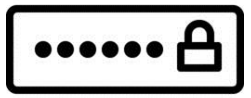
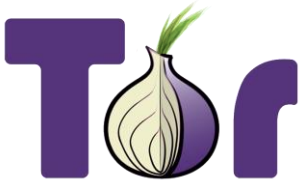



Untrusted code





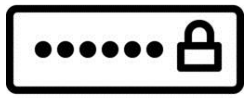




Public channels



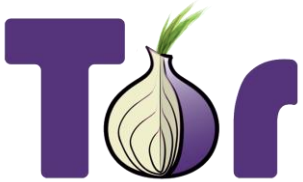
Sensitive data






Untrusted code




Private channels


Public channels

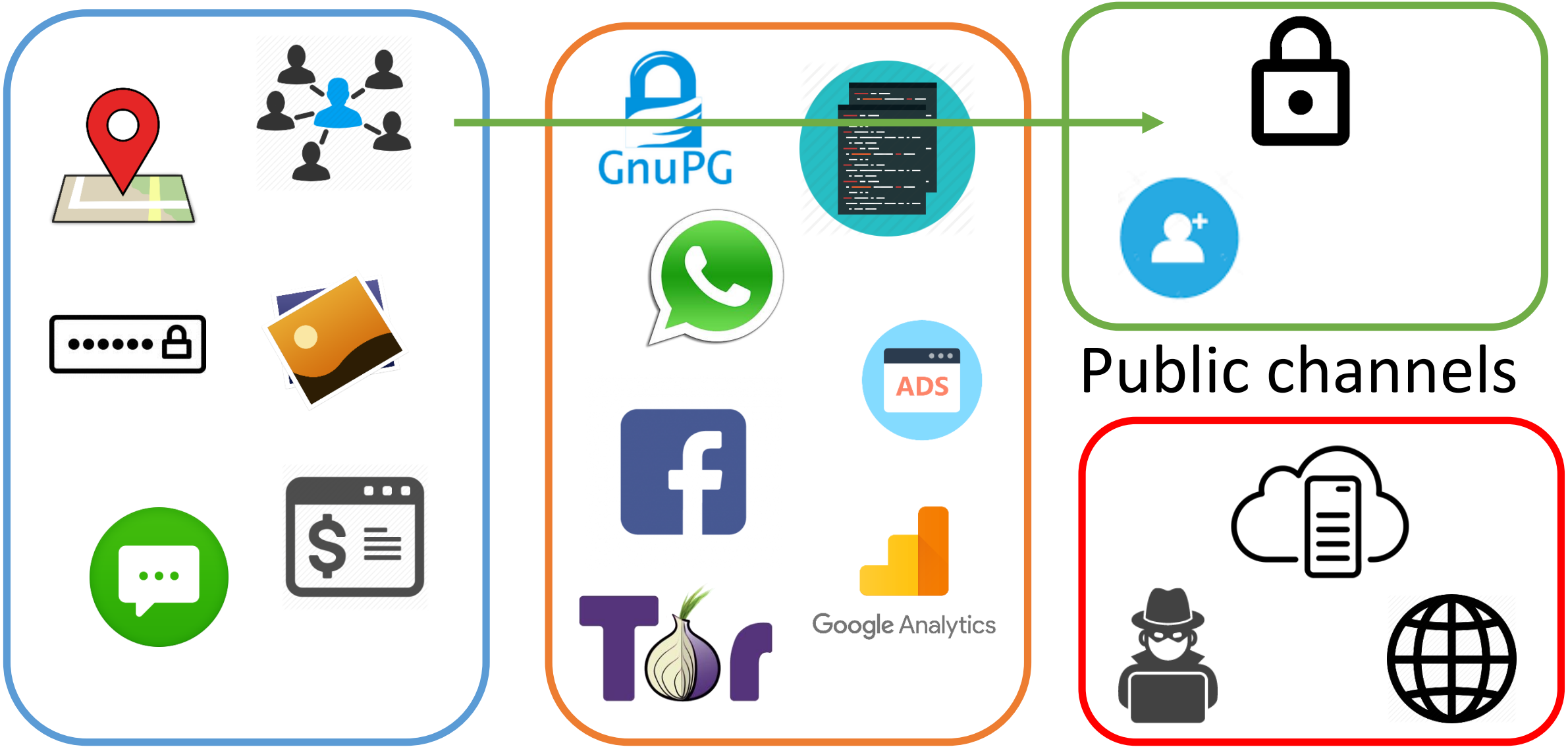


Sensitive data

Untrusted code

Private channels

Public channels

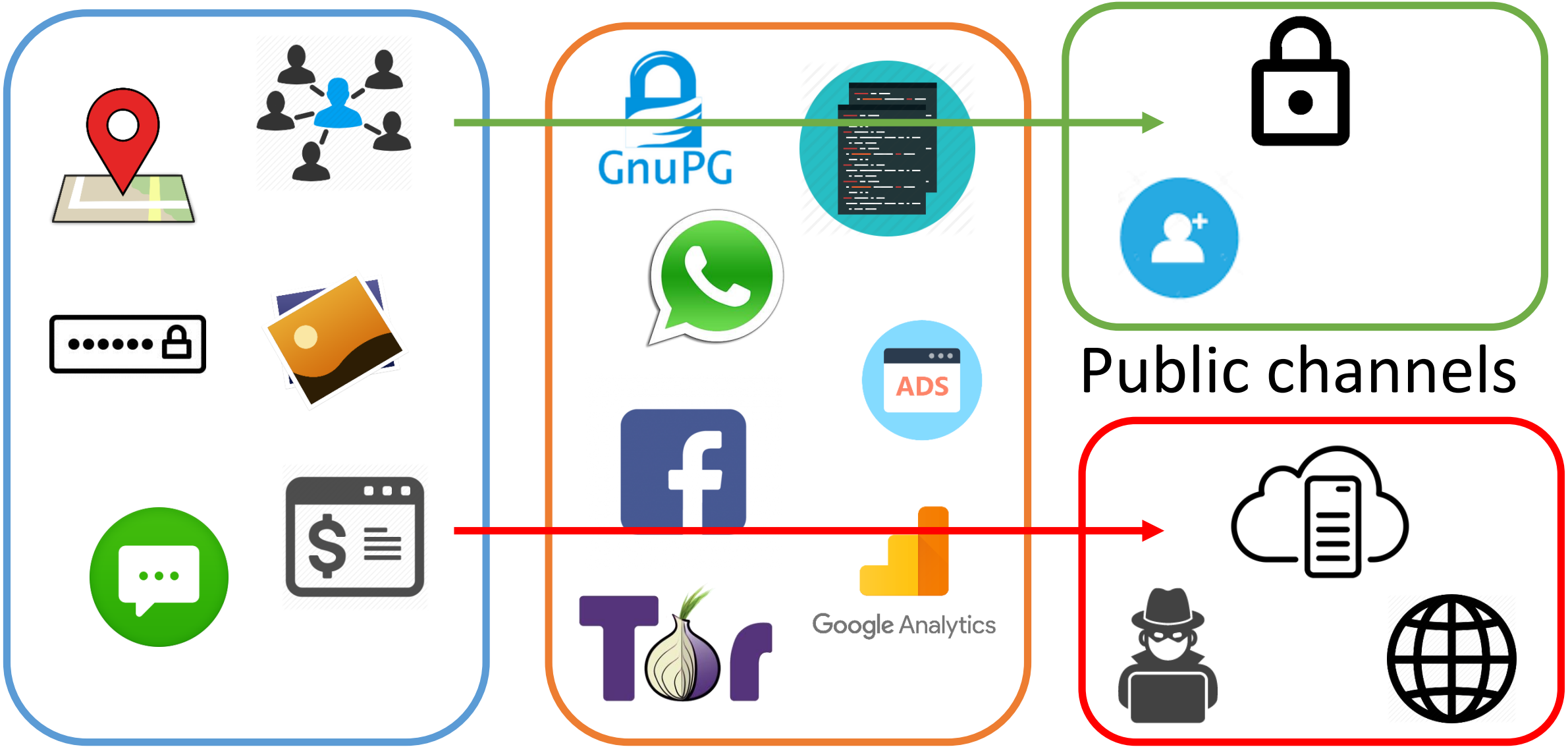


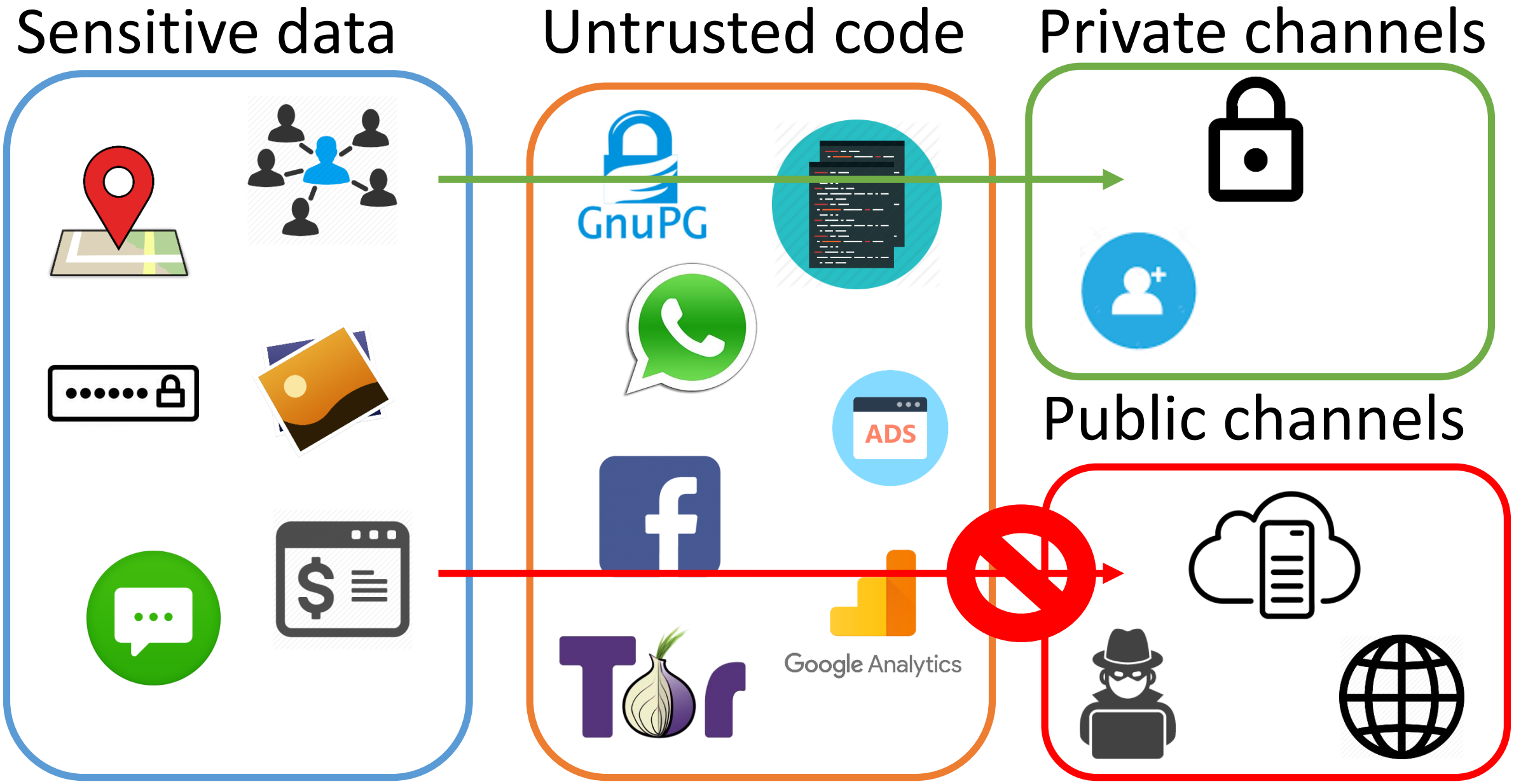
