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# Apply Human Intelligence to Future Generation Network

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# Problems with Service Provision

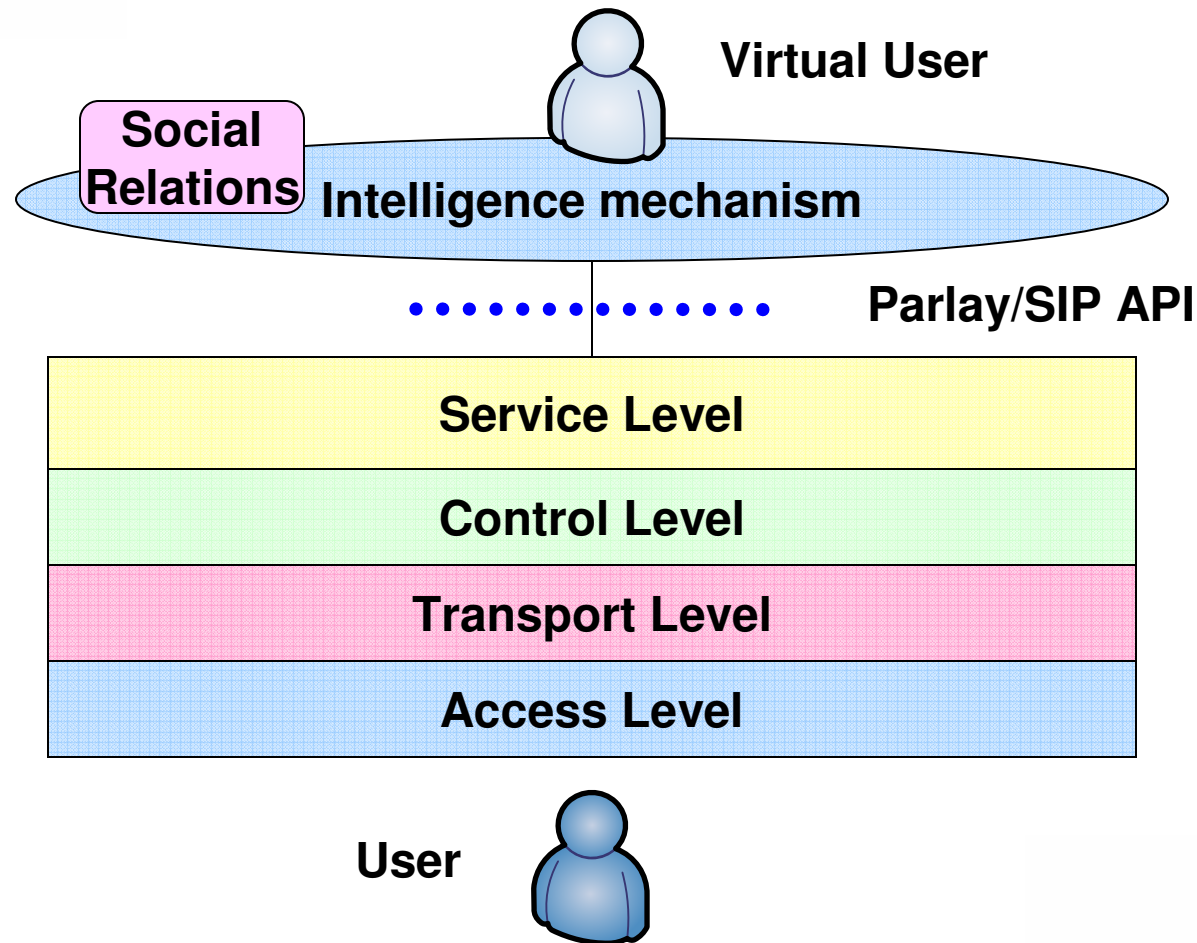
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Important issues of service management are missed out in current networks:

- Users' social relations with other users
  - Communications happen between at least two related people
  
- Heavy communication burden
  - More available communication terminals
  - Easily failed calls



