VoIP and ENUM in Japan

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VoIP

Trends in Communication Market in Japan

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Drivers

- **Change of Regulation**
    - **Privatization of Public Telecom Corporation**
    - **Relaxation of Regulation**
- **Evolution of Devices**
    - **Small, Wireless, High-functioned (e.g., mobile phones with cameras)**
- **Popularization of Internet and IP Technology**
   - **From Circuit Exchange to Packet Data Exchange**

History

~Sept.1987	only NTT provided public telephone services
First half of 1990s	communication cost decreased rapidly by competition
Latter half of 1990s	share of mobile phones grew rapidly subscribers of mobile phones overtook PSTN in March 2000
2000~	broadband including IP telephony grew rapidly

individual IP telephone service providers ==> a couple of groups
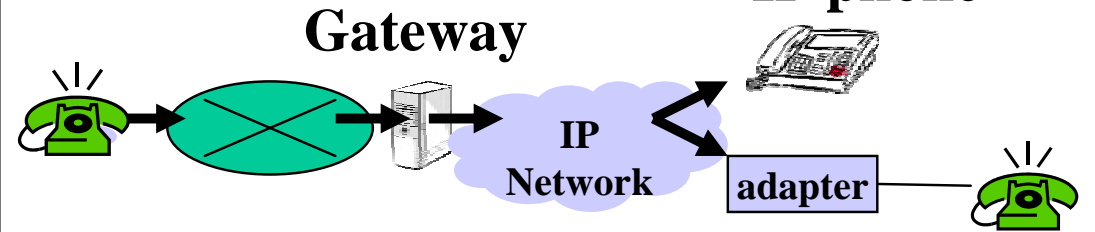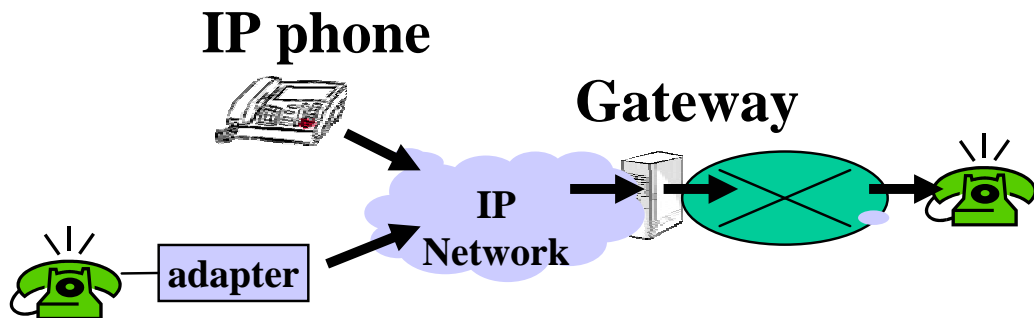
Patterns of IP Phones
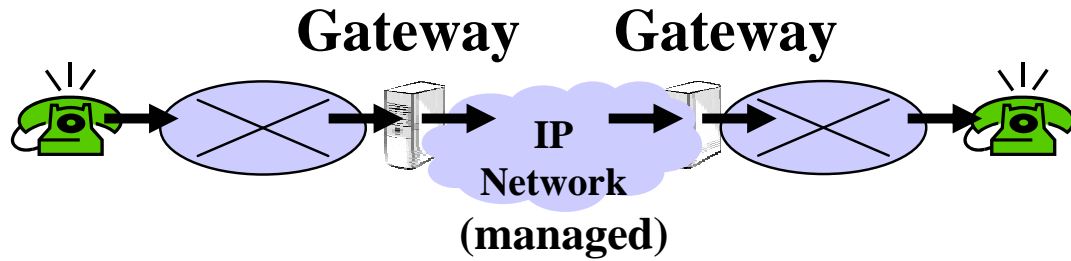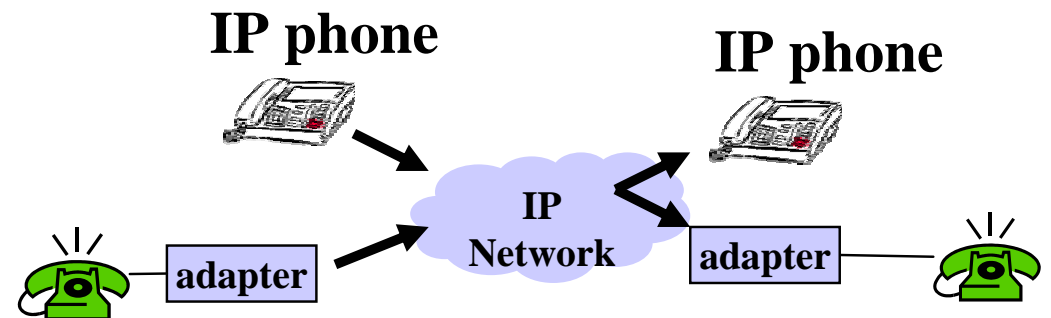
IP Telephony and Quality Classes

	Class A (PSTN quality)	Class B (mobile quality)	Class C
General voice transmission quality rate (R)	>80	>70	>50
End-to-end delay	<100ms	<150ms	<400ms
(reference value) Call failure rate (connection quality)	0.15	0.15	0.15

*R value and delay values are considered satisfactory when 95% of the samples are satisfied

- 'Class C' is a must
- ISP alliance for IP phone services proposes
   'Class B' for end-to-end communication quality

050-xxxxxxxx are being assigned to IP phones so that PSTN users can make calls to IP phones.