Sensitive data

Untrusted code

Private channels

Public channels




Sensitive data
Untrusted code
Private channels
GnuPG
ADS
Public channels
Google Analytics
Tor

Noninterference

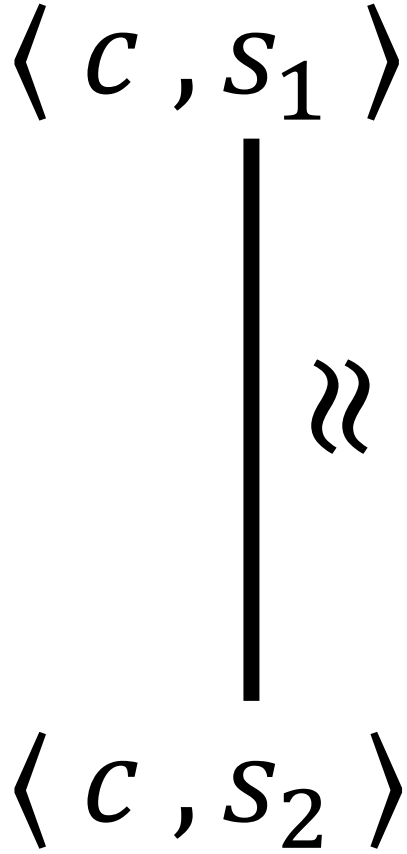
$\langle\, c\,, s_1\,\rangle$

Noninterference

$\langle\, c\,, s_1\,\rangle$

$\langle\, c\,, s_2\,\rangle$

Noninterference



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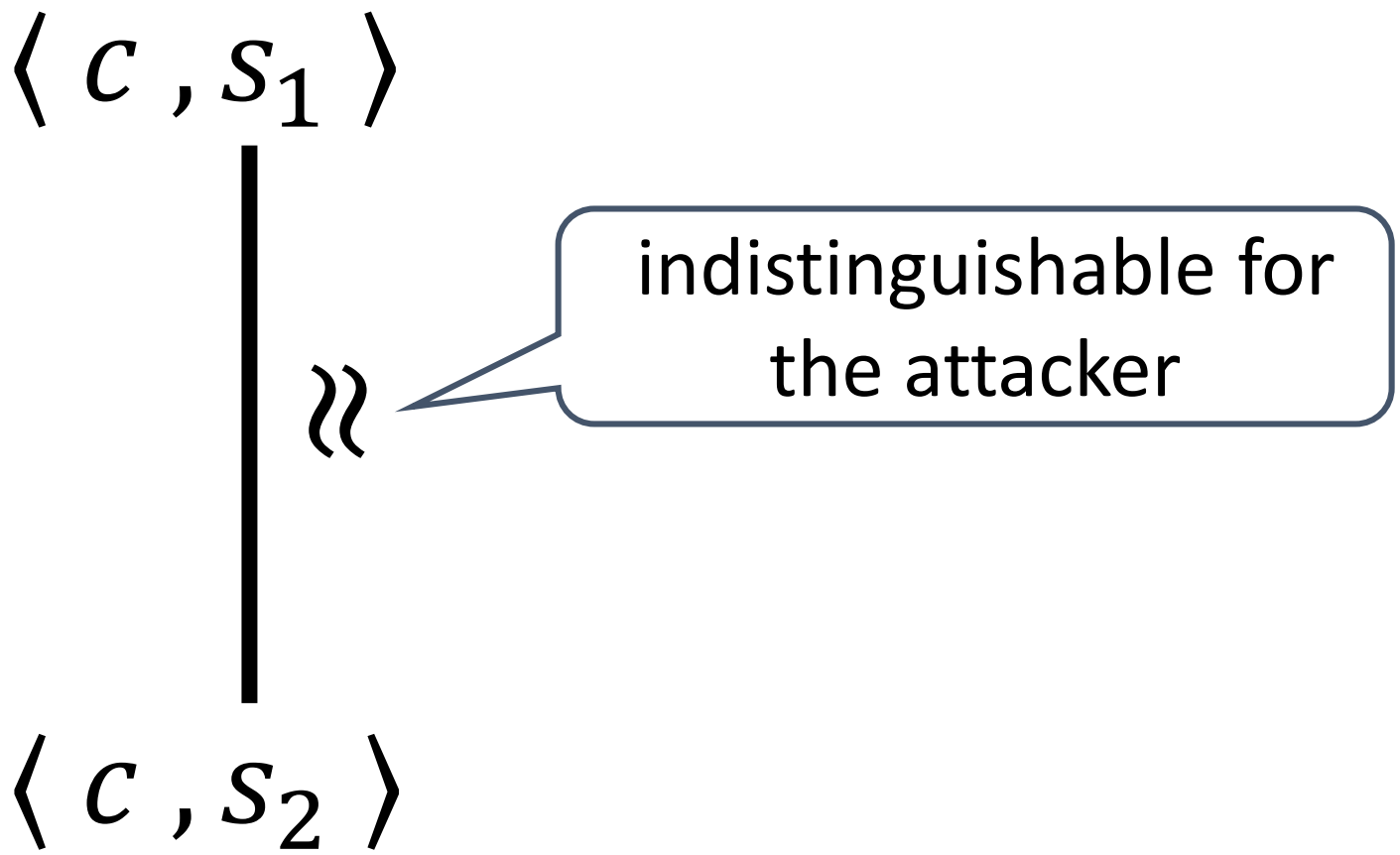