# Apply Human Intelligence to NGN

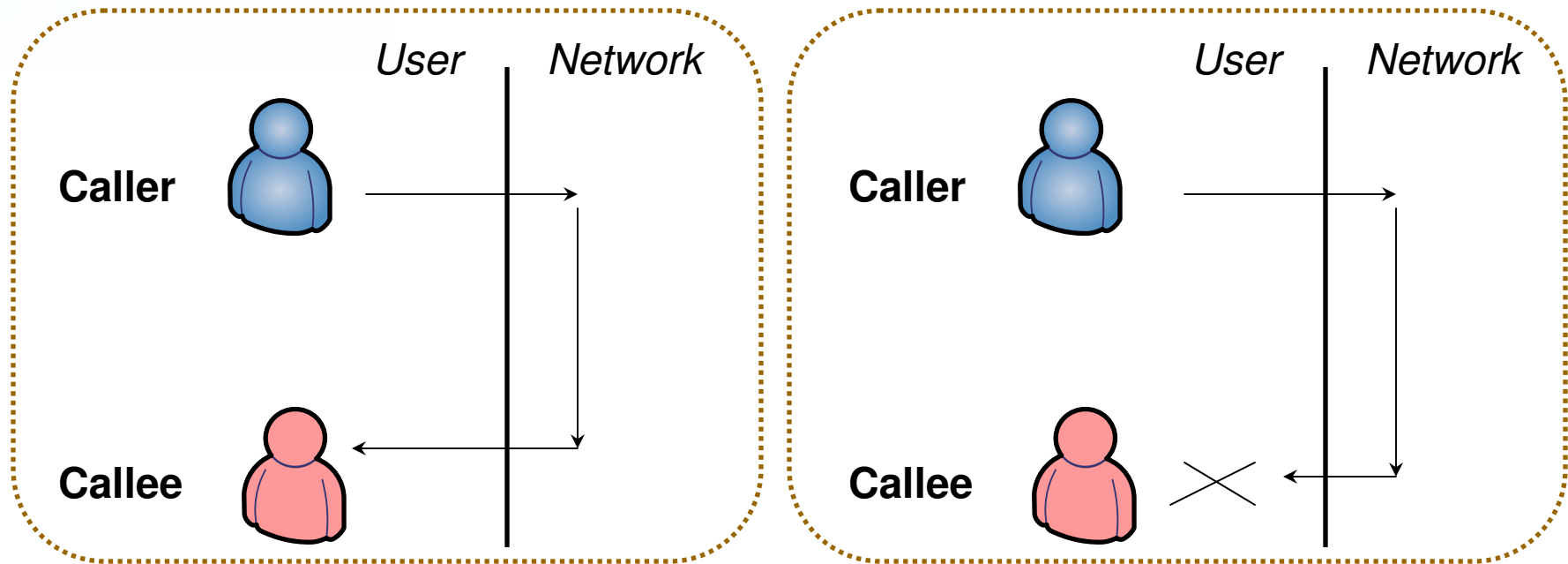


# Apply Human Intelligence to NGN

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- Set a **virtual user** within network to work for a real user;
- Apply **human intelligence** to the virtual user to deal with communication sessions;
- Consider **users' social relations** when processing services;
- Connect to service level via SIP API to match a general NGN architecture.