* prefix 050 is an easily recognized code for IP Phone

IP Phone Numbering Structure

050-CDEF-GHJK

IP phone   Assigned to service provider   Assigned to subscriber

MPHPT has assigned 9 million 050 phone numbers to service providers

- **PSTN=>IP phone : in service from fall 2003**
- **IP phone=>IP phone : in service**

Number of IP Phone Users

end of 2002	2.27 million
2007 (estimated)	22.73 million

Other relevant statistics (as of Q1 2003)

population	127 million
number of households	47 million
PSTN subscribers	61 million
mobile subscribers	75 million
Internet users	70 million
broadband users	20 million
broadband subscribers	7.8 million

source   MPHPT : White Paper "Information and Communications in Japan", NTT East, NTT West

Communication Charges

		Yen	US$
\<PSTN\>	**local**	**8.5 / 3min**	**0.08 / 3min**
	domestic long distance	**80 / 3min**	**0.73 / 3min**
	to US	**180 / 3min**	**1.6 / 3min**
	to Korea	**360 / 3min**	**3.3 / 3min**
\<IP to IP\>	**free of charge**		
\<IP to PSTN\>	**domestic**	**8 / 3min**	**0.07 / 3min**
	to US	**24 / 3min**	**0.23 / 3min**
	to Korea	**90 / 3min**	**0.82 / 3 min**
(other data)			
	PSTN basic fee	**2000 / month**	**18 / month**
	ADSL additional fee	**3500 / month**	**32 / month**
	100M Fiber	**< 10000 / month**	**< 91 / month**
	CATV	**< 10000 / month**	**< 91 / month**

- **Emergency calls**
  - under technical investigation ➔ emerging
- **Caller ID notification form IP phones**
  - just in service
- **Call from PSTN or mobiles to IP phones**
  - just in service
- **Call among IP phone service providers**
  - Interconnected among providers in the same group
    - Several groups
  - Japan ENUM Study Group
  - ENUM Trial Japan
- **Call during Power failure**
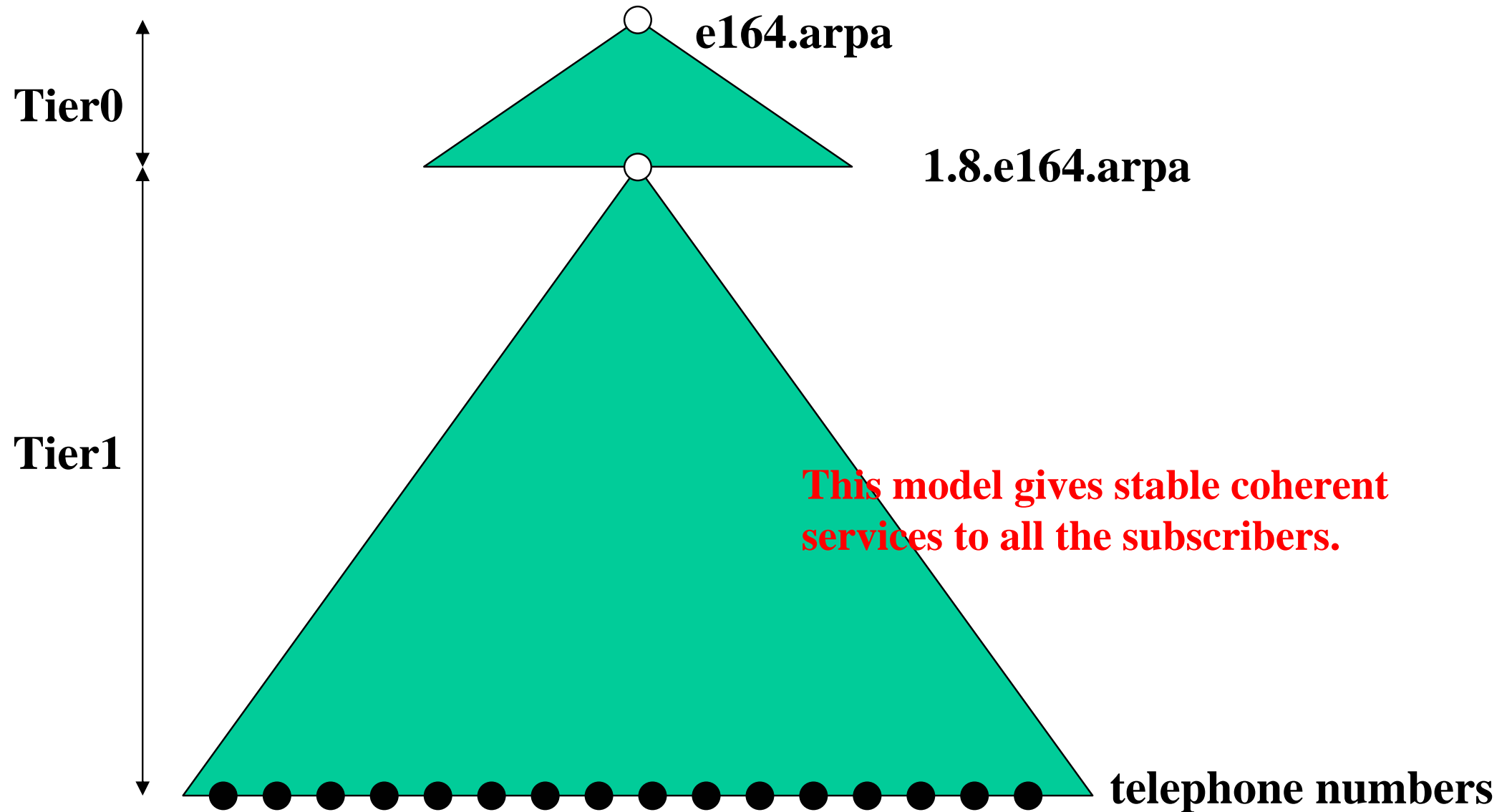
ENUM