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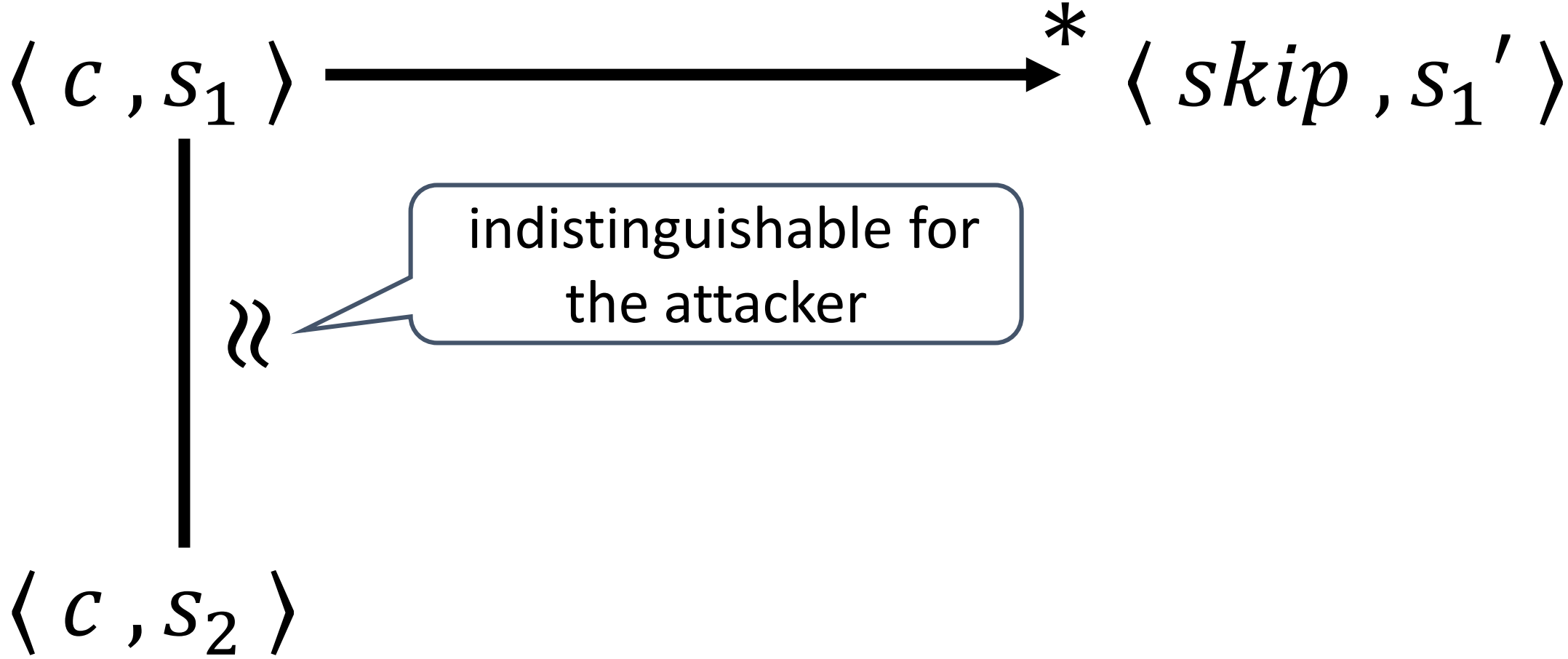
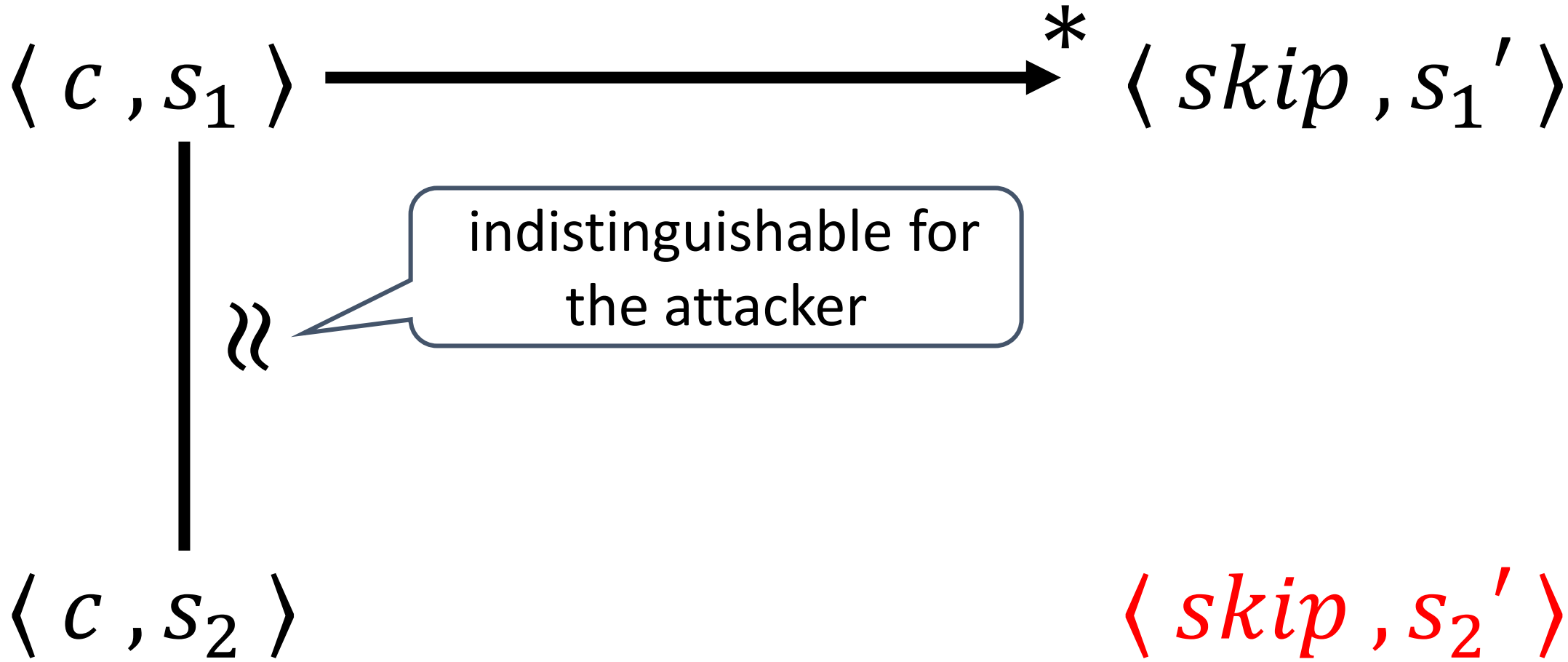
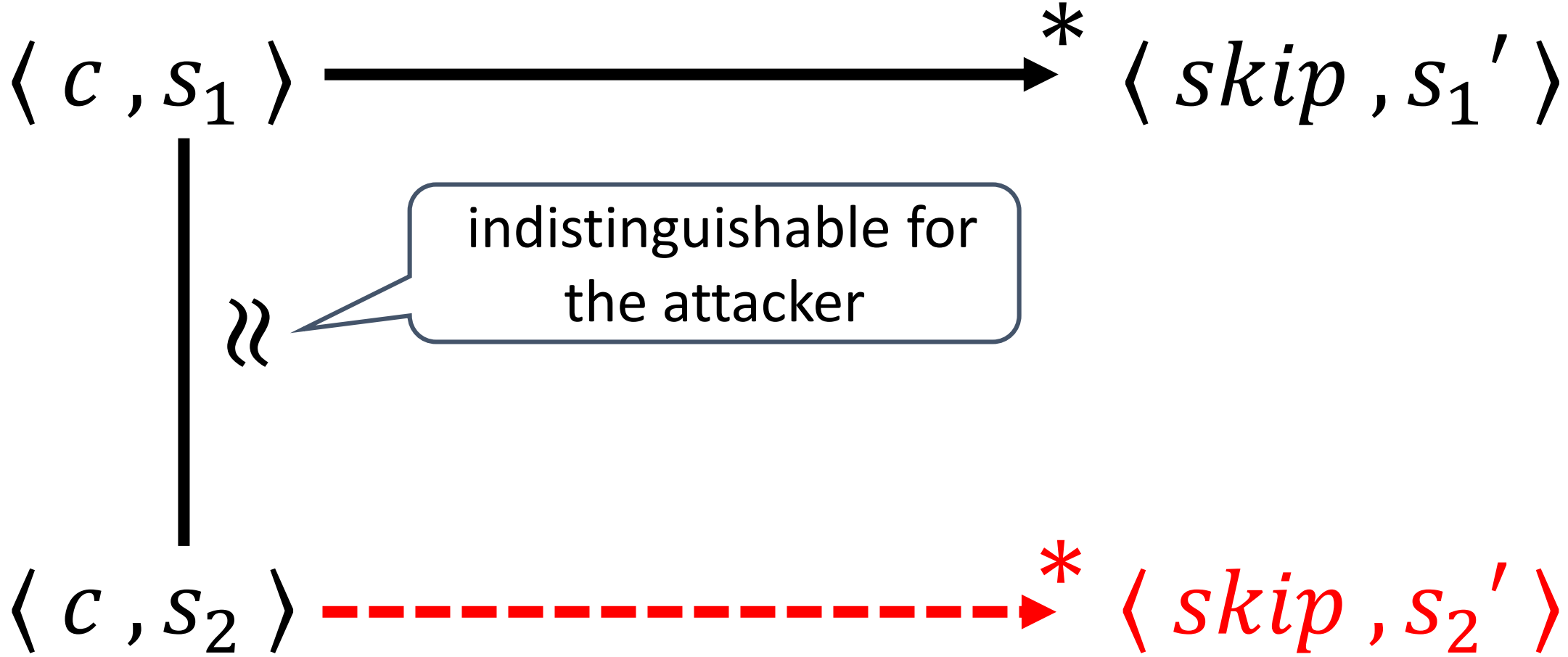


Noninterference



Noninterference



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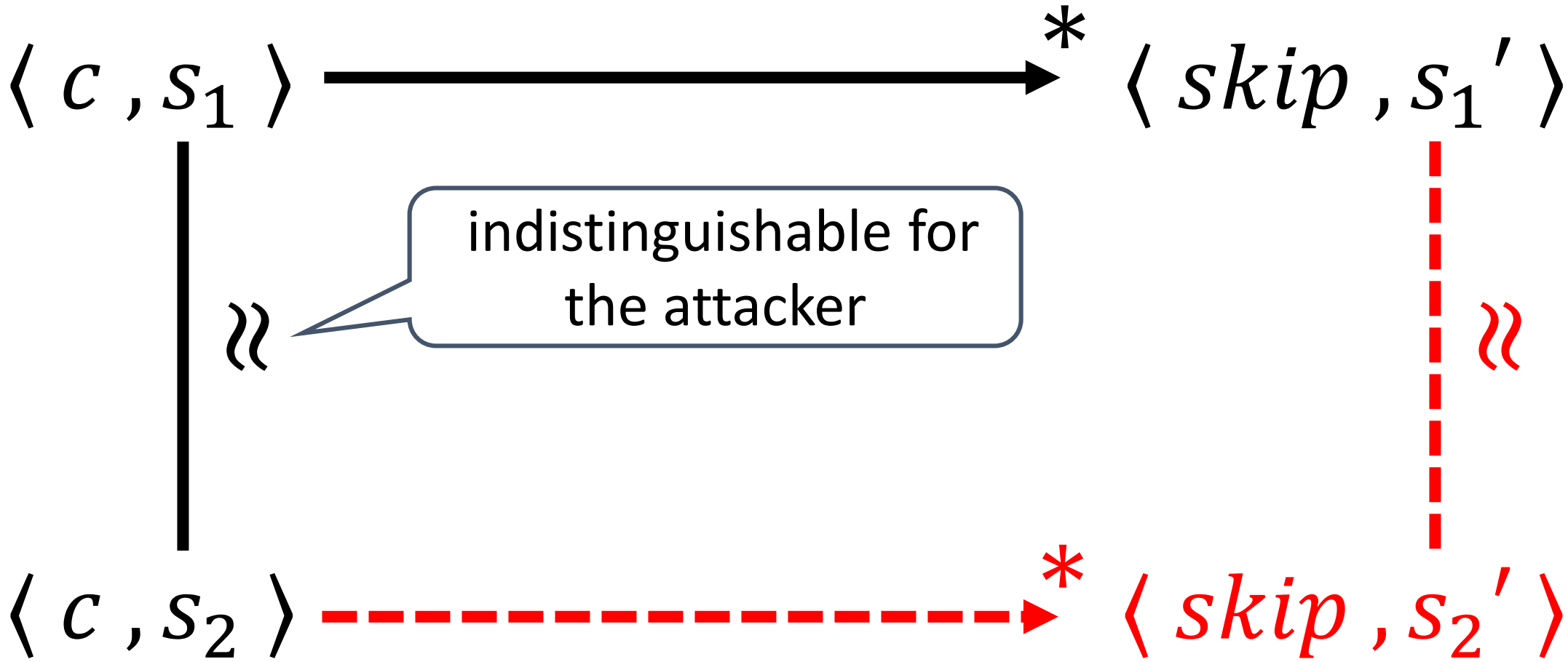

