Apply Human Intelligence to Future Generation Network

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Problems with Service Provision

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

Virtual User

Social Relations

Intelligence mechanism

Service Level

Control Level

Transport Level

Access Level

Parlay/SIP API

User
Apply Human Intelligence to NGN

- 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**.
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 finds **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**.
Database

Virtual Personal Profile (VPP)

Service Comparator (SC)

Service Generator

Decision Maker (DM)

Registrar

Service Keeper

Virtual Personal Profile (VPP)

Service Database (SDB)

Functional Design
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. Caller -> Service Keeper
2. Service Keeper -> Registrar
3. Registrar -> VPP_Caller
4. VPP_Caller -> VPP_Callee
5. VPP_Callee -> VPP_Assistant
6. Caller Or Assistant Callee -> Generated Service
7. Generated Service -> Service Comparator
8. Service Comparator -> Decision Maker
9. Decision Maker -> Created Service
10. Created Service -> Service Database

Flow Chat:
- 1: Caller
- 2: Service Keeper
- 3: Registrar
- 4: VPP_Caller
- 5: VPP_Callee
- 6: VPP_Assistant
- 7: Generated Service
- 8: Service Comparator
- 9: Decision Maker
- 10: Created Service
- 11: Service Database
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

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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

- Mrs. Johns
- Mr. Smith
- Mrs. Smith
- Ms. Green
- Jimmy
- Husband-Wife
- Father-Son
- Mother-Son
- Colleague
- Boss-Employee
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
Thank you.

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