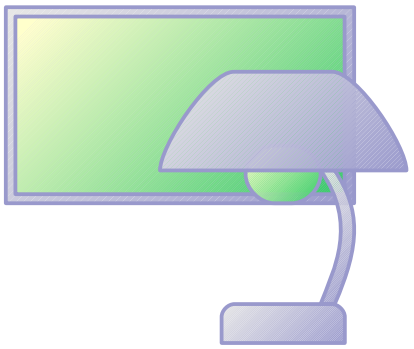
User-Preferred Interface Design with Abstract Interaction Description Language

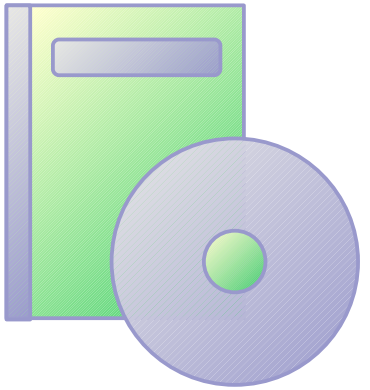
Takuto Yanagida,
Hidetoshi Nonaka, Masahito Kurihara

Hokkaido University

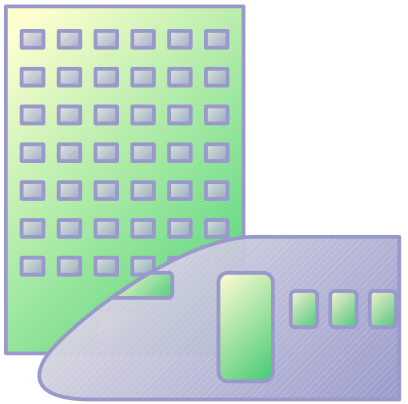
Increasing services:



Appliances



Shopping



Reservations

User Interfaces

Increasing services

Increase of Interfaces
with intermediary computers

Problem

- Users' characteristics
  - Environment
  - Body description
  - Preference for interfaces

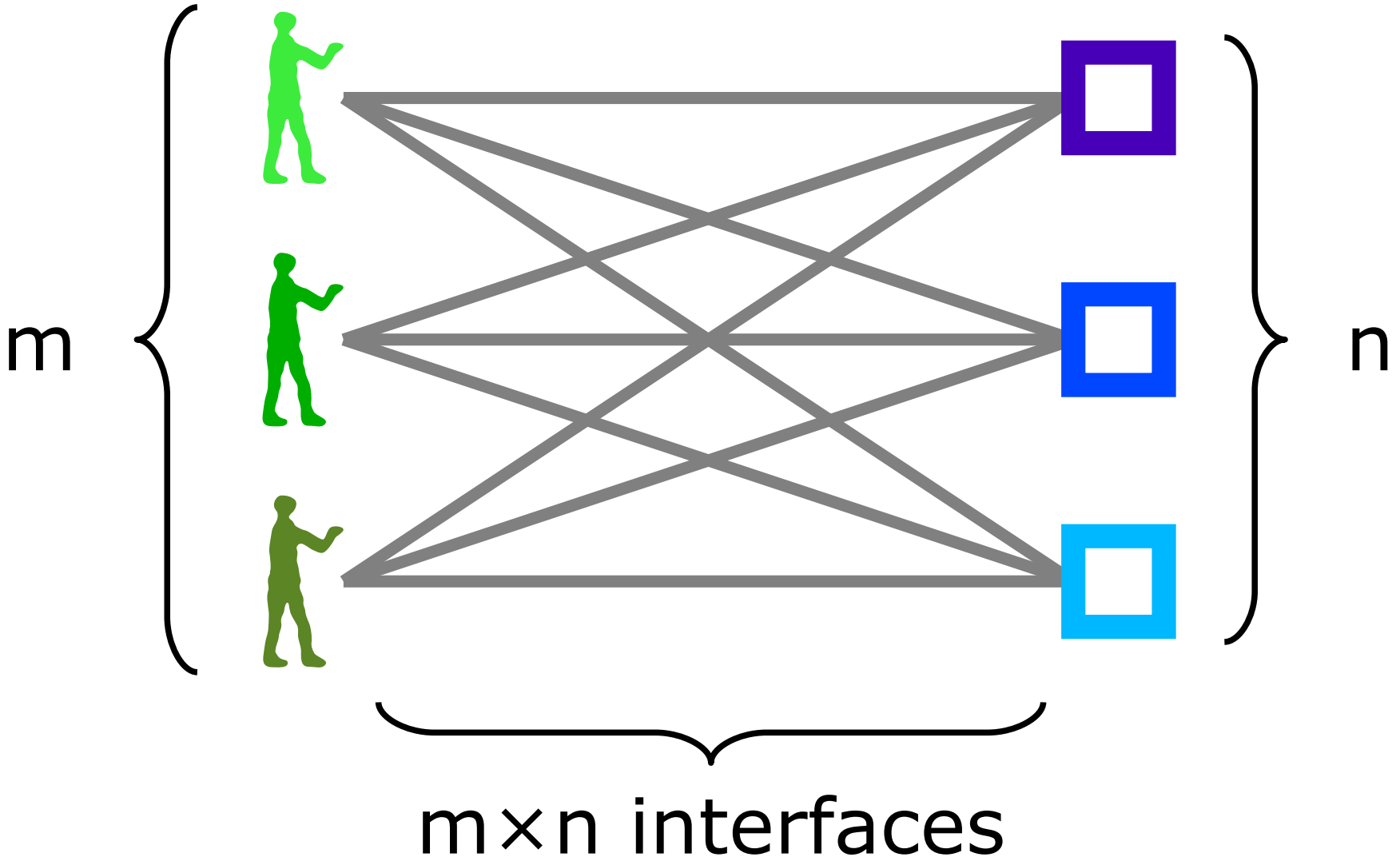
- Interfaces are
  - predefined and fixed
  - mostly GUIs
  - slightly different

Solution?

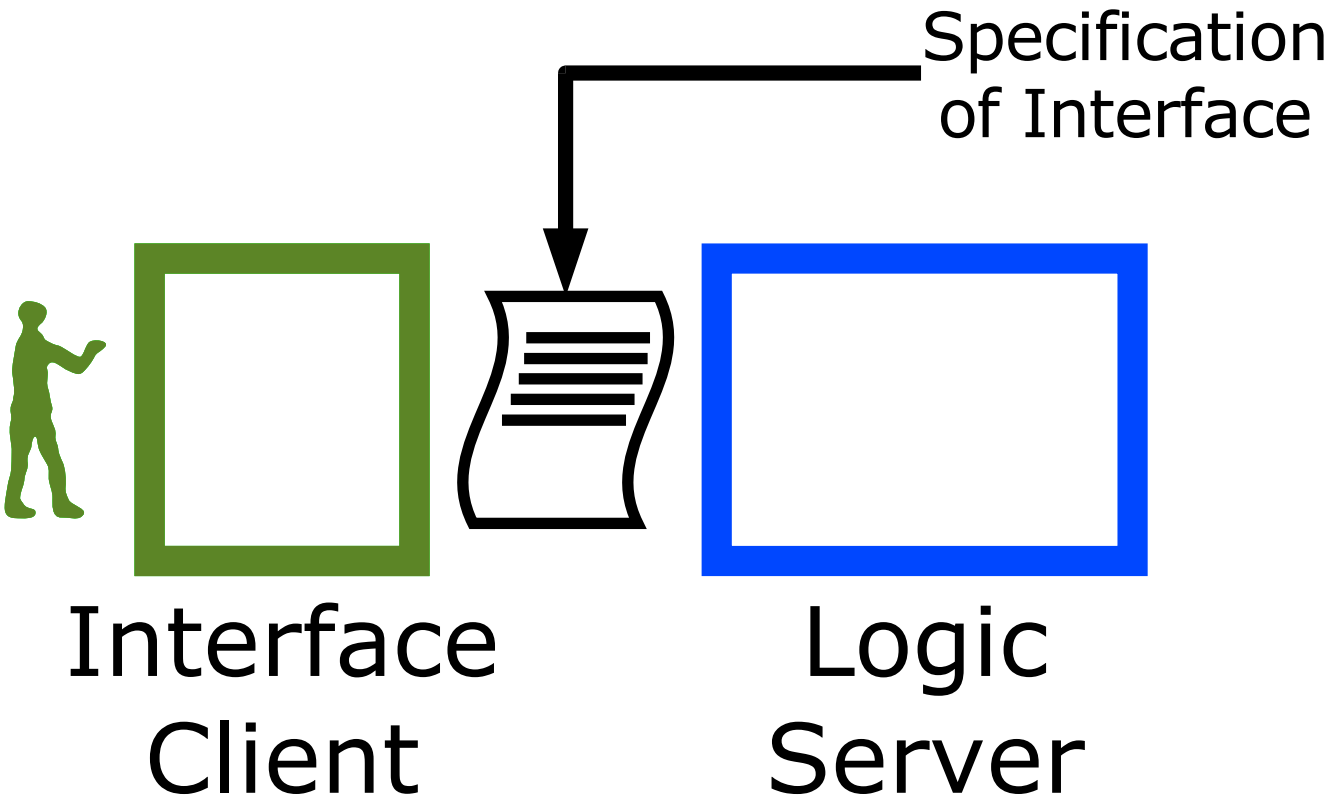
Service developers prepare all kinds of interfaces.