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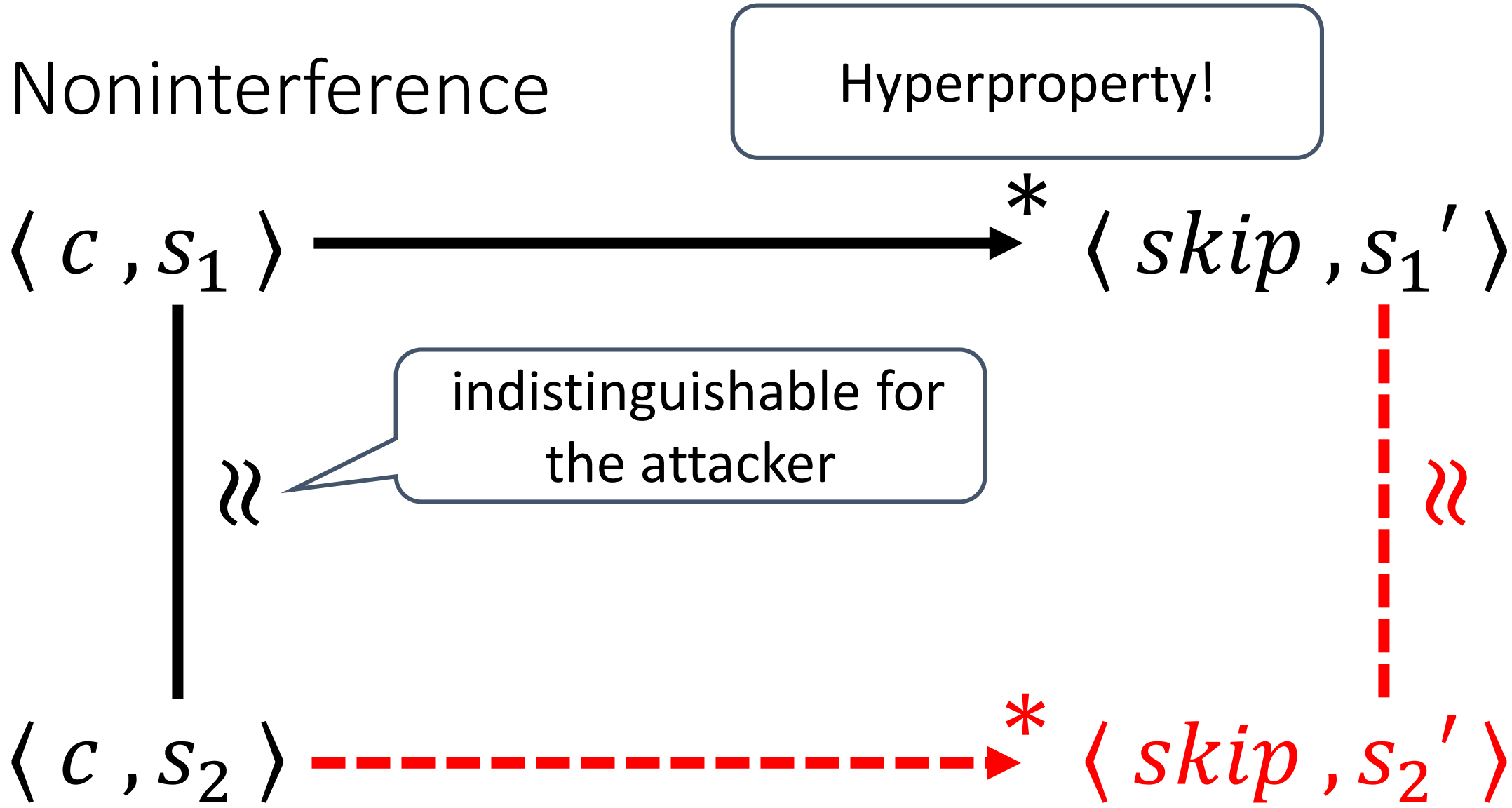
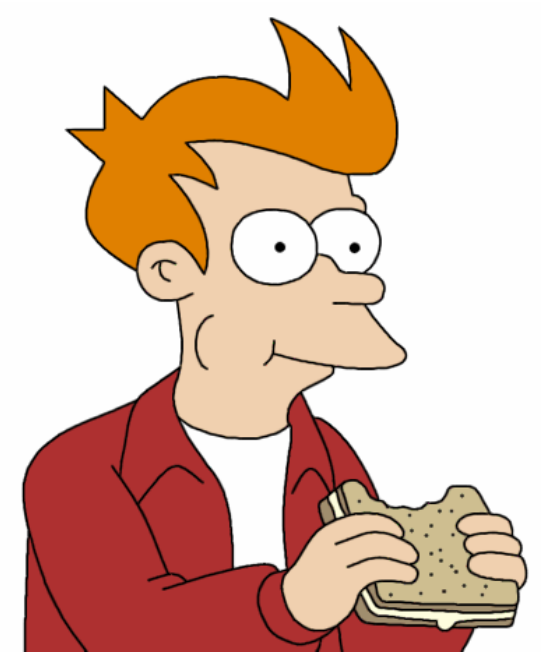


Database Access Control

User

Database

Database Access Control



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Access Control

Database

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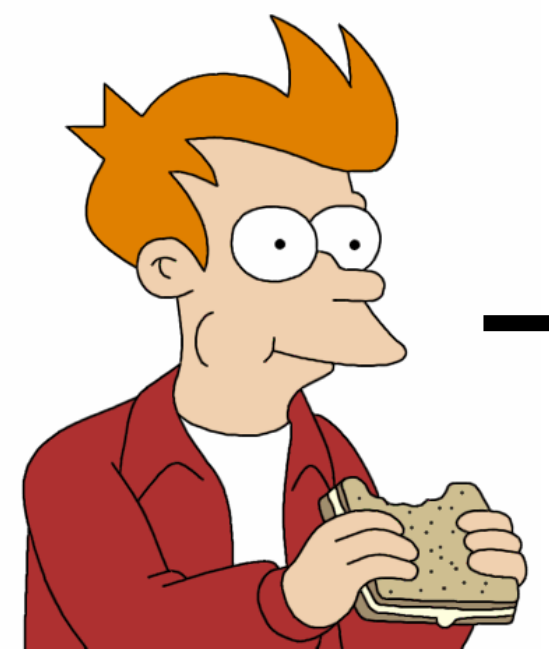