# High-level Design – Case One

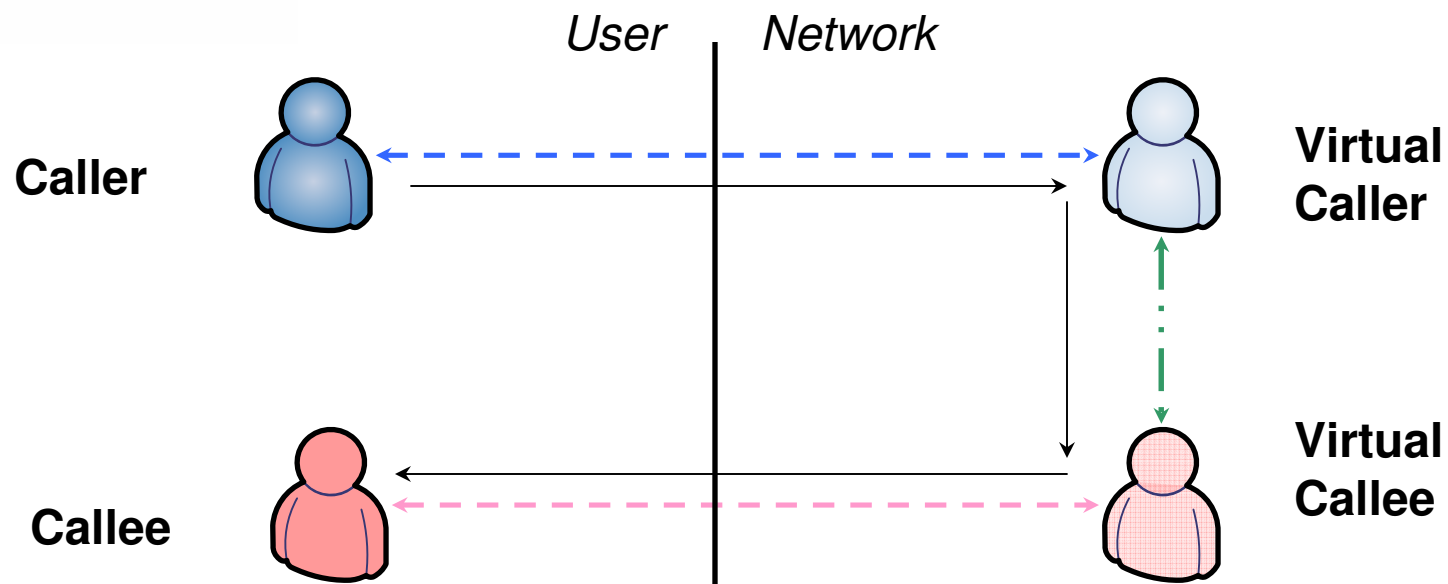


Before setting virtual users:

- The call from a caller to a callee will go through User-Network-User;
- Assume network works properly, if the callee is not available, the call will still fail.