- ENUM Study Group & ENUM Trial Japan -

- **Established**
  - **September 2002**

- **Objectives**
  - **Understanding the ENUM technology : desk work**
  - **Studying the implementation and operation of the ENUM–based system, and related matters**
  - **Finding political/regulatory issues related to ENUM-based implementation and operation**
  - **Finding technological issues related to ENUM**
  - **Clarifying pros and cons in ENUM usage**

- **Target of the study**
  - **ENUM technology**
  - **Related technology such as DNS URI DDDS**

- ## Tier structure and DNS zone structure
  - ### Country dependent
  - ### Existing structures of Telecom and Internet-related industry should be considered and a new combined/compromised structure may be necessary to utilize ENUM

- ## Recommendation
  - ### Boundary between Tier0 and Tier1 is 1.8.e164.arpa
    - as +81 is used for subscribers if and only if in Japan
  - ### Boundary between Tier1 and Tier2 has some options
    - Examples are shown in next pages

Boundary between Tier1 and Tier2 (model1)
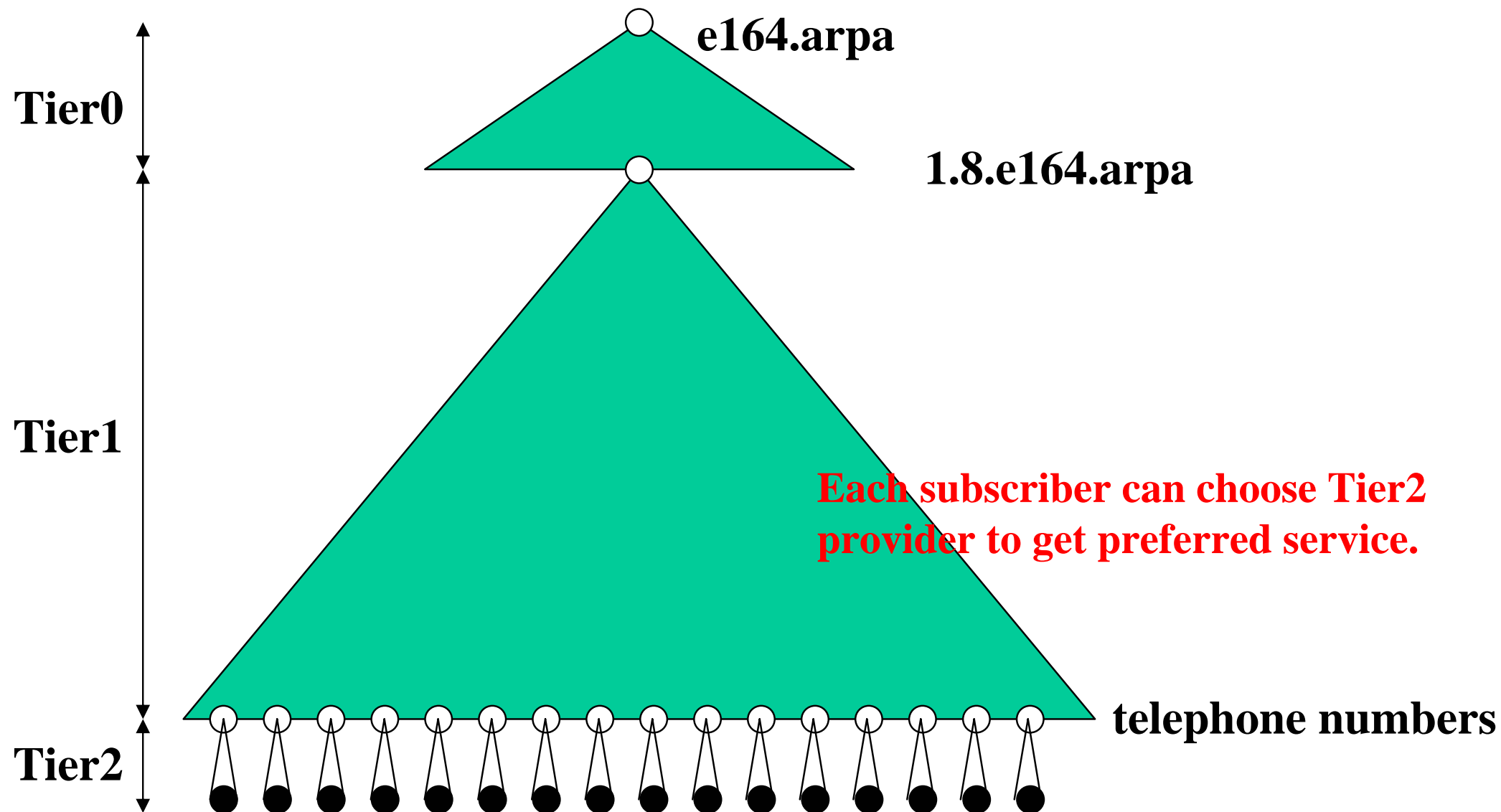
Tier1 has phone numbers in full and no Tier2 is introduced