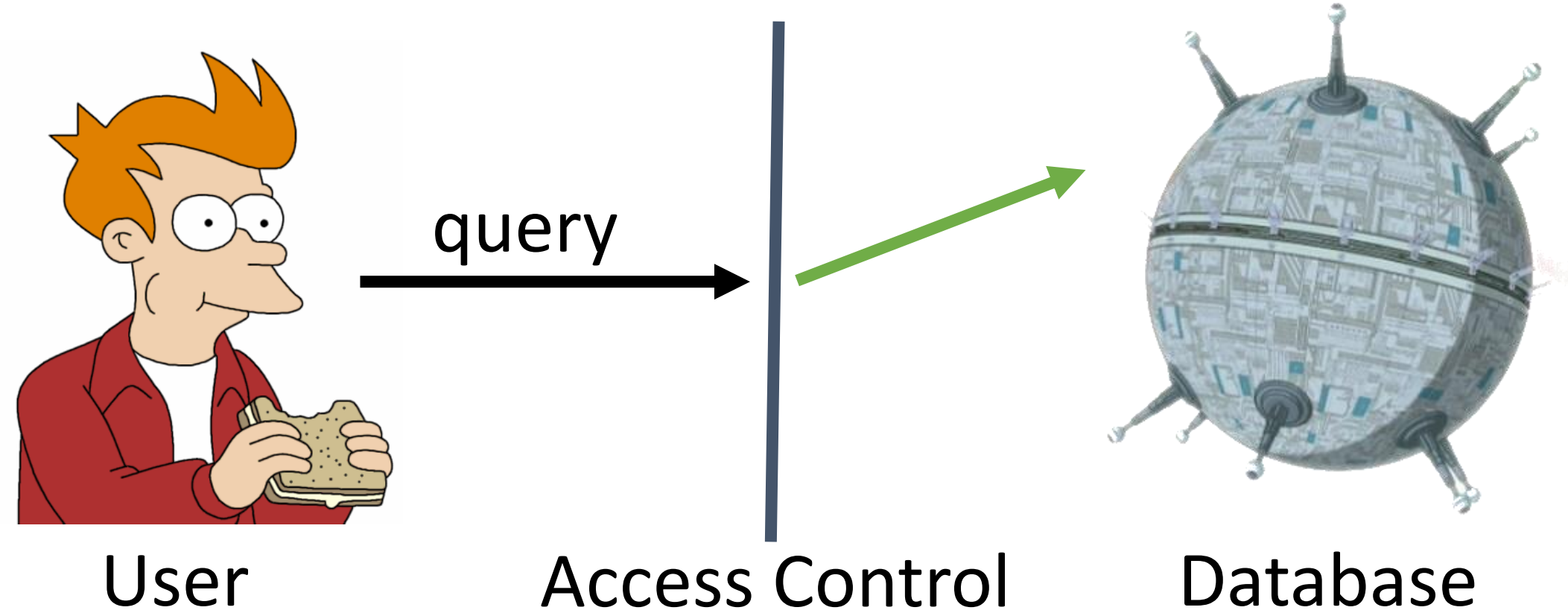
query

User

Access Control

Database

Database Access Control



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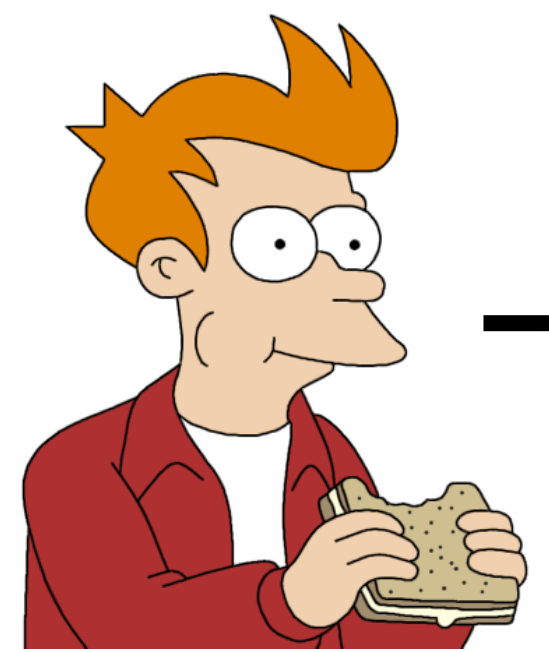

query

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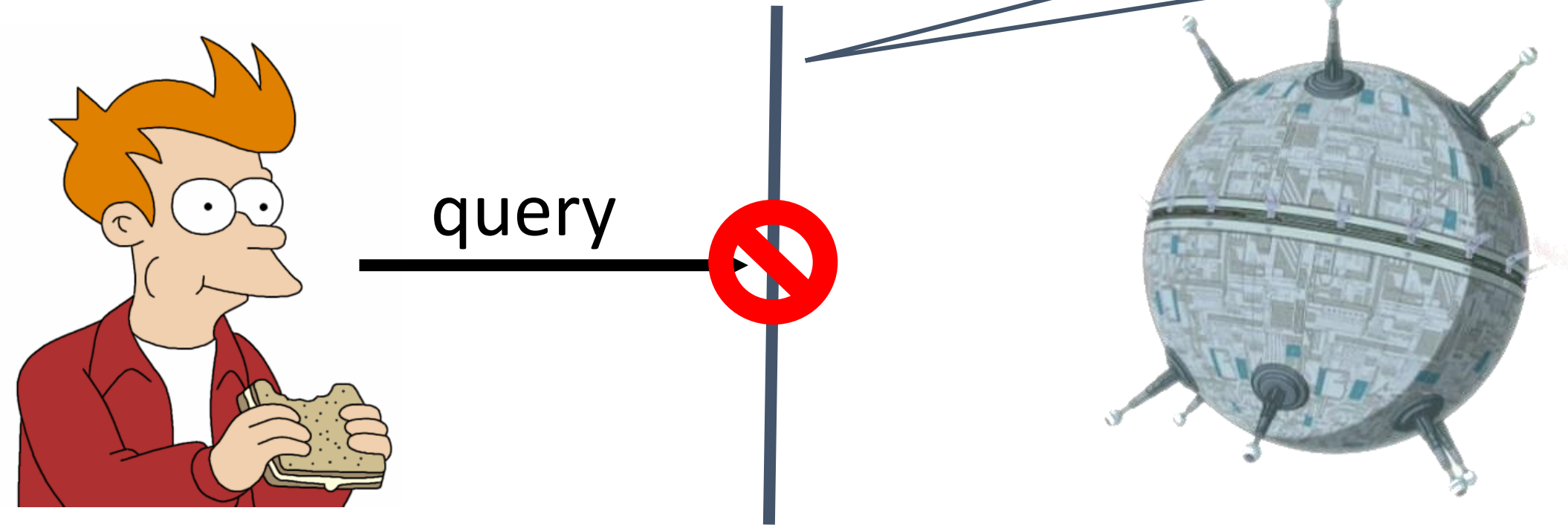

Queries are programs

```
-- As admin:
CREATE TRIGGER foo AFTER INSERT ON public
  INSERT INTO public(x) VALUES (1)
  WHEN (SELECT * FROM secret) ;
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INSERT INTO public(x) VALUES (5) ;

SELECT * FROM public ;
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SELECT * FROM public ;
```
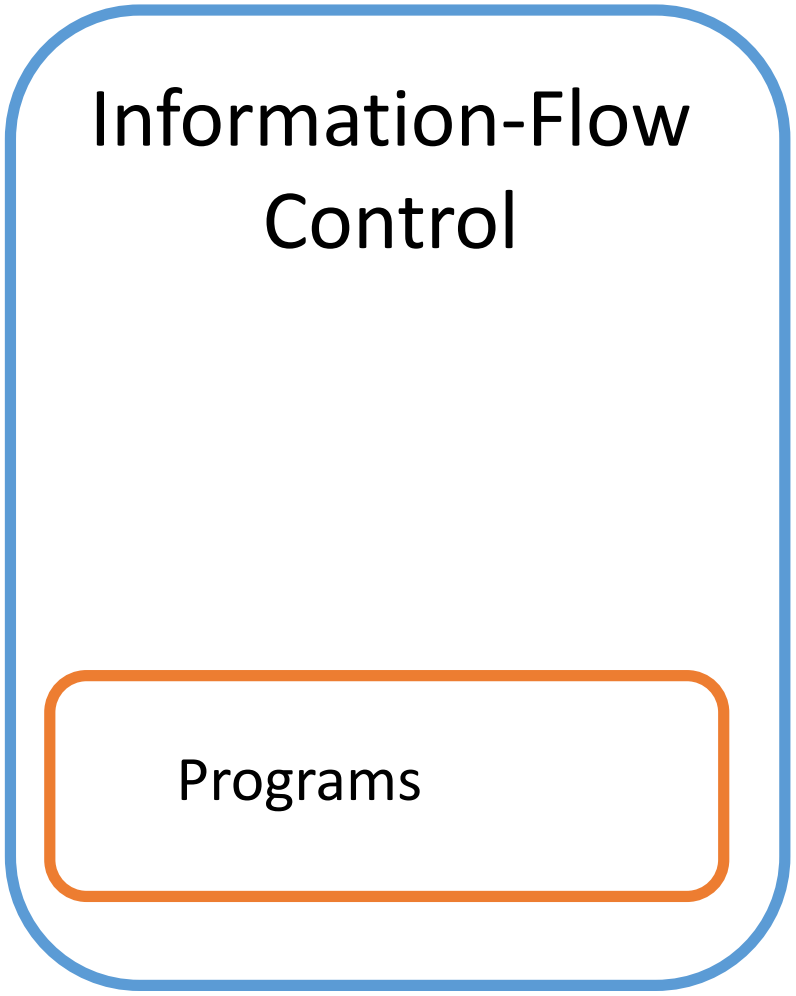

Reveals if secret is empty

Summary

Information-Flow Control

Summary



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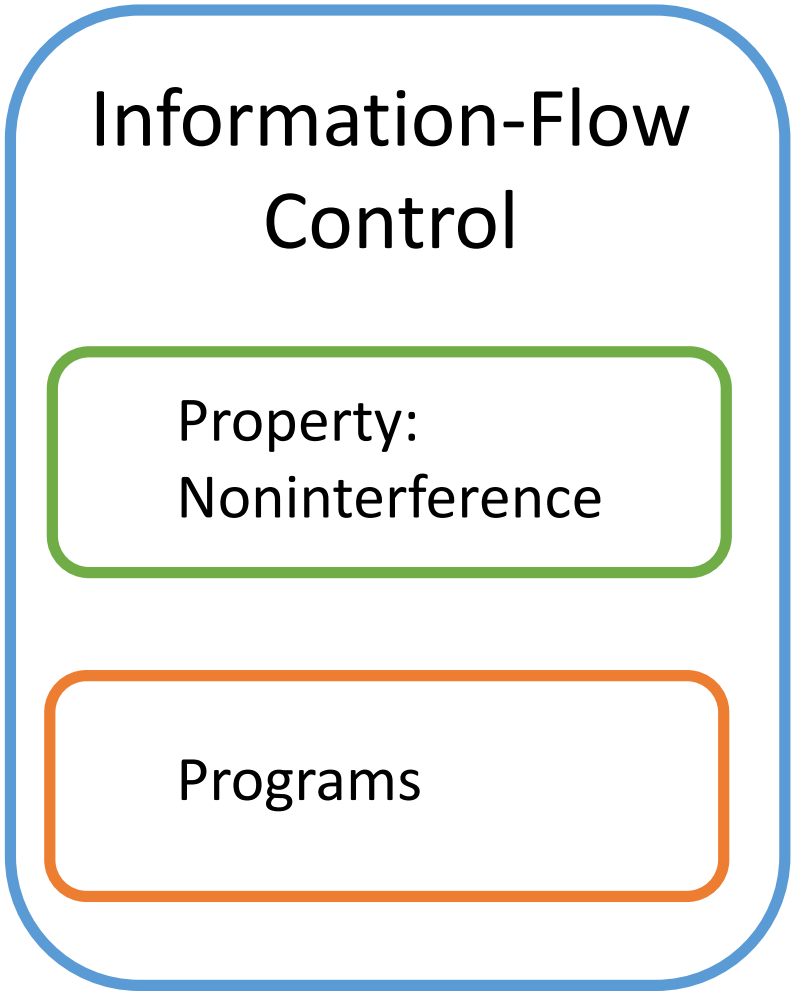