# High-level Design – Case One

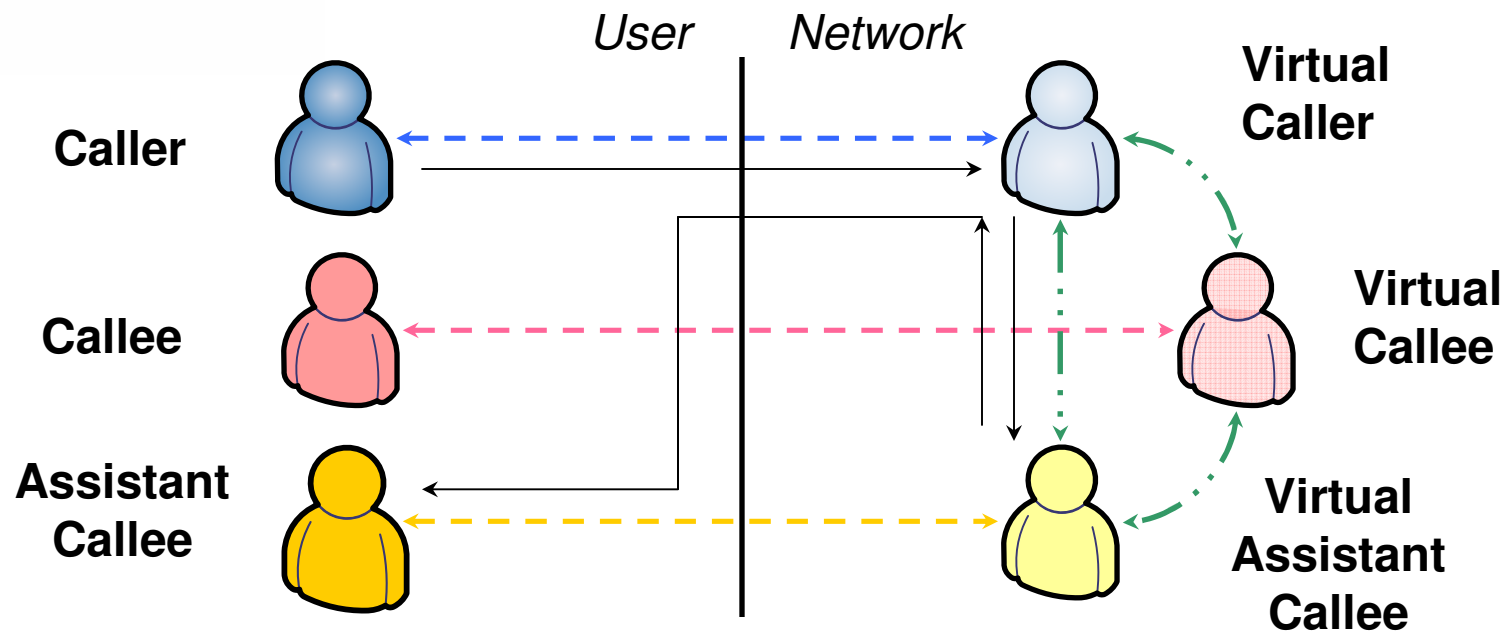


After setting virtual users, a call will be set up via the following steps:

- **Caller** (real user) first contacts virtual caller;
- then virtual caller will check with virtual callee on whether **callee** is available;
- If yes, a call will be set up between **caller** and **callee**.