Too difficult

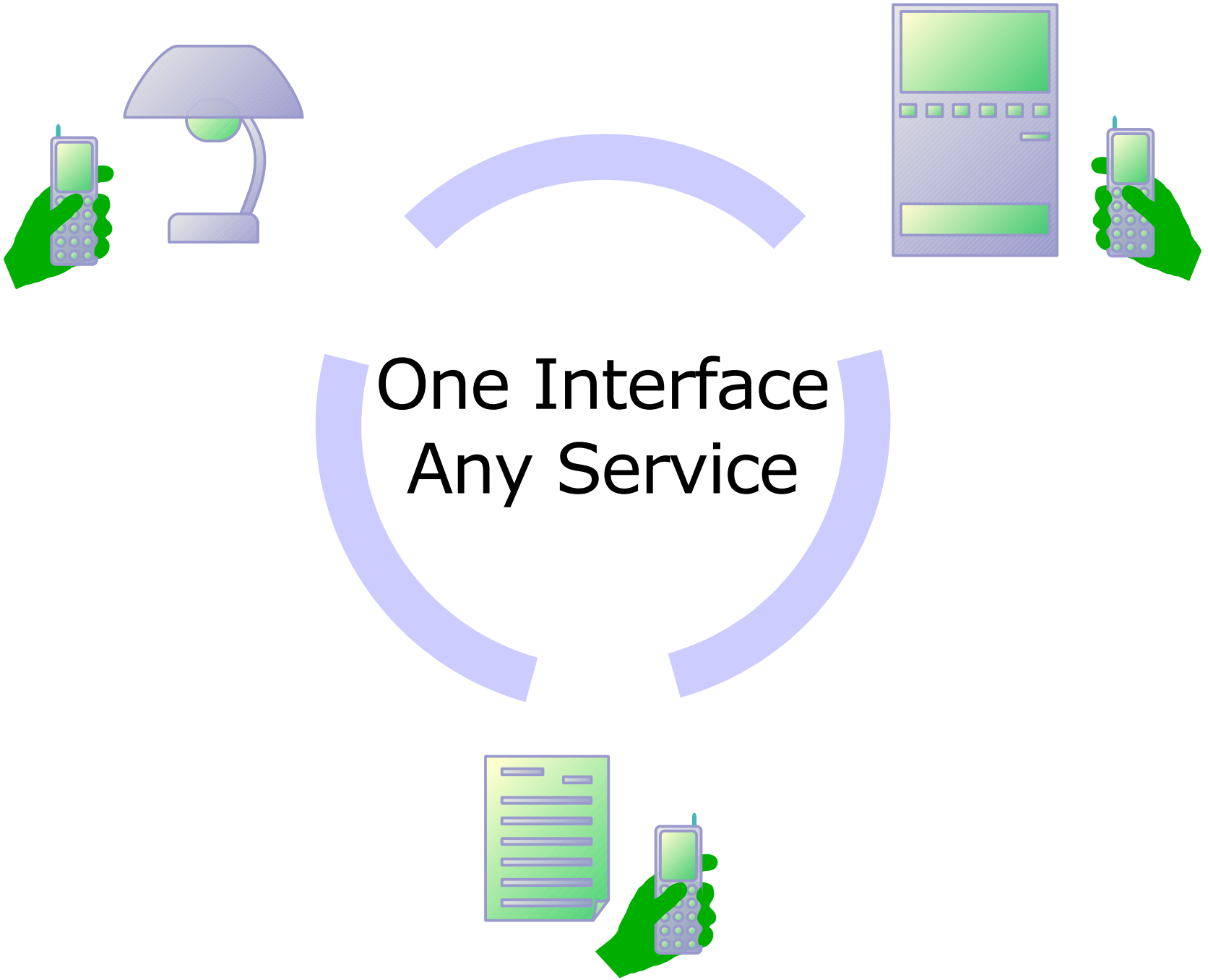
~~Solution~~

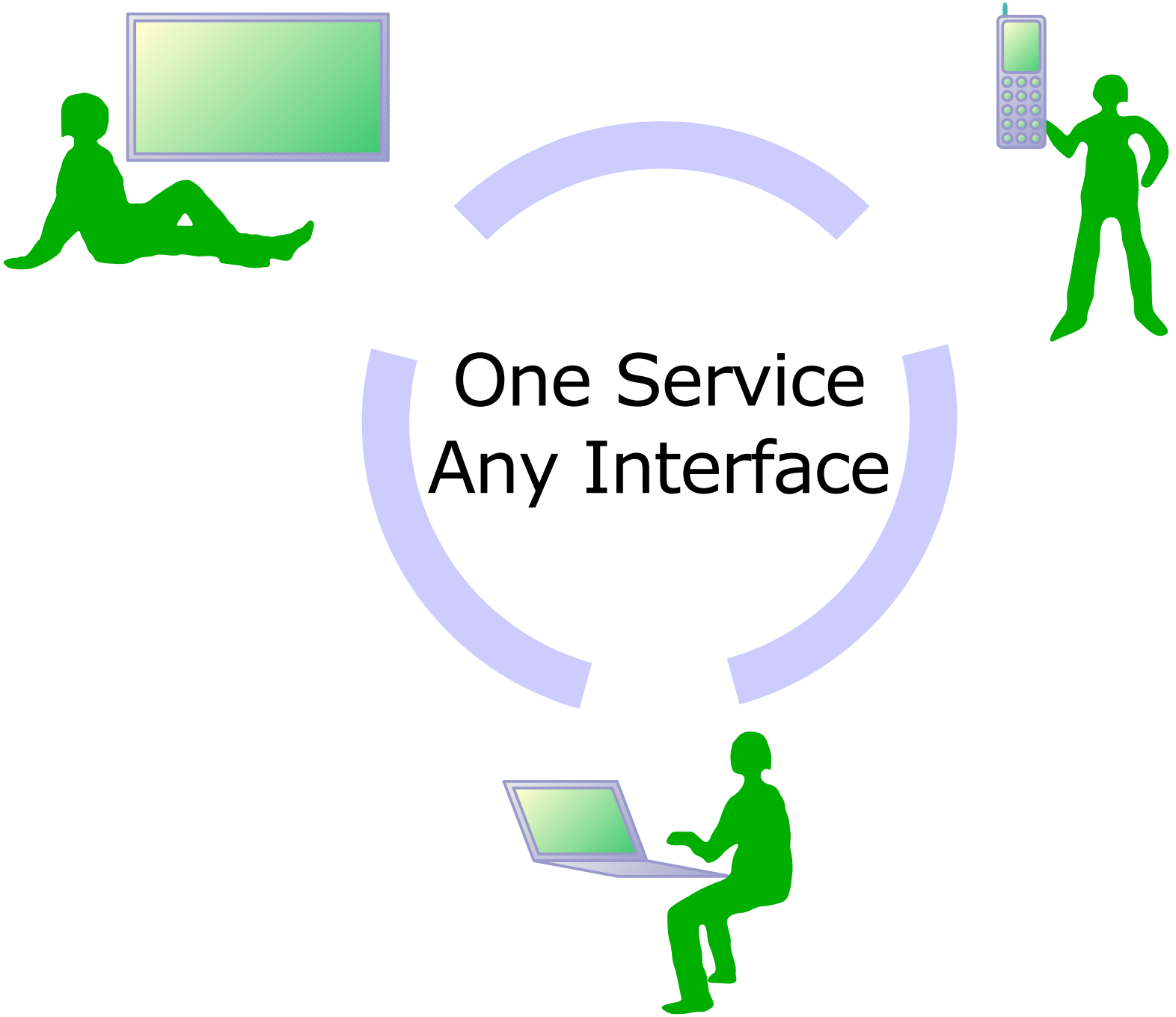


Proposal Architecture

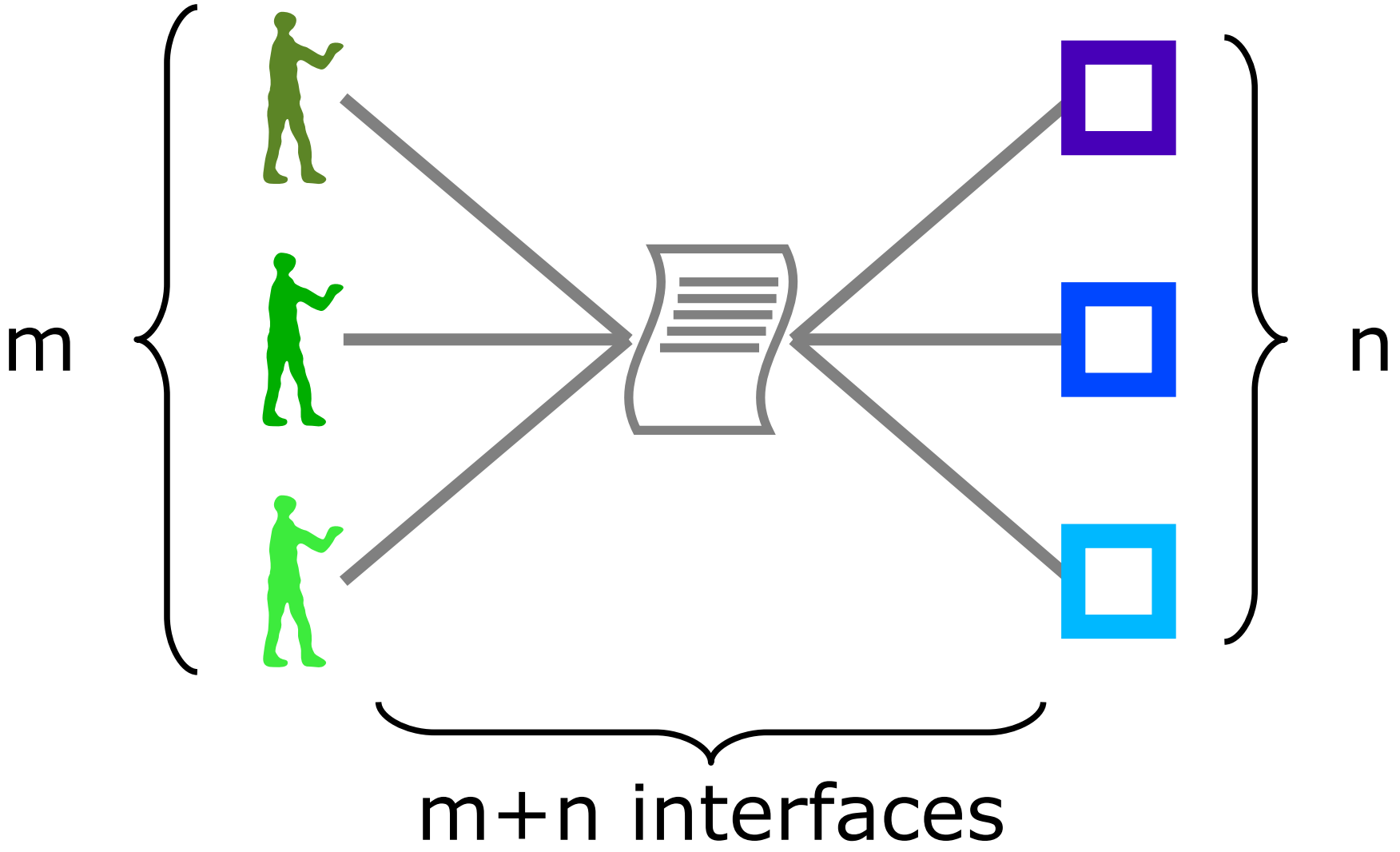


Interface Client/Logic Server (ICLS)