Information-Flow Control
Property: Noninterference
Programs

Summary

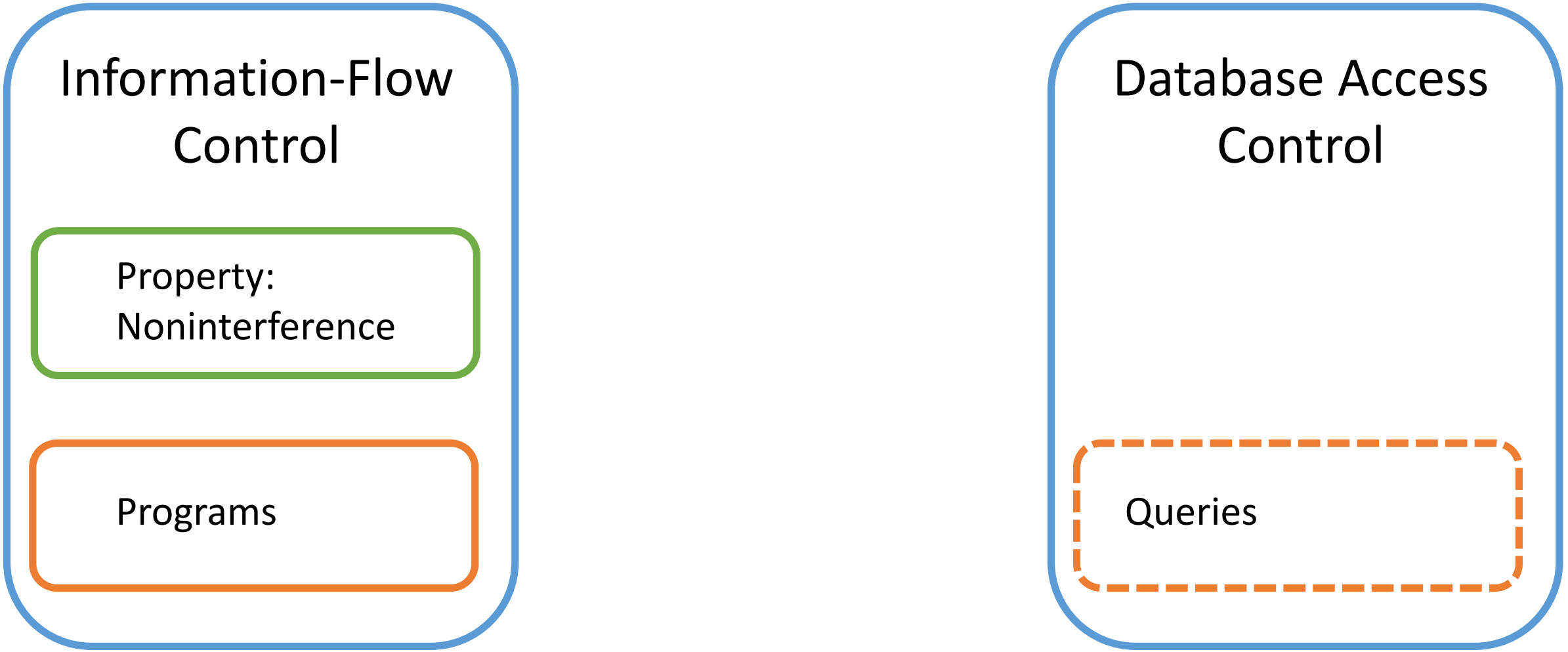
Information-Flow Control

Property: Noninterference

Programs

Database Access Control

Summary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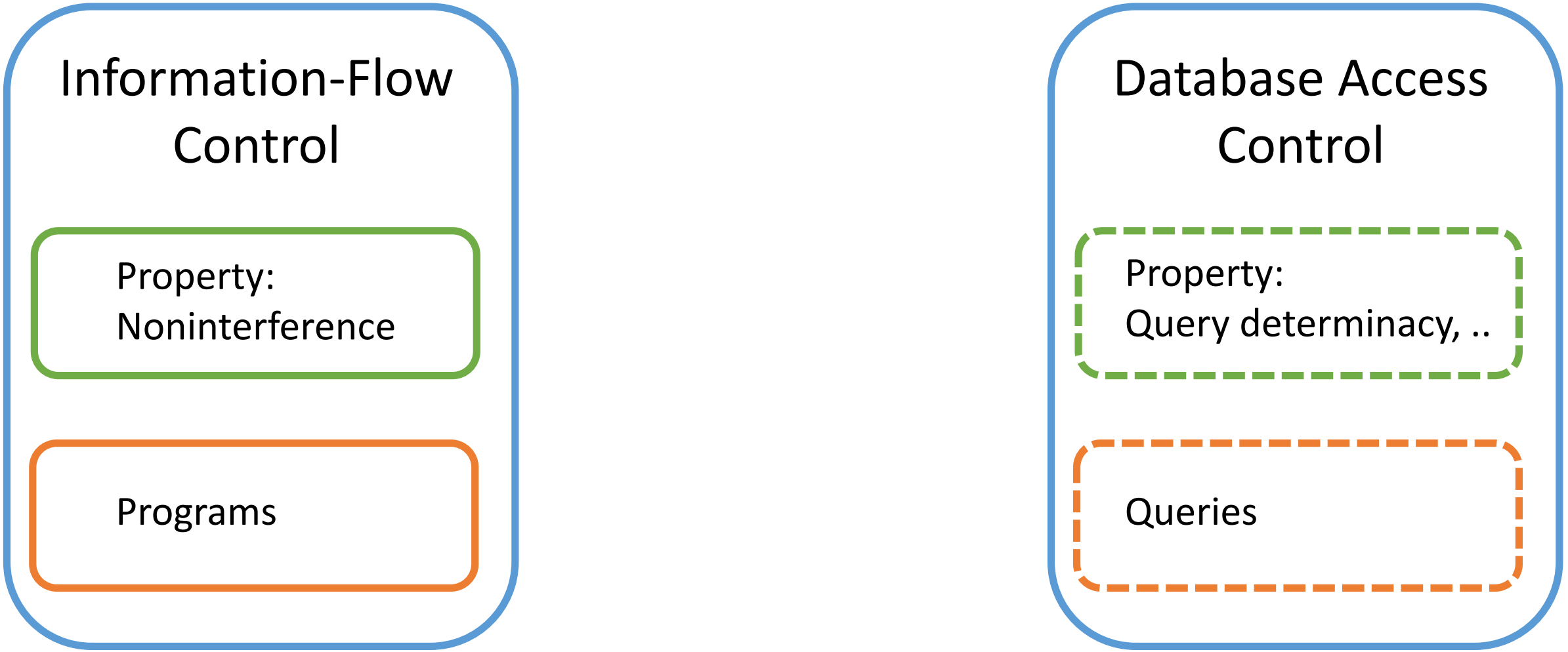
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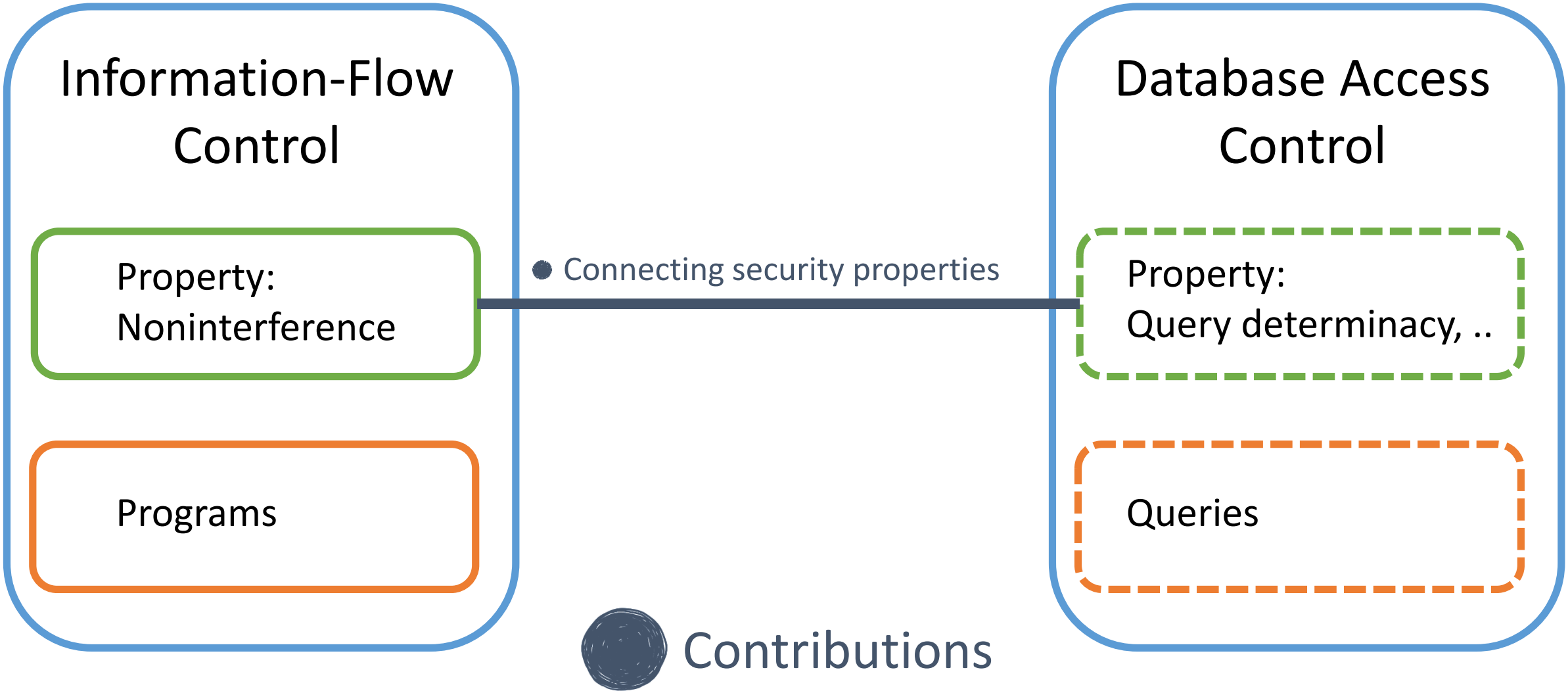
Information-Flow Control
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Connecting security properties
Database Access Control
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Queries
Contributions