# High-level Design – Case Two

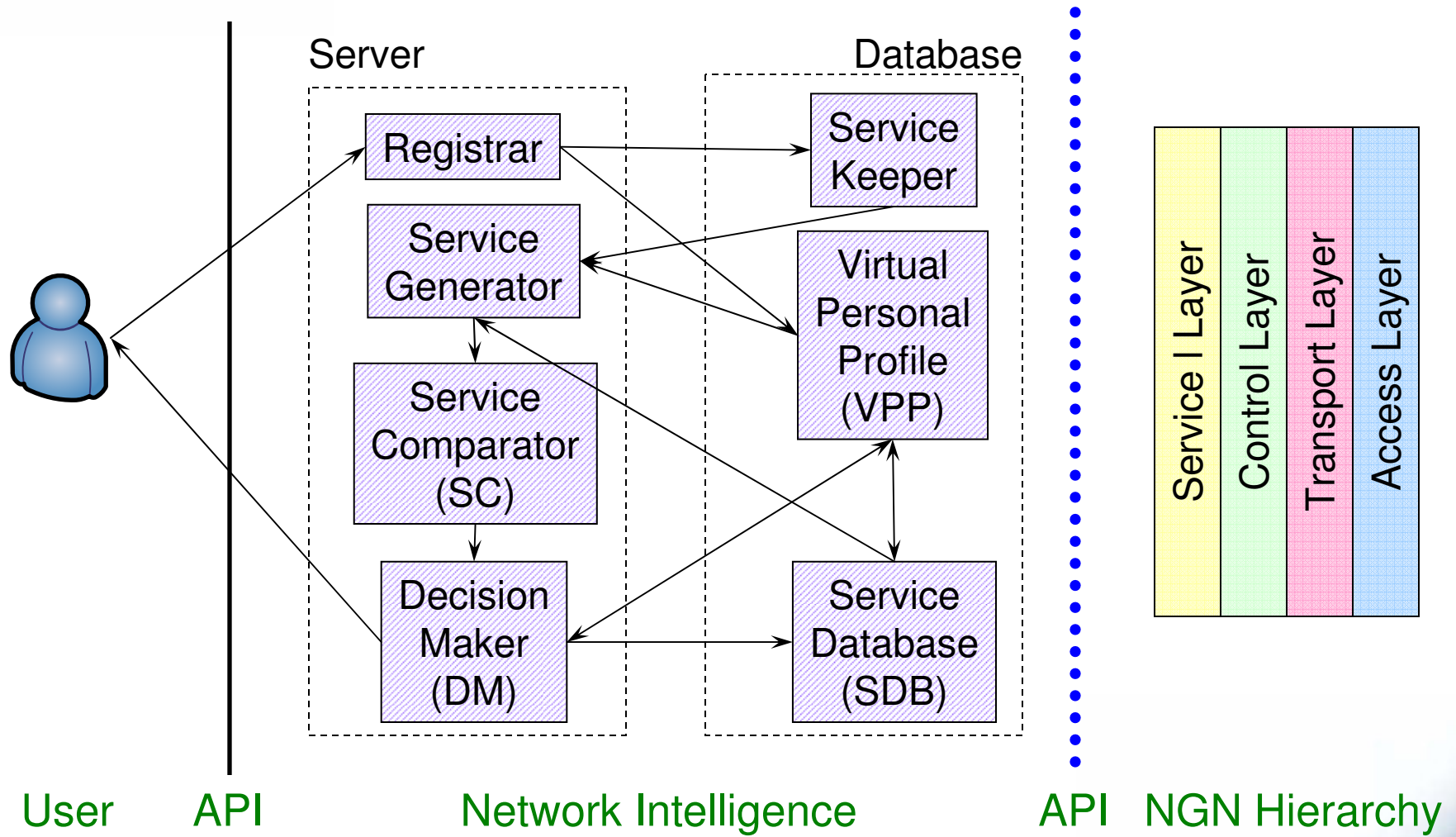


Procedure with a 3-party call:

- **Caller** initiates a call and the call goes to virtual caller;
- Virtual caller first checks with virtual callee and find **callee** busy;
- Virtual callee further contact virtual assistant callee for help;
- Virtual assistant callee finds **assistant callee** available;
- A call will finally be set up between **caller** and **assistant callee**.



# Functional Design





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# Functional Design – Entity Definition