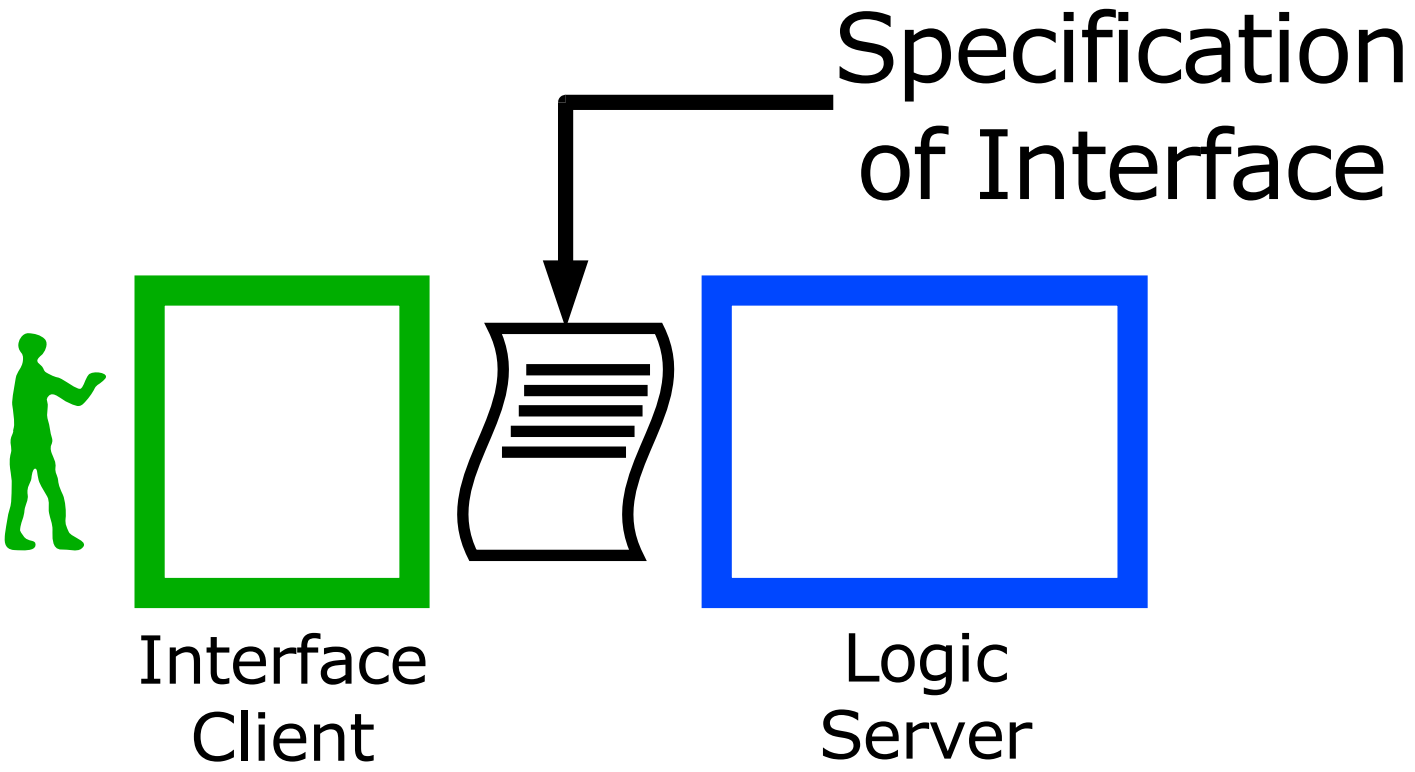

One Interface
Any Service

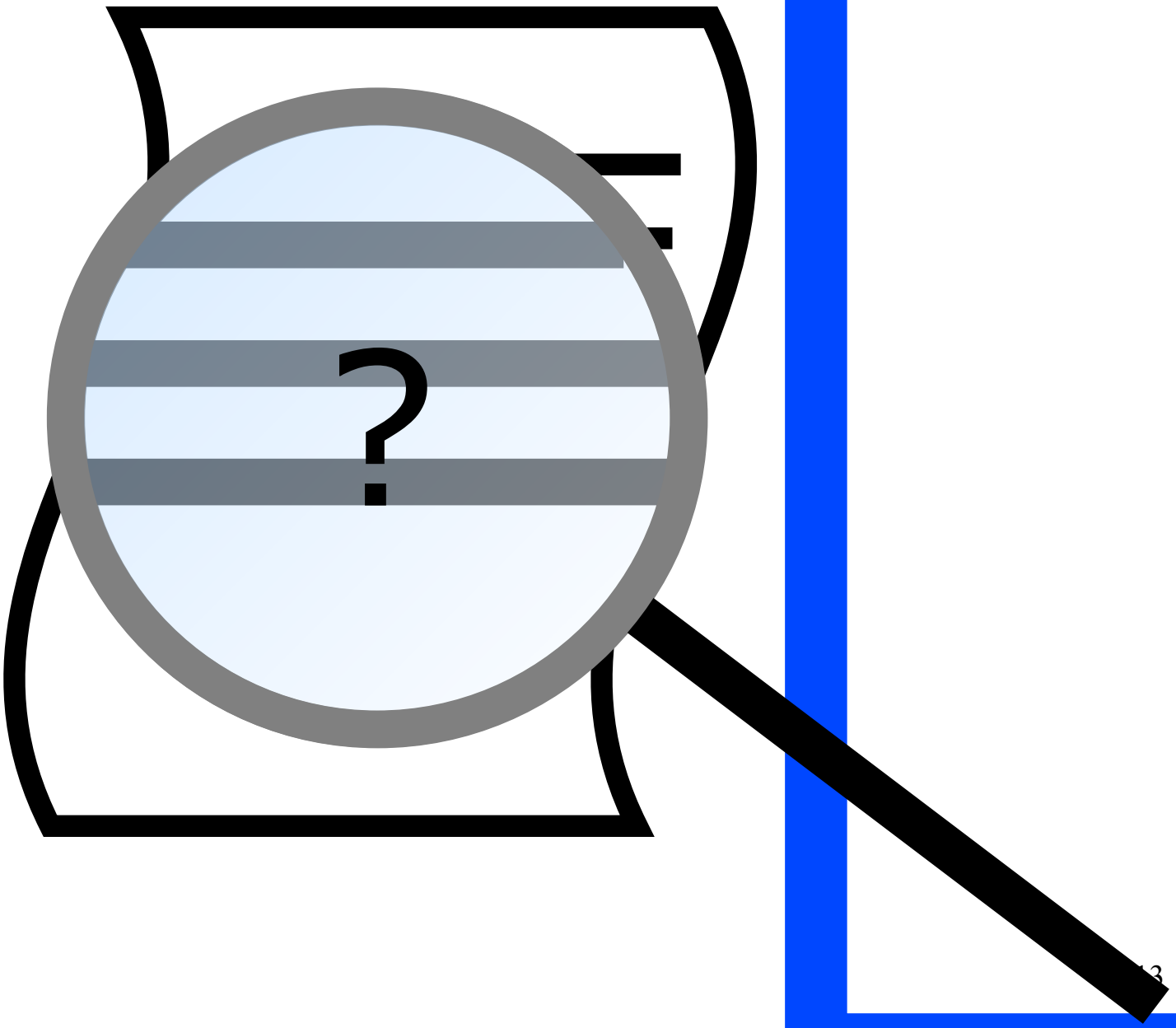

One Service
Any Interface

Solution



ICLS Architecture





How To Describe Interface?

For independence from devices:

"Push button"

"Input from keyboard"

"Command with voice"

Description of Interaction

Interaction:

information exchanged

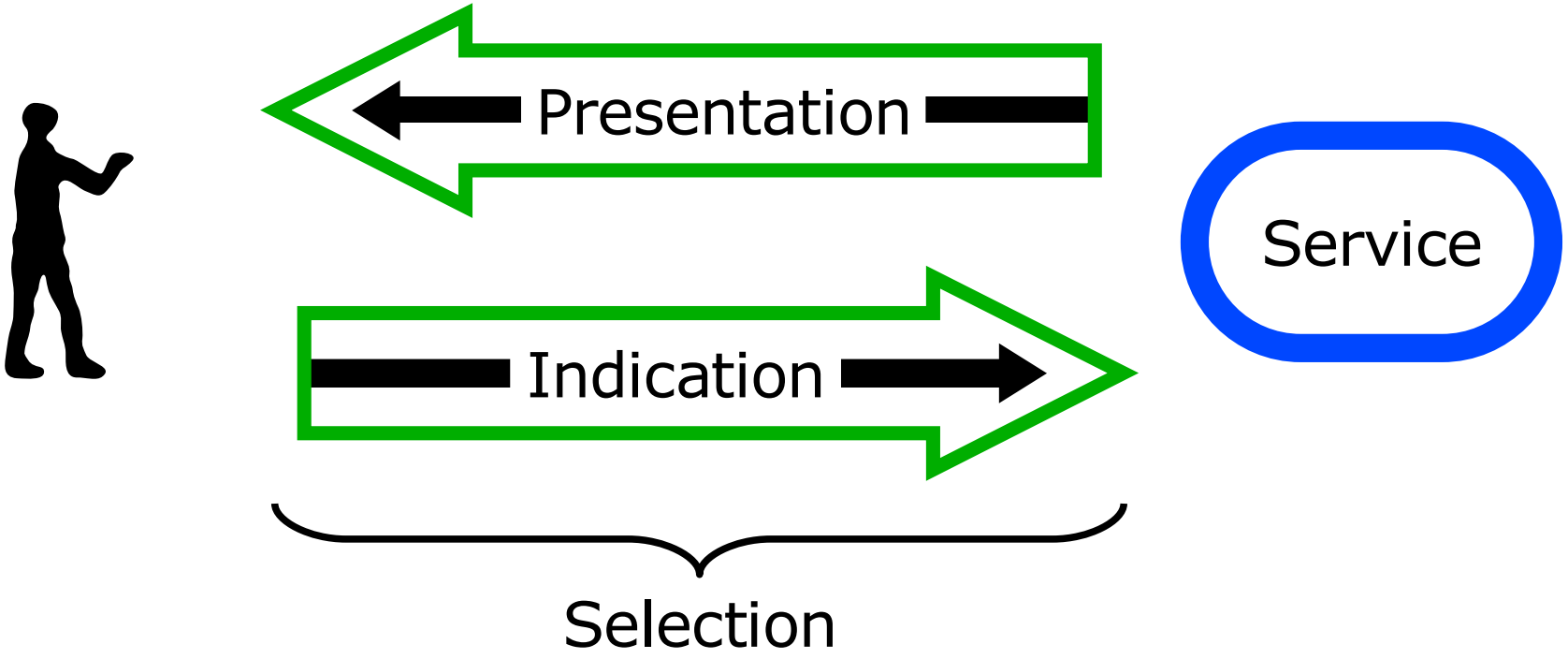
between user and service.

Focusing on:

"How do you select from among choices?"

Interaction model

Interaction Model



Presentation and Indication Model (PIM)

Graph Expression

Interaction graphs

represent interactions
abstracted by PIM.

Abstract Interaction Description Language

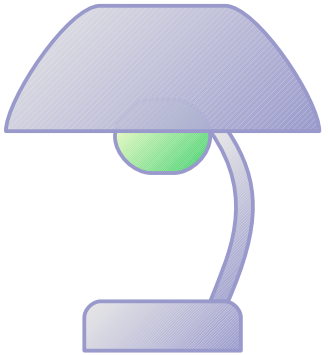
(AIDL)

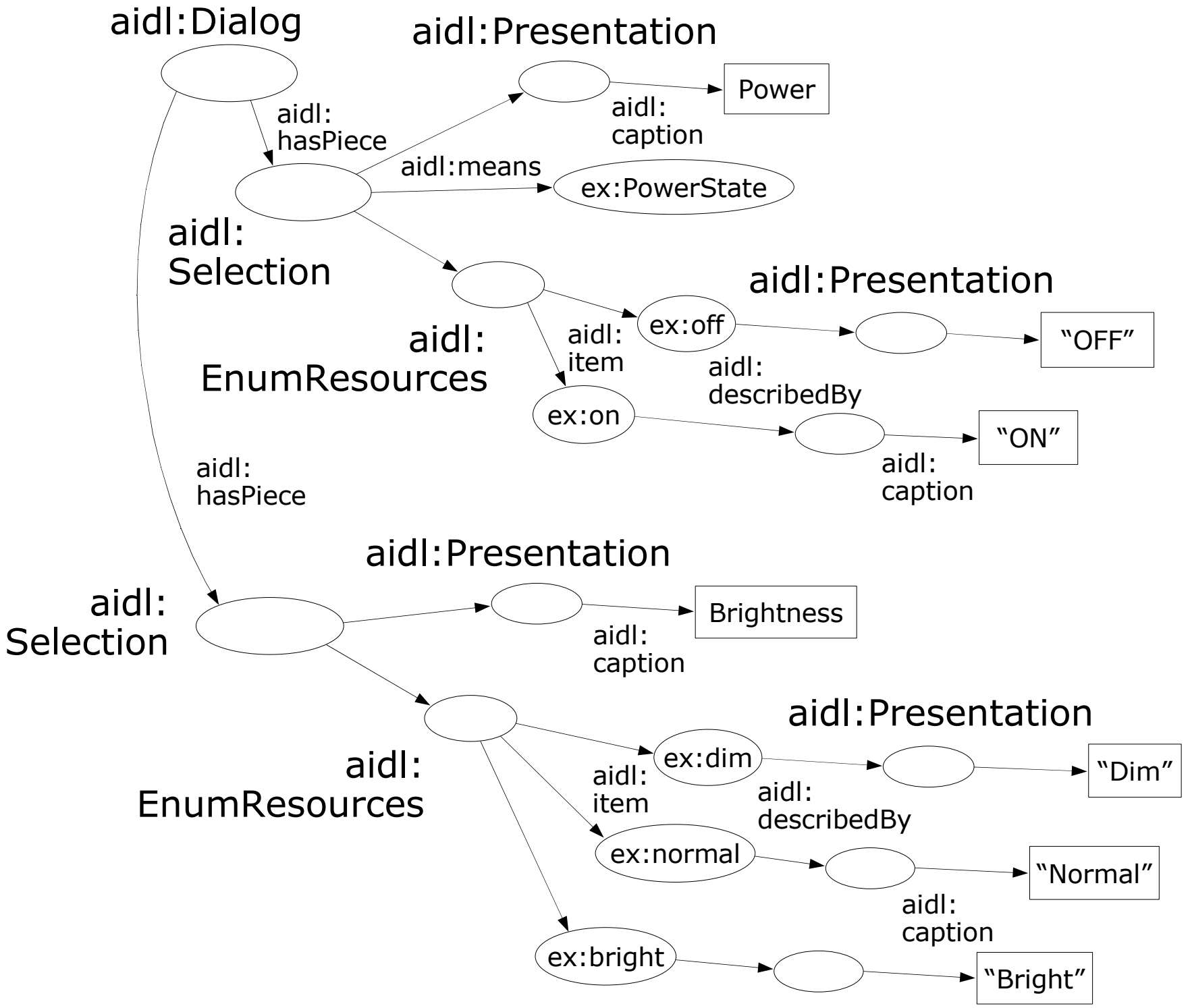
- AIDL:
  - is an application of Semantic Web
  - is a vocabulary of RDF
  - uses classes as meanings of selection acts