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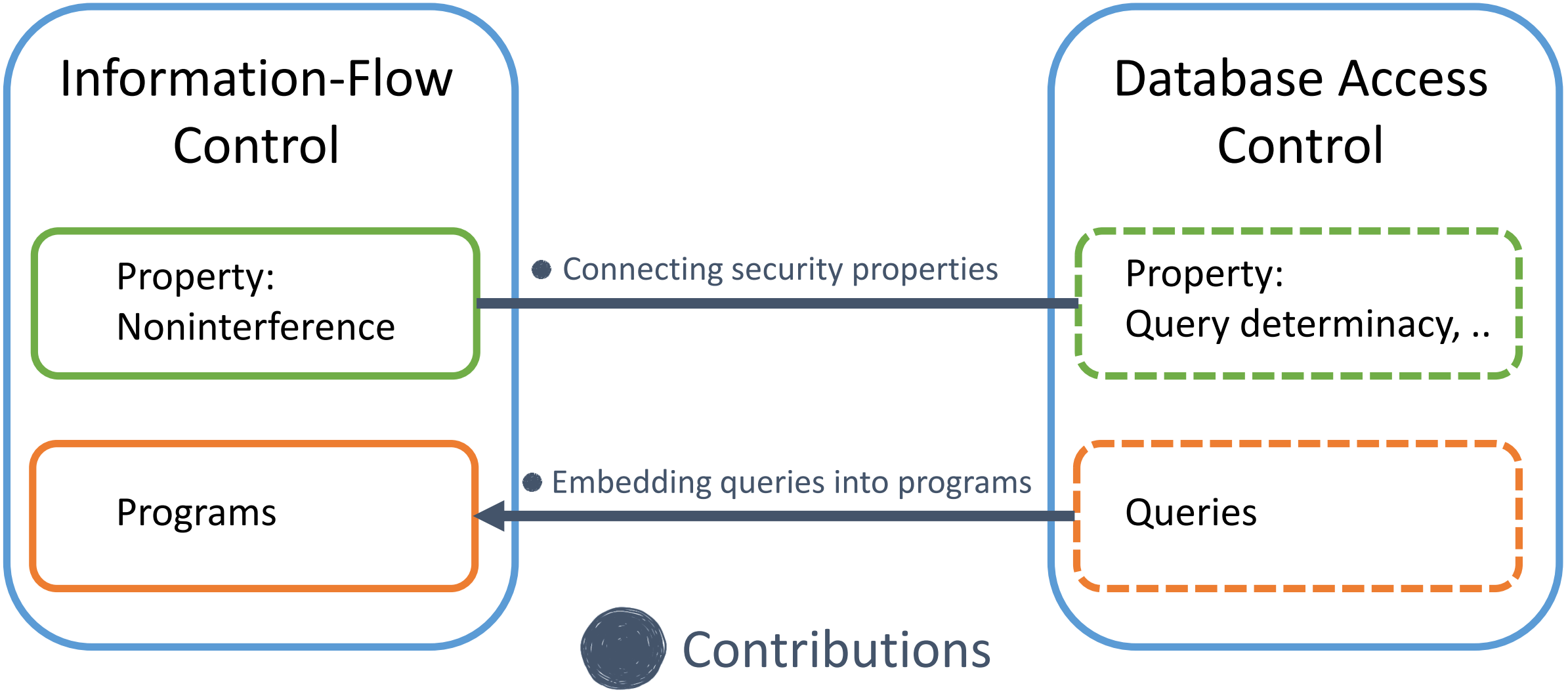
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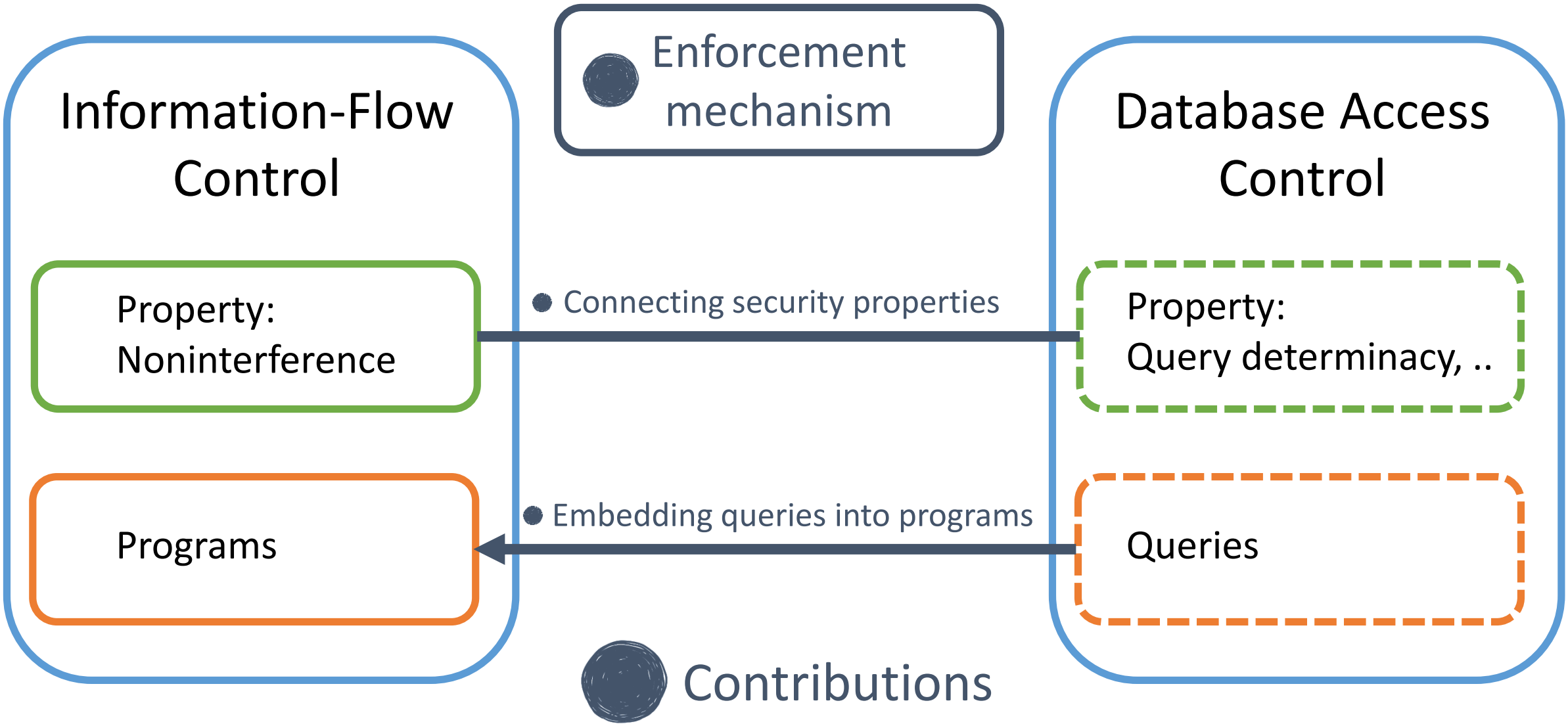
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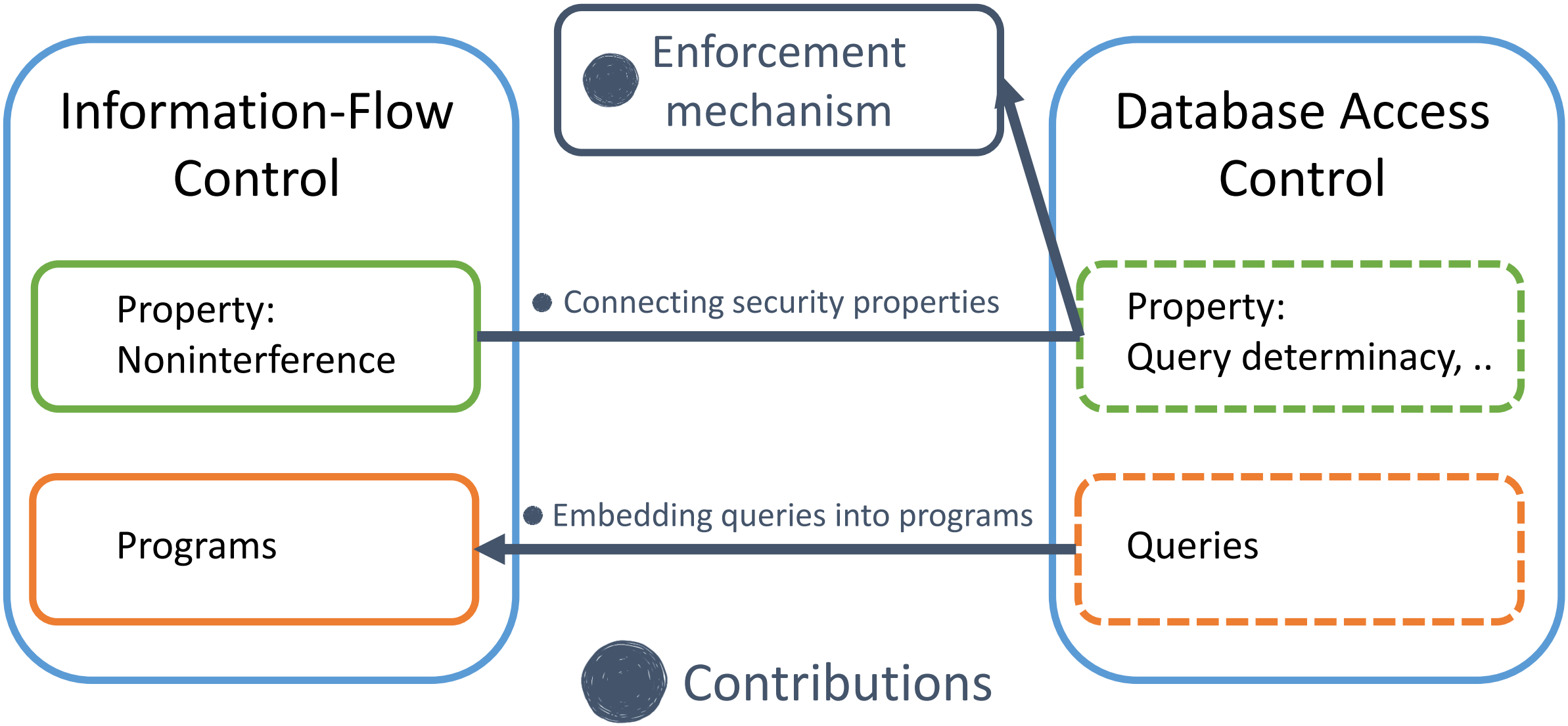