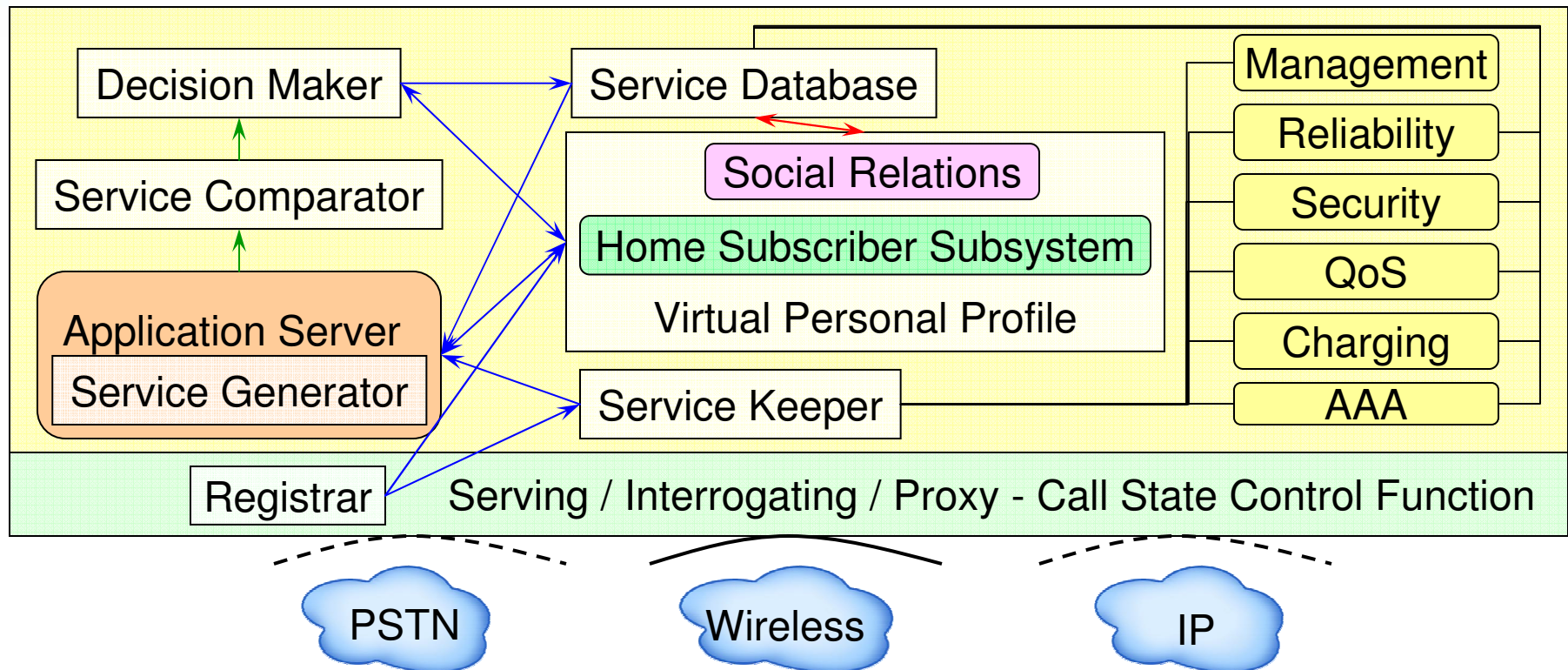
- Registrar : Registers a service by characteristics
- Service Keeper : Keeps all current services by characteristics
- Virtual Personal Profile (VPP) : Keeps users' personal communication profiles
- Service Generator : Generates a virtual service by combing service characteristics and users' VPP
- Service Comparator : Compares service performance
- Decision Maker : Decides how to deal with a service
- Service Database : Keeps temporarily failed services



# Functional Design – Flow Chat

- 1) Initiate a service session;
- 2) Register a service;
- 3) Generate original service;
- 4) Generate new service (required service);
- 5) Compare the above two services;
- 6) Decide how to do with the session:
  - ❑ Pass without any condition;
  - ❑ Pass with caller's permission;
  - ❑ Postpone till callee changes to be free;
  - ❑ Ask third-party for help;
  - ❑ Turn to third-party to learn on how to deal with the service.