Tier0

Tier1

e164.arpa

1.8.e164.arpa

This model gives stable coherent services to all the subscribers.

telephone numbers

○ **NS record**　　●**NAPTR record**

Boundary between Tier1 and Tier2 (model2)

Tier1 has phone numbers in full and Tier2 handles a NAPTR record of each number.

e164.arpa

Tier0

1.8.e164.arpa

Tier1

Each subscriber can choose Tier2 provider to get preferred service.

telephone numbers

Tier2

○ **NS record**   ● **NAPTR record**

Boundary between Tier1 and Tier2 (model3)

Boundary corresponds to the chunks (10,000 numbers) assigned to Telecom providers.

Tier0

e164.arpa

1.8.e164.arpa

Tier1

Telephone provider and Tier2 registry can be the same, in which case the management of users may be efficient.

050xxxx   050yyyy   090zzzz

Tier2

. . .

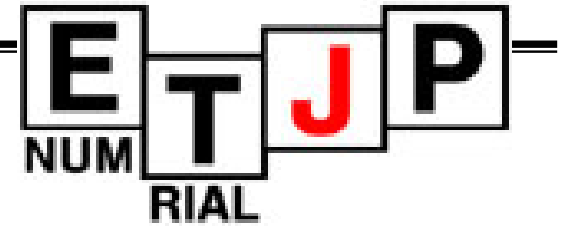**telephone numbers**
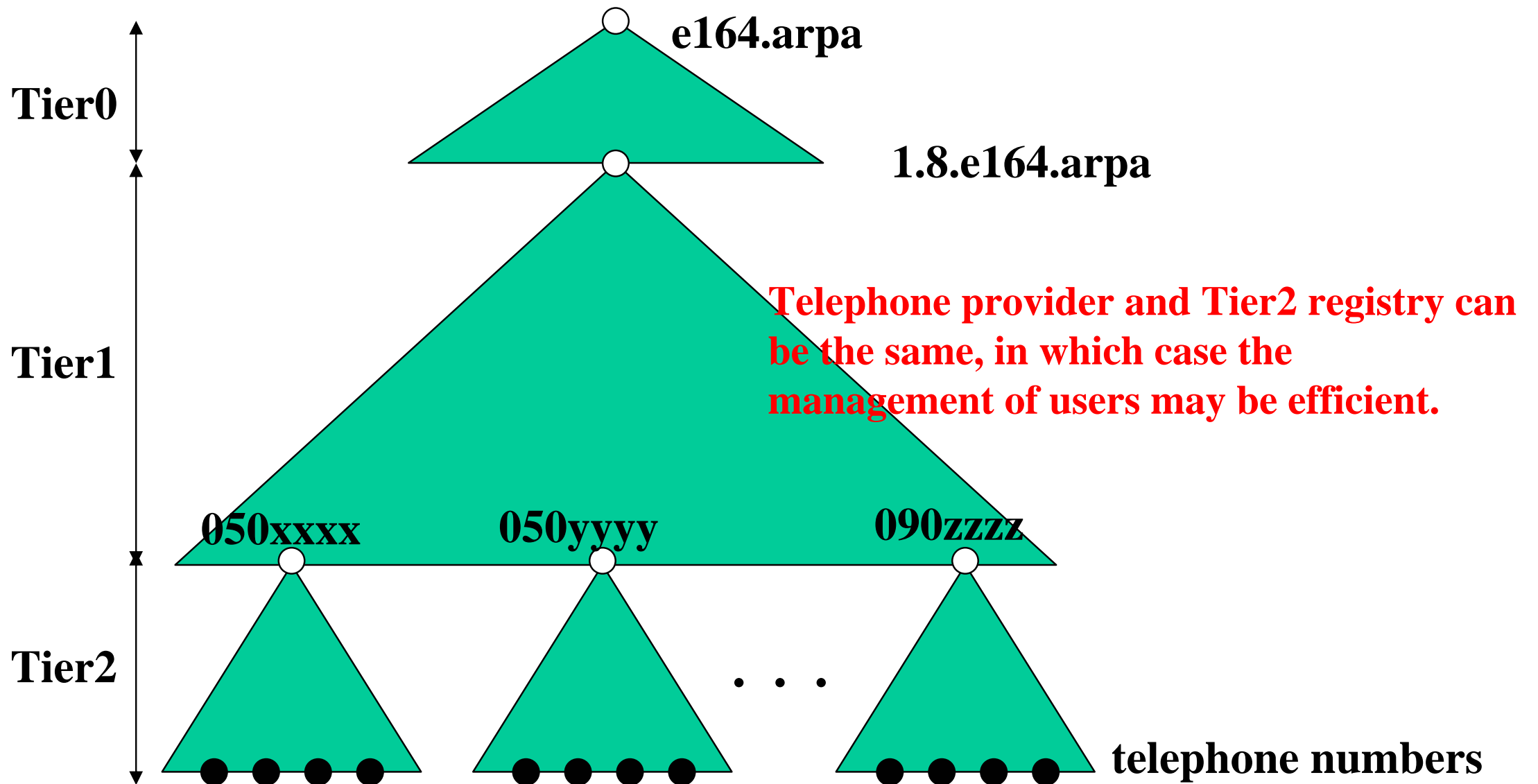
○ NS record   ●NAPTR record