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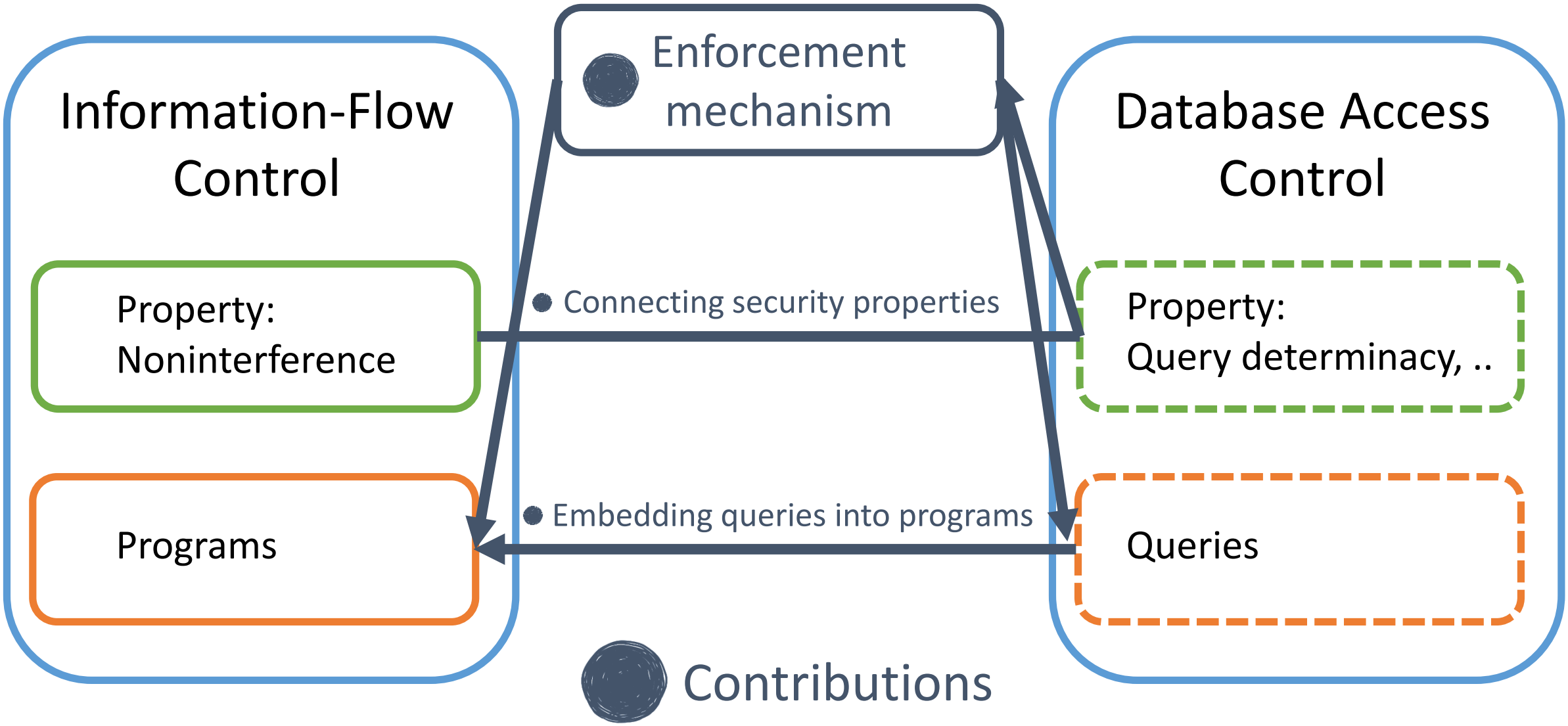
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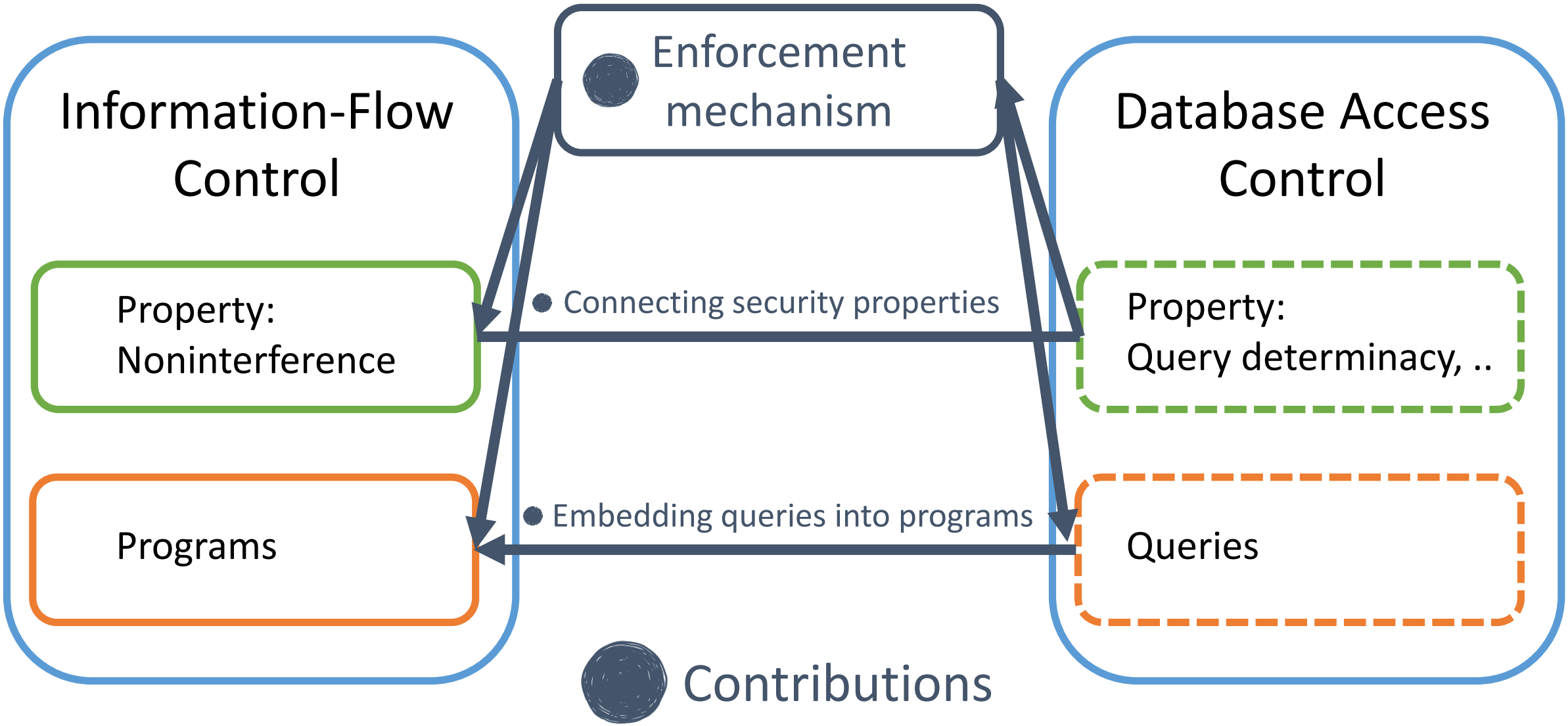
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