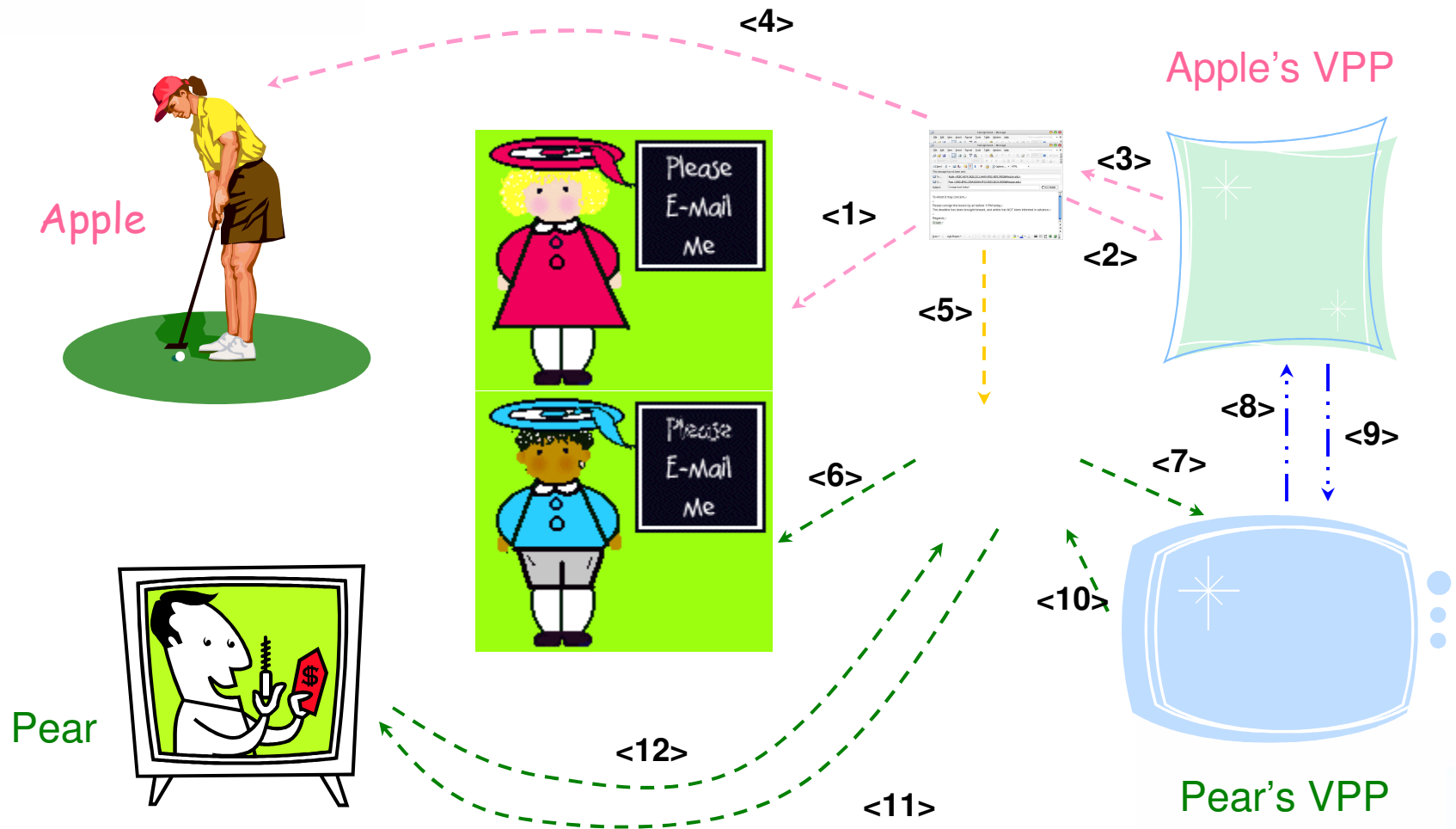
# Apply Intelligence on IMS



Reasons for implementing human intelligence on IMS testbed:

- 1) IMS is a practical model of general NGN concept
- 2) IMS emphasizes on services and thus provides interfaces for intelligence