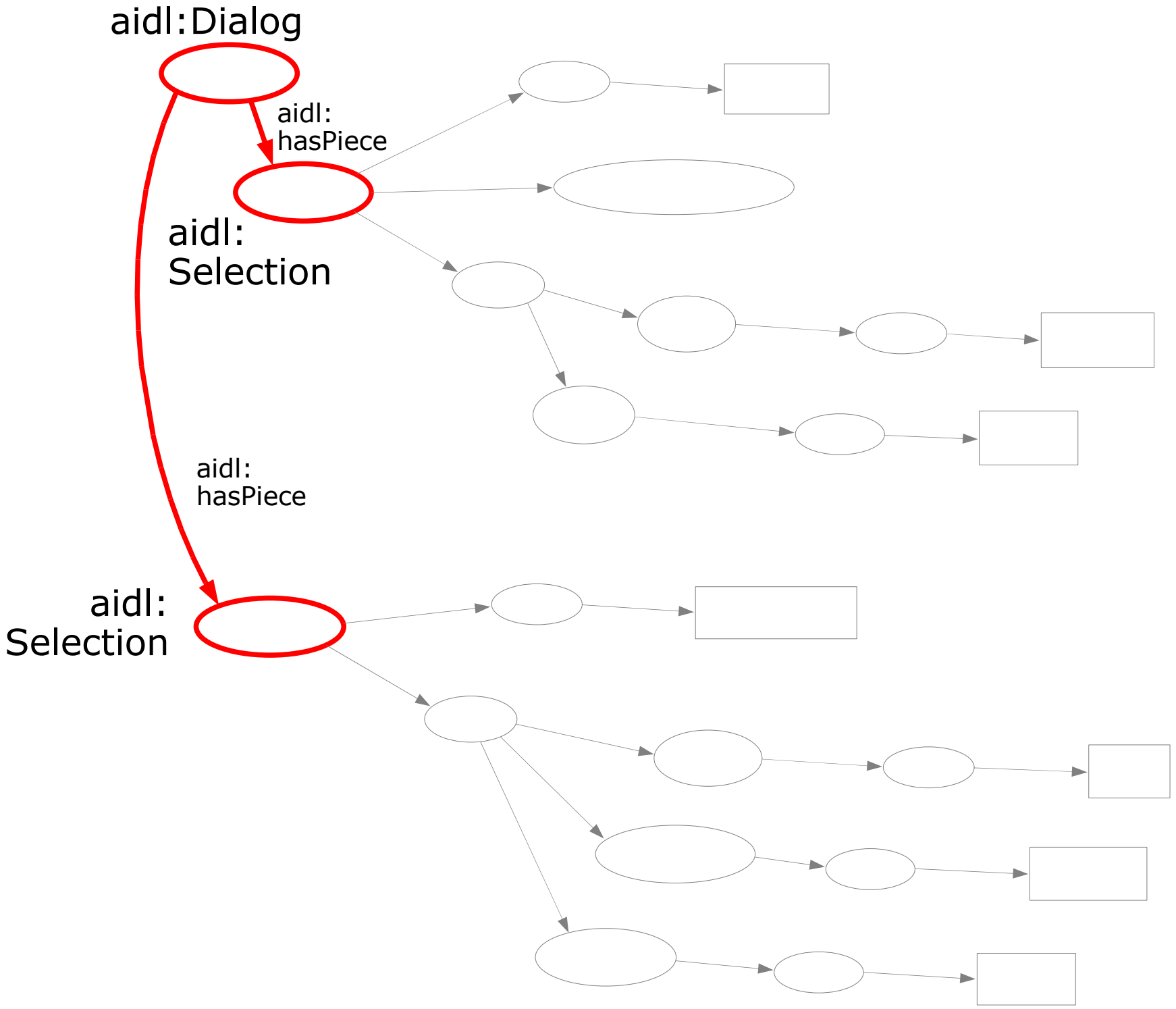
Highly extensibility

Example

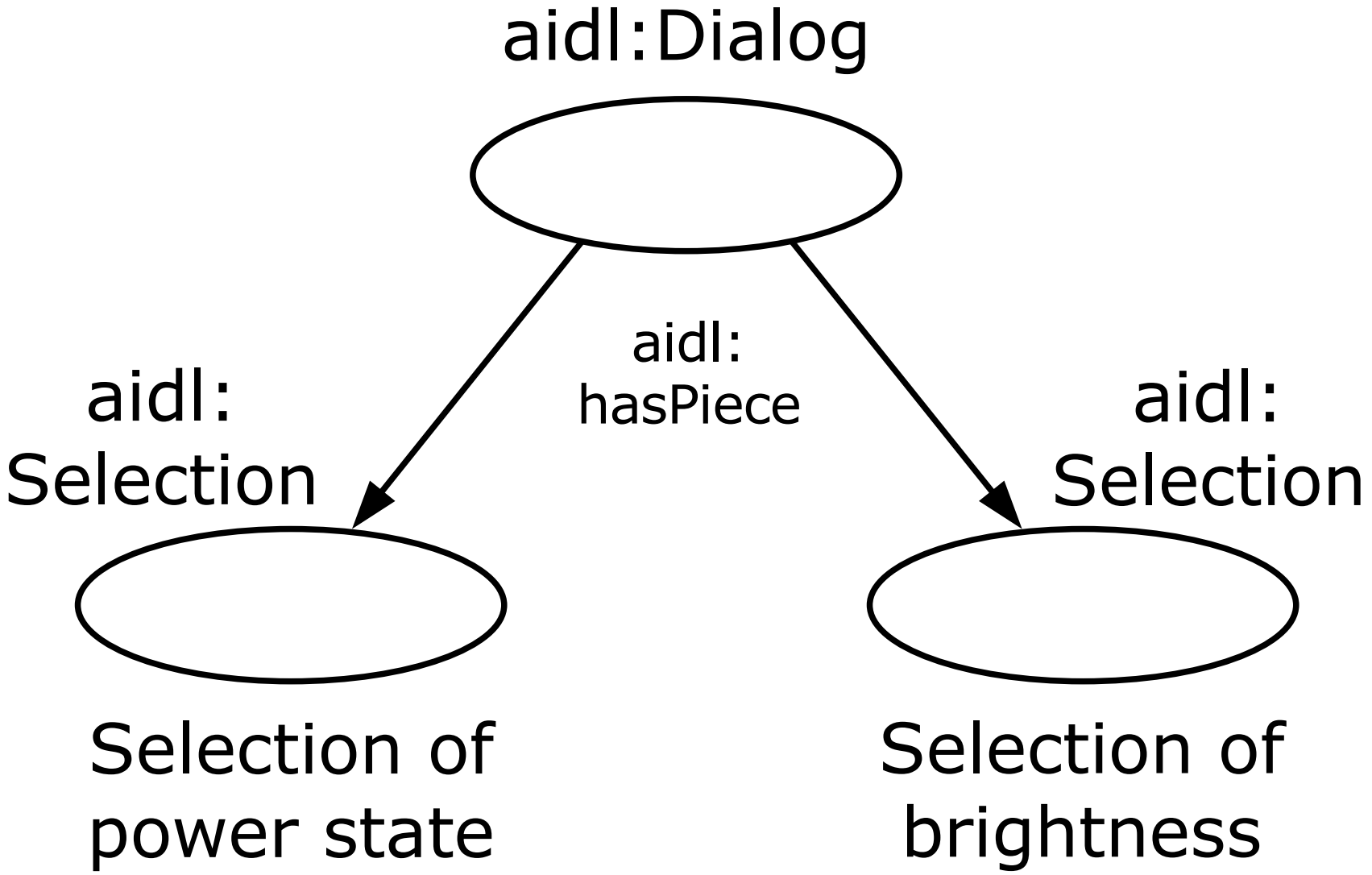
- Desk Lamp Control Service
  - Power State (ON, OFF)
  - Brightness (Bright, Normal, Dim)