Boundary between Tier1 and Tier2 (model4)

Tier1 is divided into groups corresponding to chunks, each represents a phone service for example.
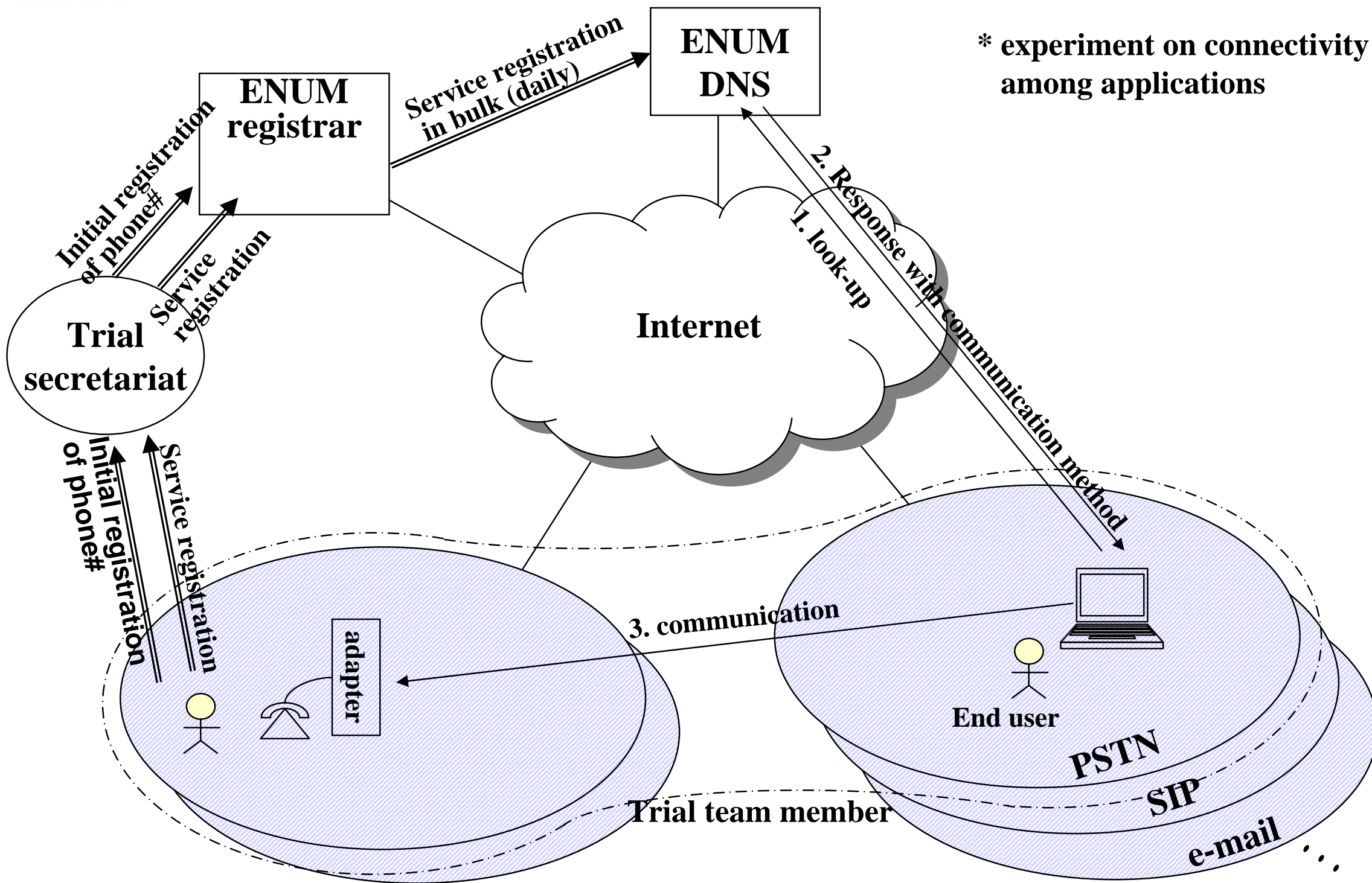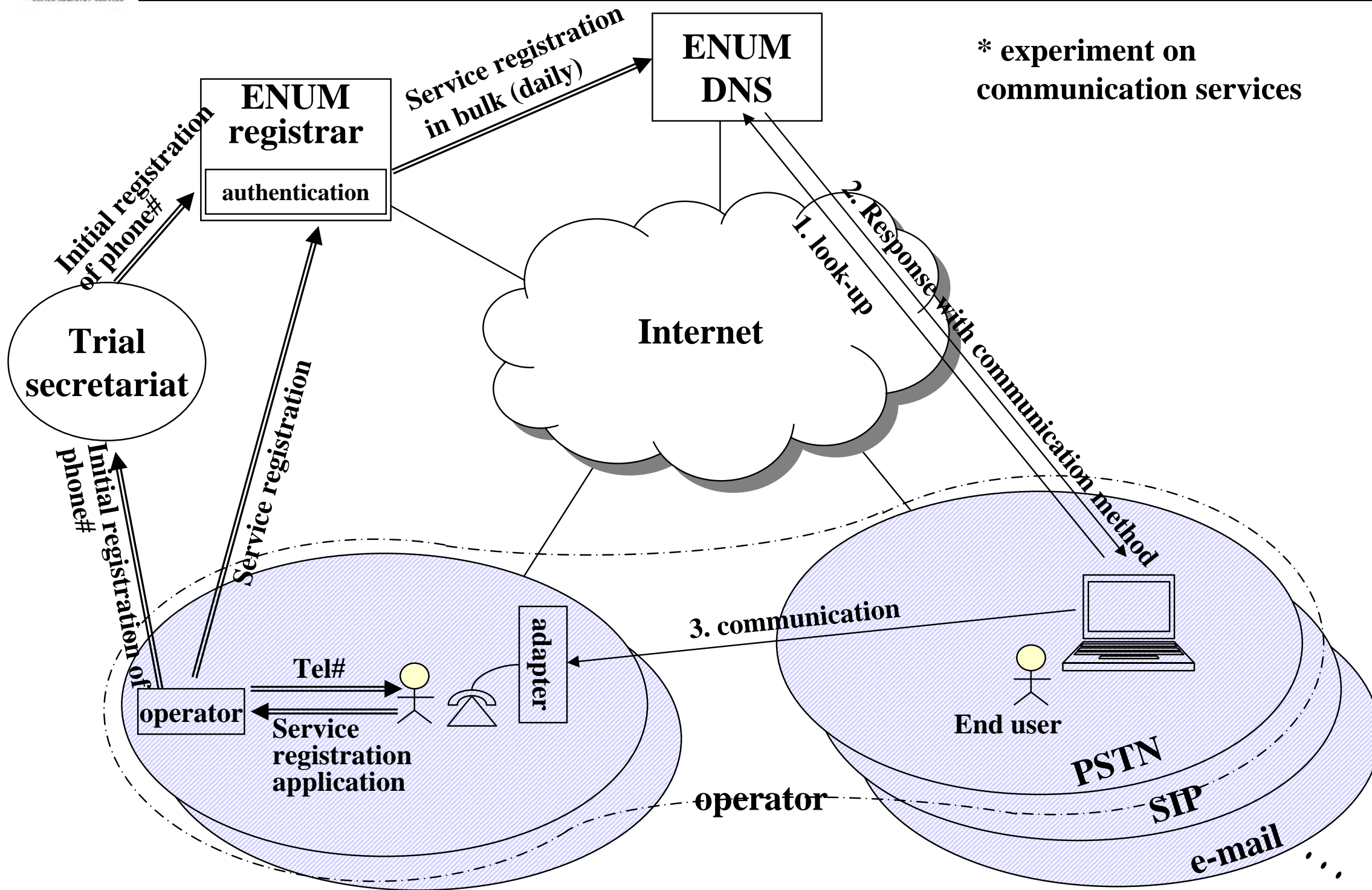