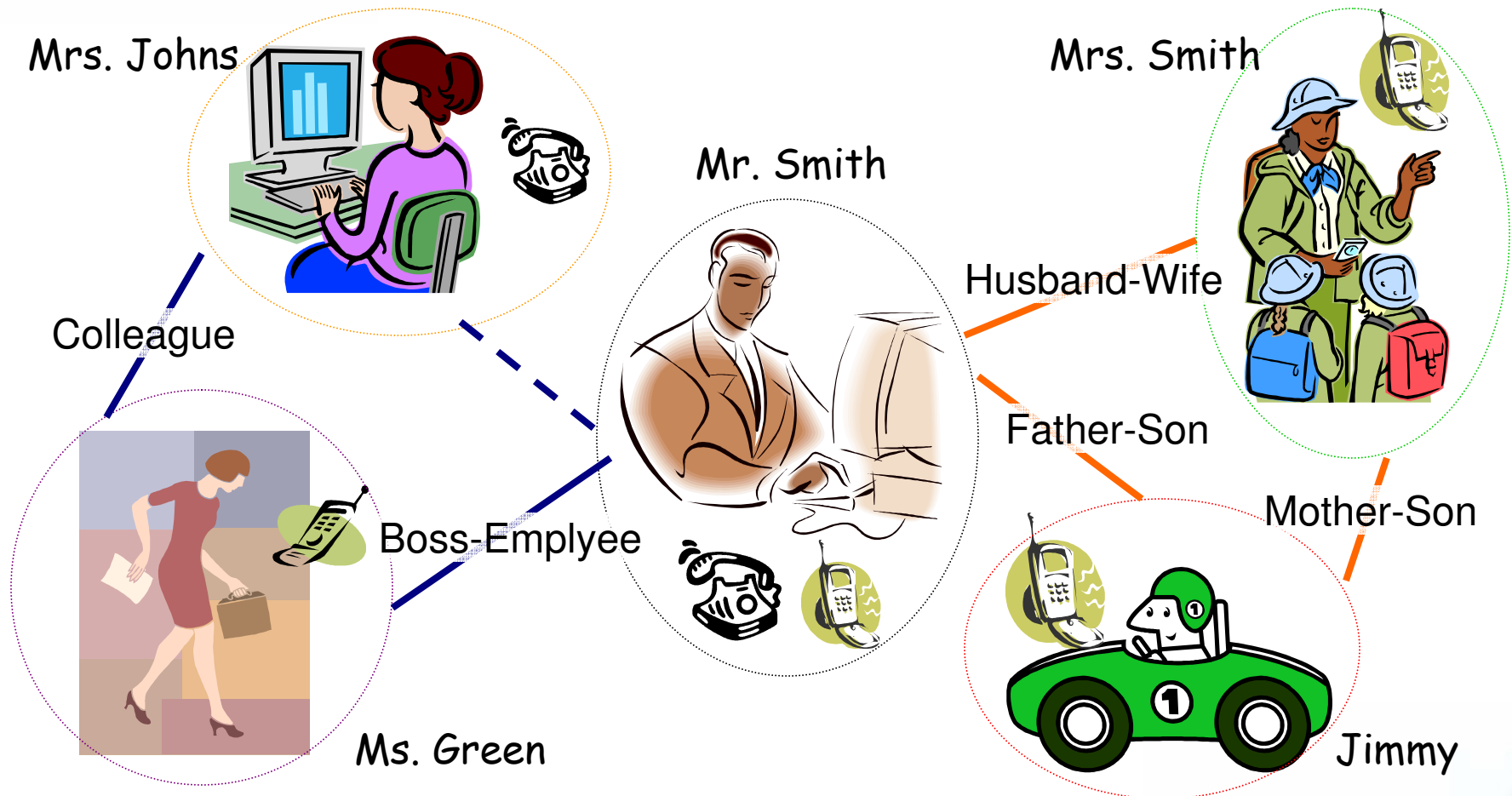
# Live Example 1 – Successful service



# Live Example 1

- Mr. Pear is Ms. Apple's new assistant;
- An urgent email is sent to Apple and copied to Pear;
- If both Apple and Pear do not reply in 5 minutes, the service will first turn to Apple's VPP;
- If Apple's VPP indicates to call Apple, network will call Apple;
- If Apples does not answer the call, the service will turn to Pear's VPP;
- If Pear's VPP does not know how to deal with an urgent email, but it does know learning office rules from Apple;
- Pear's VPP will learn from Apple's VPP;
- Pear's VPP will indicate network to call Pear;
- If Pear picks up the call, the service succeeds.

# Live Example 2 – Social Relations



# Live Example 2

- Mr. Smith & Mrs. Smith – Family & Equal
  - Mrs. Smith takes up service when Mr. Smith fails
- Mr. Smith & Jimmy – Family & Leveled
  - Deliver service to Jimmy with Smith's permission
- Mr. Smith & Ms. Green – Colleague & Leveled
  - Postpone service to Mrs. Green if not urgent
  - Mrs. Green turn to others if urgent
- Ms. Green & Mrs. Johns – Colleague & Equal
  - Turn to Mrs. Johns for help if urgent
  - Learn from Mrs. Johns when no experience



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# Thank you.

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