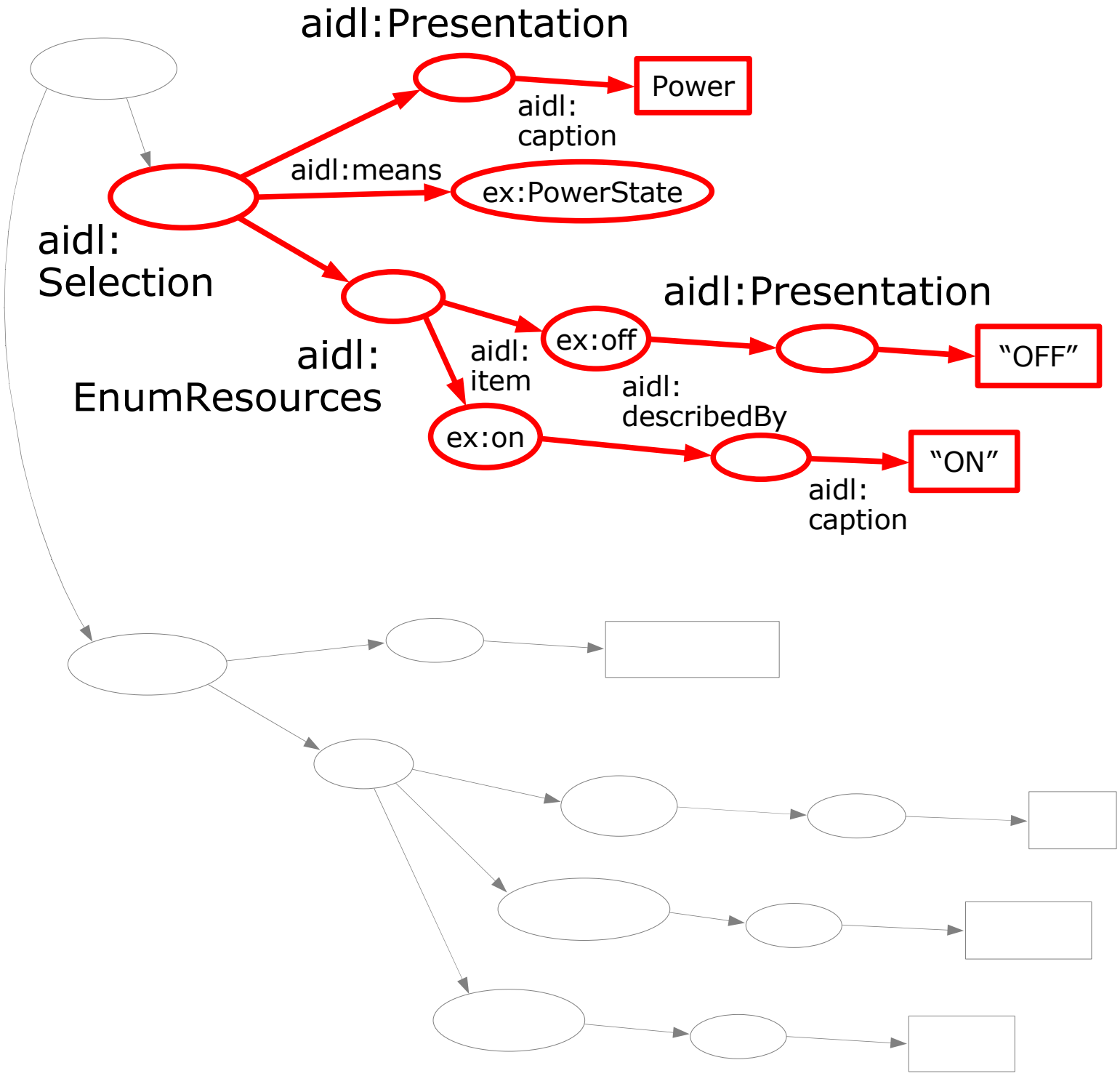



aidl:Dialog
aidl:Presentation
aidl:
hasPiece
Power
aidl:
caption
aidl:means
ex:PowerState
aidl:
Selection
aidl:Presentation
aidl:
EnumResources
aidl:
item
ex:off
"OFF"
aidl:
describedBy
ex:on
"ON"
aidl:
caption
aidl:
hasPiece
aidl:Presentation
aidl:
Selection
Brightness
aidl:
caption
aidl:Presentation
aidl:
EnumResources
aidl:
item
ex:dim
"Dim"
aidl:
describedBy
ex:normal
"Normal"
aidl:
caption
ex:bright
"Bright"

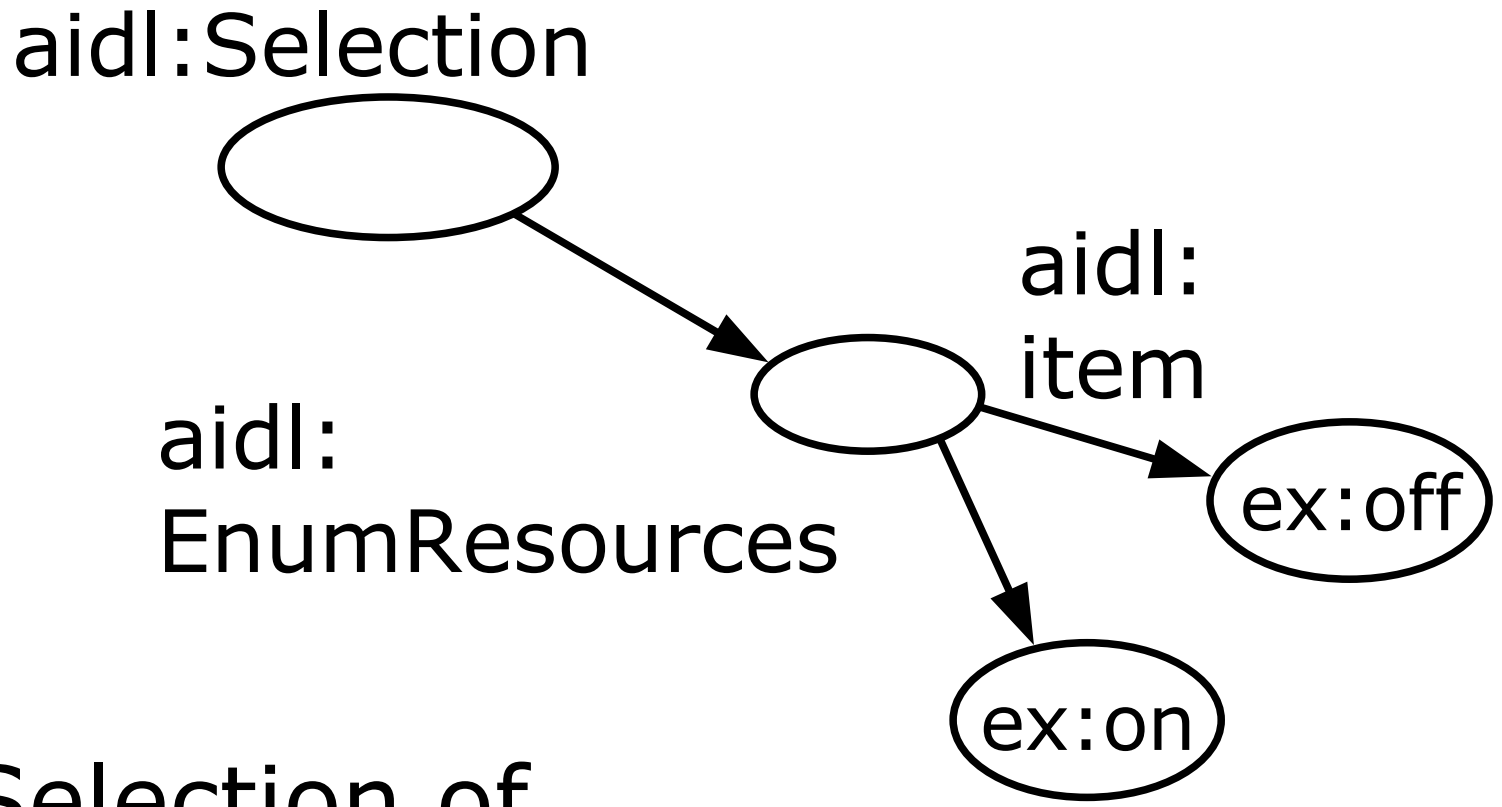

aidl:Dialog
aidl:
hasPiece
aidl:
Selection
aidl:
hasPiece
aidl:
Selection

Tree Structure




aidl:Presentation
Power
aidl:
caption
aidl:means
ex:PowerState
aidl:
Selection
aidl:Presentation
aidl:
item
ex:off
"OFF"
aidl:
EnumResources
aidl:
describedBy
ex:on
"ON"
aidl:
caption