Tier0

Tier1

Tier2

e164.arpa

1.8.e164.arpa

for example, 050 for IP phones and 090 for mobile phones

050

090

050xxxx

050yyyy

090zzzz

. . . .

telephone numbers

○ NS record ● NAPTR record

ENUM Trial Japan (ETJP)
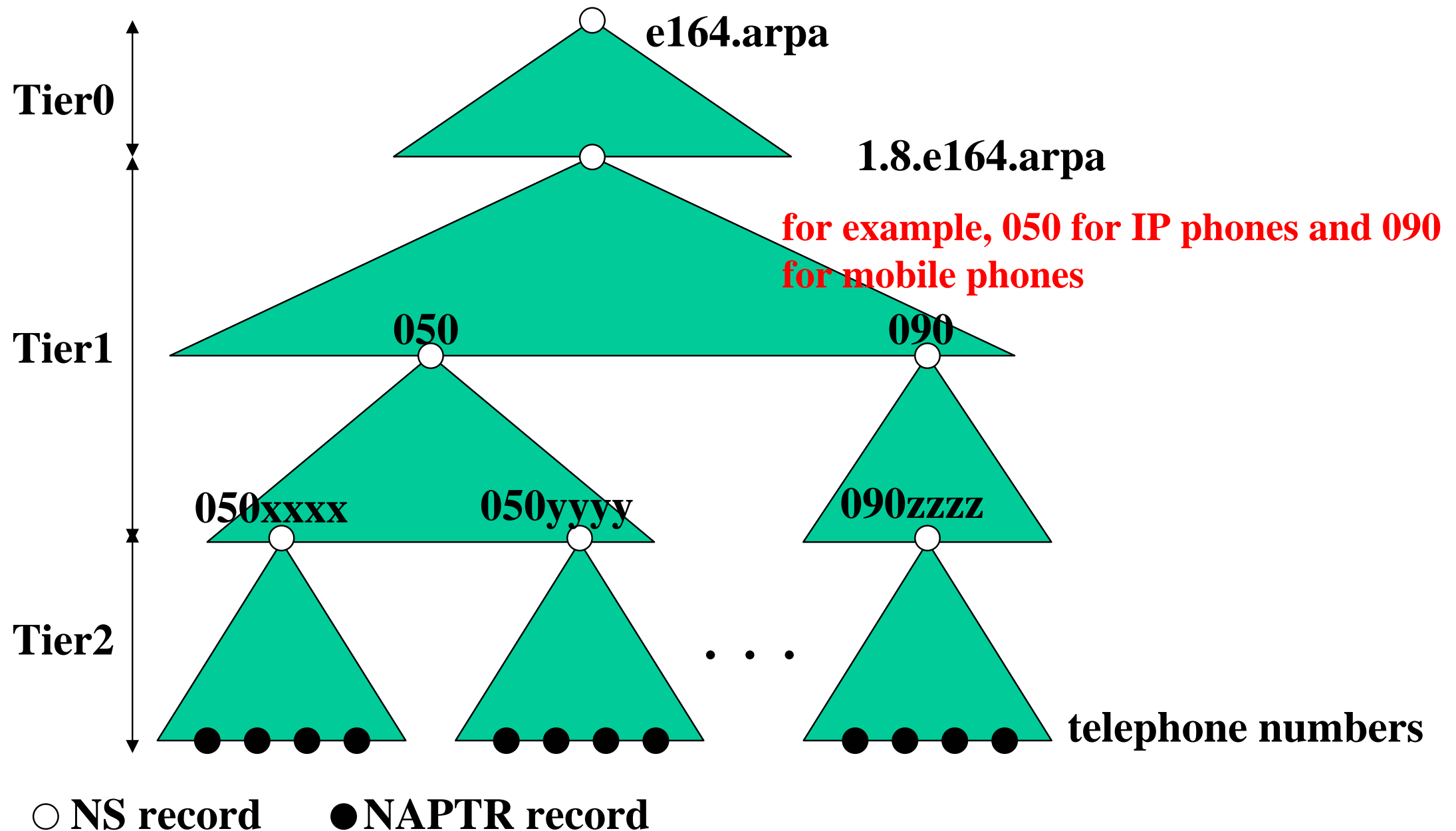
- **Established**
  - **on 17 September 2003   (1 year activity)**
- **Purpose**
  - **Perform ENUM trials to ensure functioning and feasibility of basic technical facility**
  - **Demonstration of technology for international use**
  - **Accumulation of know-how on ENUM and sharing of it among participants**
- **Activities**
  - **DNS operation for ENUM Trial**
  - **Feasibility test of communication applications (device, software) using ENUM**
  - **Feasibility test of communication services**
- **Results**
  - **Results of technical verification**
    - **Communication devices and software provided by participants**
    - **Communication services**
  - **Clarification and consideration of relevant issues**

- **Participants**
  - **Companies, organizations, and individuals who hope to contribute to ETJP activities**
  - **Number of members: 39 (as of October 27, 2003)**
- **Officers**
  - **Chairman**
    - **Shigeki Goto**

      Japan Network Information Center (JPNIC)/Waseda University
  - **Vice chairman**
    - **Hirofumi Hotta**

      Japan Registry Service Co., Ltd.(JPRS)
    - **Yoshiki Ishida**

      WIDE Project

ENUM trial (phase1)

* experiment on connectivity among applications

ENUM registrar

ENUM DNS

Service registration in bulk (daily)

Initial registration of phone#

Service registration

Trial secretariat

Internet

1. look-up

2. Response with communication method

Initial registration of phone#

Service registration

adapter

3. communication

End user

PSTN

SIP

e-mail

Trial team member

ENUM trial (phase2)

ENUM trial (phase3)