Expression of Selection

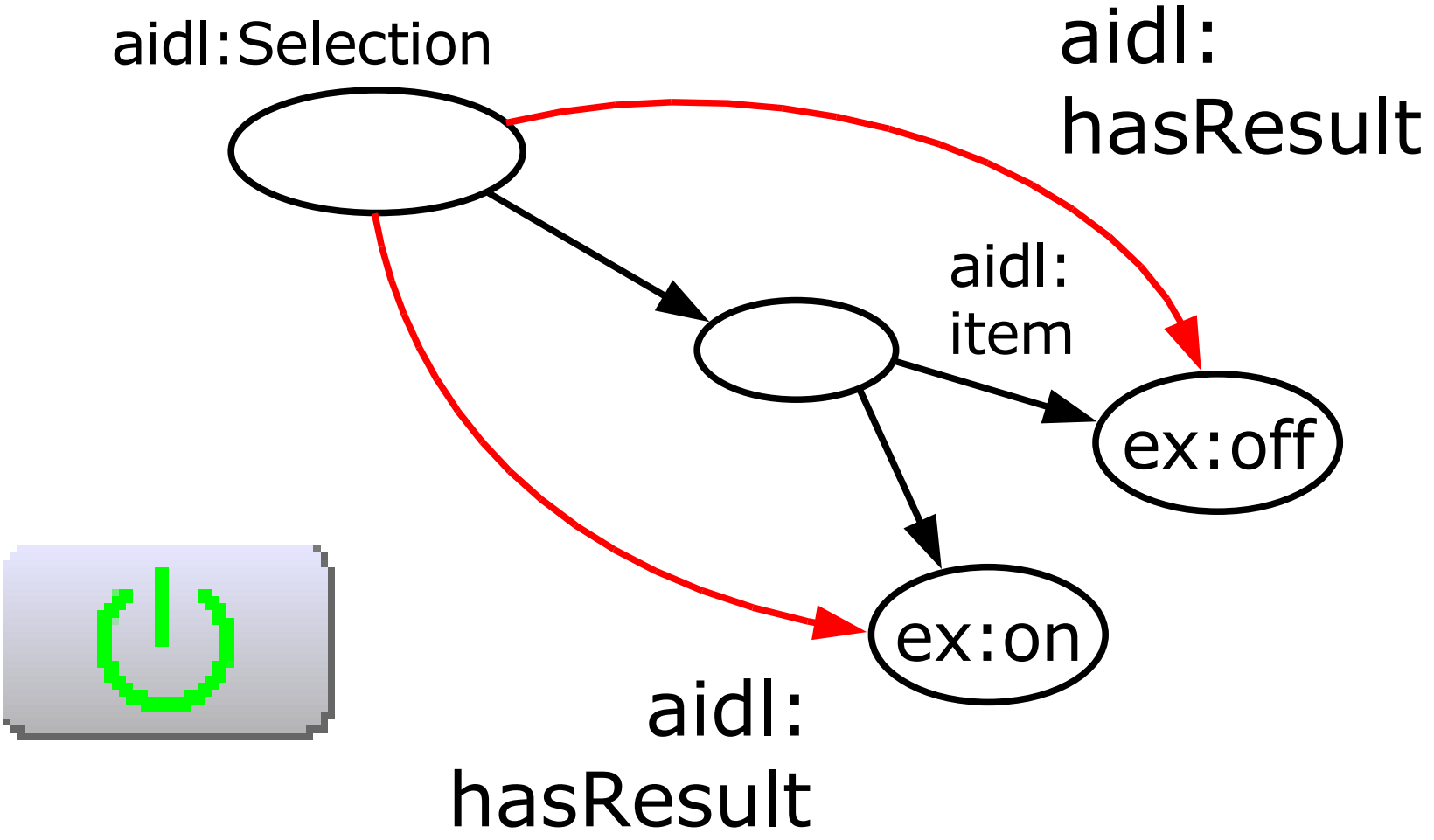


Selection of
power state

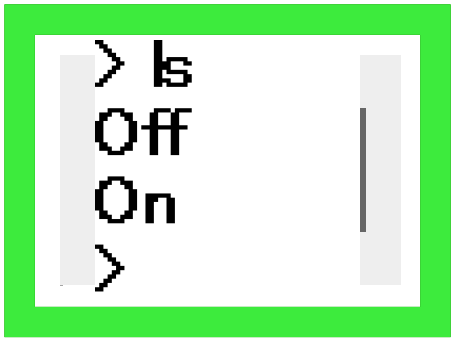
Users' Response

- Interaction Graphs in AIDL represent:
  - Specification of Interface
  - State of Current Interaction

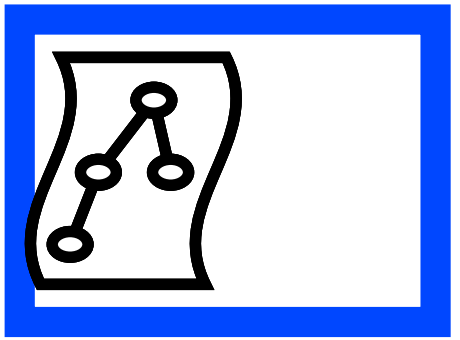
Selection of power state:



Cooperation of C/S

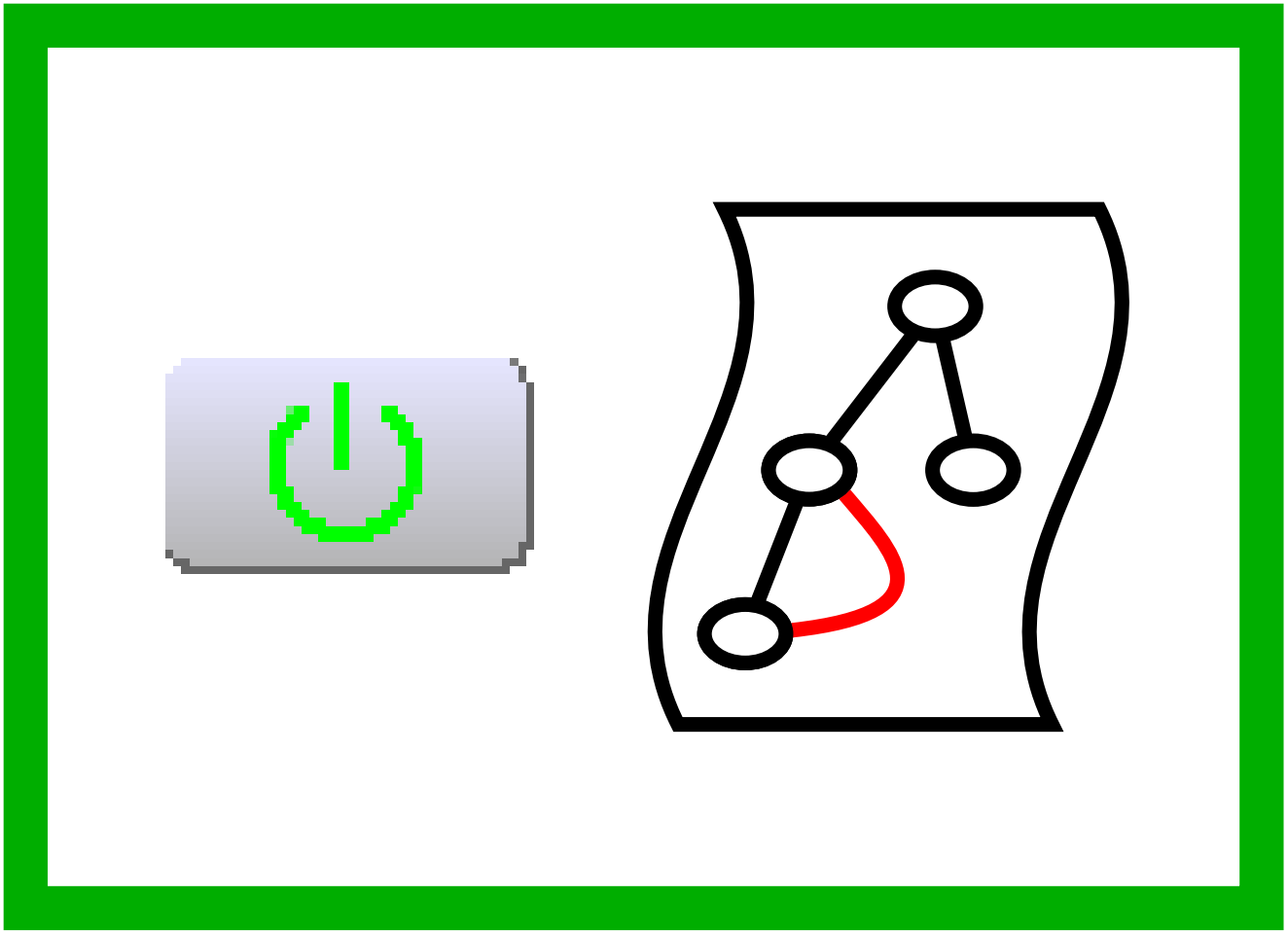


Interface
Client



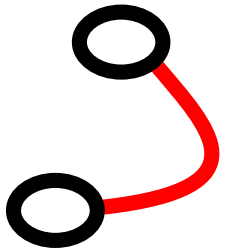
Logic
Server

As specification of interface

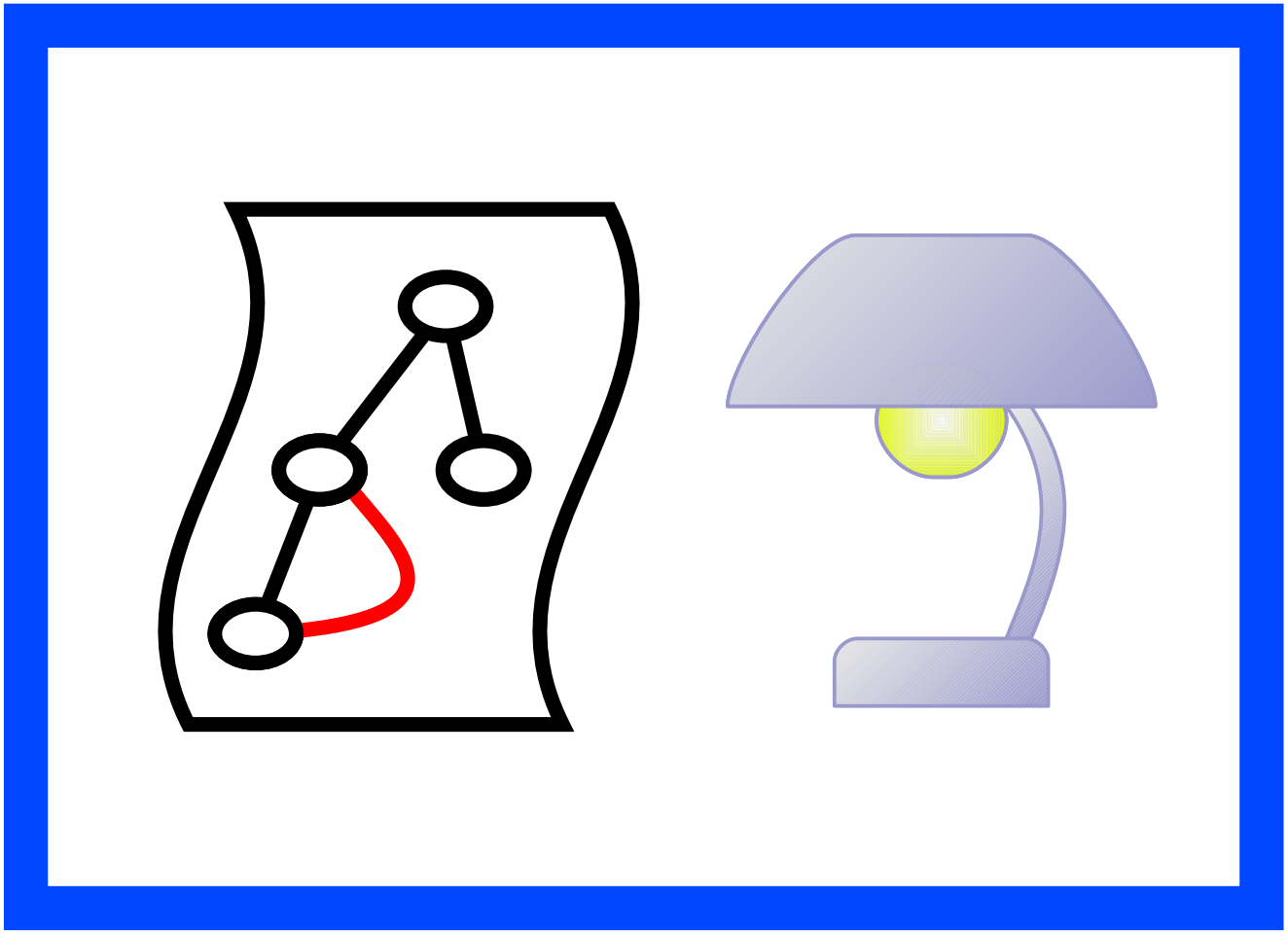


As state of current interaction

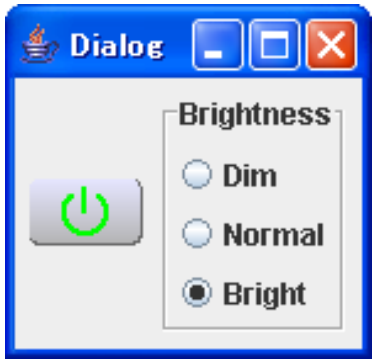
Difference information



Change log



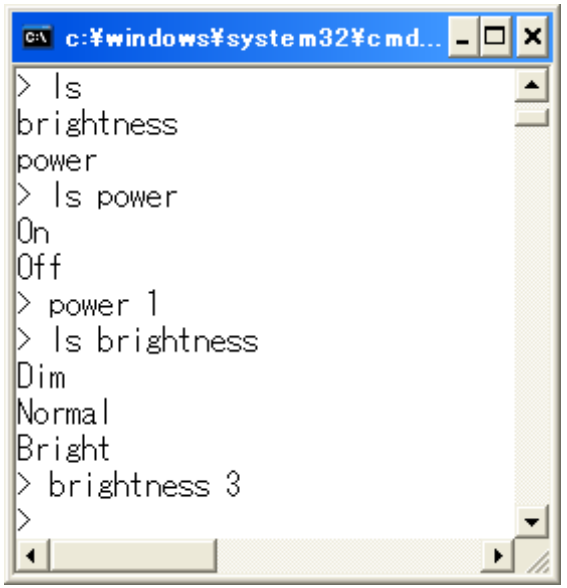
Implementation



GUI

Desk Lamp

Mobile



CLI

Conclusion

- Proposal
  - Interface Client/Logic Server (ICLS)
  - Abstract Interaction Description Language (AIDL)

takty@main.ist.hokudai.ac.jp

References

1. Harmonia, “Tutorial booklet December,” 1997.
2. H. Okada and T. Asahi, “PC remote controller based on user interface transformation,” The Transactions of Human Interface Society, 2002.
3. S. Nylander and M. Bylund, “The ubiquitous interactor–universal access to mobile services,” in HCII 2003.
4. S. Nylander, M. Bylund, and A. Waern, “The ubiquitous interactor–device independent access to mobile services,” in CADUI’2004.
5. J. Nichols, B. A. Myers, M. Higgins, J. Hughes, T. K. Harris, R. Rosenfeld, and M. Pignol, “Generating remote control interfaces for complex appliances,” in UIST 2002.
6. J. Nichols, B. A. Myers, and K. Litwack, “Improving automatic interface generation with smart templates,” in IUI 04, 2004.
7. E. Miller, R. Swick, and D. Brickley, “Resource Description Framework (RDF).”
8. E. Miller, R. Swick, D. Brickley, B. McBride, J. Hendler, G. Schreiber, D. Wood, and D. Connolly, “W3C Semantic Web,” 2001.
9. FOAF, “The Friend of a Friend (FOAF) project.”