operator C

ENUM registrar

authentication

ENUM DNS

Service registration in bulk (several times a day)
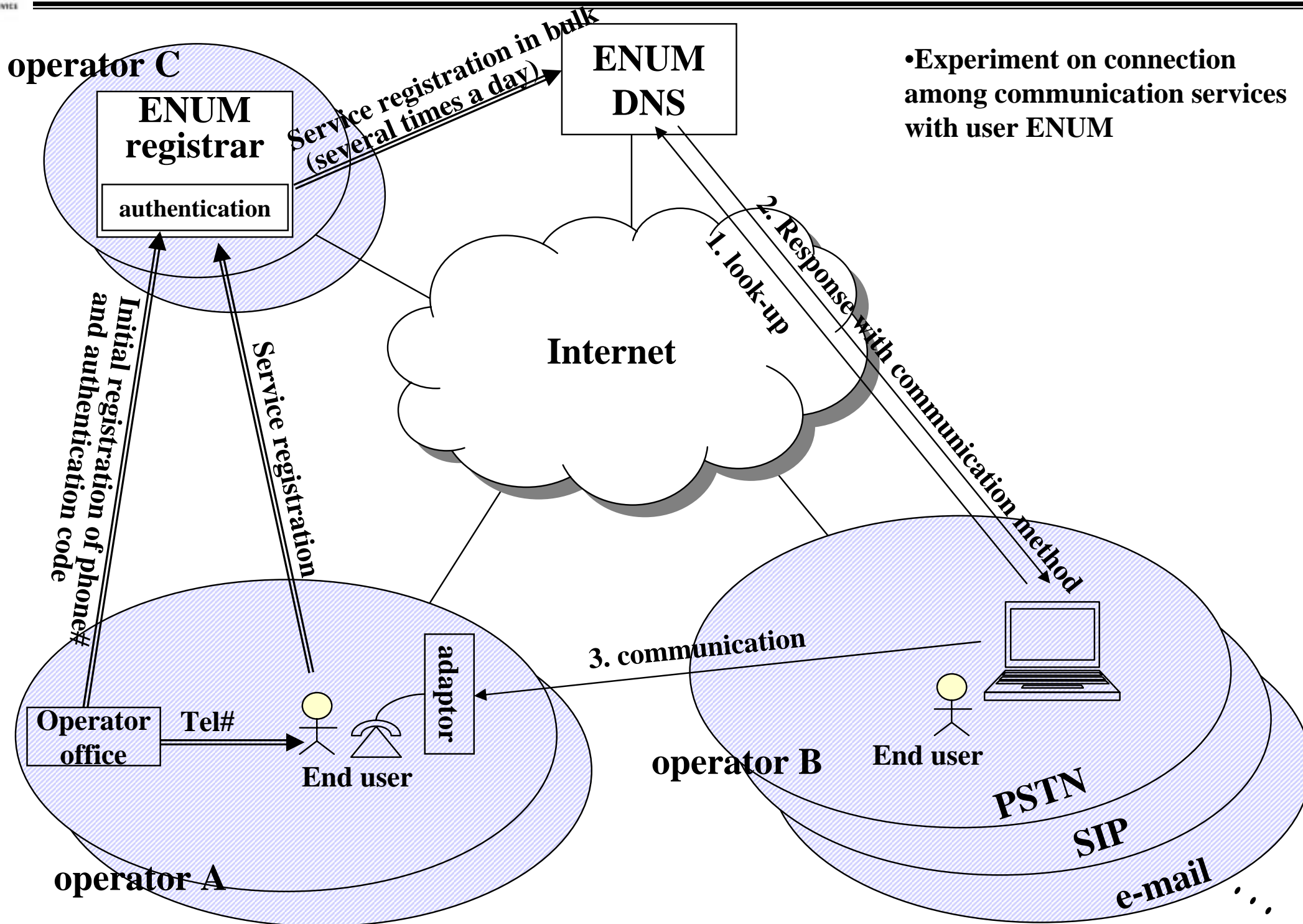
•Experiment on connection among communication services with user ENUM

Initial registration of phone# and authentication code

Service registration

Internet

1. look-up

2. Response with communication method

Operator office

Tel#

adaptor

3. communication

operator B

End user

End user

operator A

PSTN

SIP

e-mail

Proposal of a survey

What survey?

"Numbering Plan" very much affects the "ENUM Tier model"

(= DNS zone delegation structure)

proposal

- ## In considering appropriate numbering rules for IP Telephony and ENUM

  - **Information sharing about the numbering plans for IP phones in each country/economy is useful to decide**
    - **Telephone Numbering Plan appropriate for ENUM-based services**
    - **Appropriate ENUM Tier structure**

- ## How to conduct survey

  - **Send out Questionnaires to cctld-discuss list**
  - **Responds are collected and put into a report**
  - **Send the report back to responders**

1. How is the framework of the numbering rule in your country/economy?

    (1)Title of the regulation/legislation

    _____

    (2)Reference URL of the regulation/legislation:

    _____

    (3)The regulation/legislation is developed by:

    _____

    (4)The regulation/legislation is administered by:

    _____

    (5)Prefixes:

      For Geographic use _____

      For Cellular phone _____

      For Toll free phone _____

      For IP Telephony _____

2. Do you have a number space for IP telephony?

2-1. If not yet defined;

__ It is under consideration.

__ We do not plan to define the number dedicated to IP telephony service.

2-2. If you have the exclusive number space for IP telephony service;

(1)Is it easily recognized code?

__ Yes

__ No

(2)Is it for geographic use?

__ Yes

__ No

2-3. If the number for IP telephony is defined in the existing numbering rule;

(1)Which number space is used? _____

(2)Is it easily recognized code?

__ Yes

__ No

(3)Is it for geographic use?

__ Yes

__ No

3. Do you have a number space for ENUM trial?

3-1. If not yet defined;

    __ It is under consideration.

    __ We do not plan to define the number for ENUM trial.

3-2. If you have the exclusive number space for ENUM trial;

  (1)Is it easily recognized code?

    __ Yes

    __ No

  (2)Is it for geographic use?

    __ Yes

    __ No

3-3. If the number space for ENUM trial is defined in the existing

    numbering rule;

  (1)Which number space is used? _____

  (2)Is it easily recognized code?

    __ Yes

    __ No

  (3)Is it for geographic use?

    __ Yes

    __ No

  (4)What are the criteria for operators who are allocated such numbers?

    _____

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4. Do you have a number space for ENUM service?

4-1. If not yet defined,

   __ It is under consideration.

   __ We do not plan to define the number for ENUM service.

4-2. If you have the exclusive number space for ENUM service;

   (1)Is it easily recognized code?

     __ Yes

     __ No

   (2)Is it for geographic use?

     __ Yes

     __ No

4-3. If the number space for ENUM service is defined in the existing numbering rule;

  (1)Which number space is used? _____

  (2)Is it easily recognized code?

     __ Yes

     __ No

  (3)Is it for geographic use?

     __ Yes

     __ No

  (4)What are the criteria for operators who are allocated such numbers?