
**Dept of State ITAC-T Advisory Committee SG-A Ad Hoc Meeting on ENUM
March 28th & 29th, 2001
ENUM CONTRIBUTION**

TITLE: ENUM architecture issues.

DATE: March 28th, 2001.

SOURCE: Telcordia Technologies, Inc.

ABSTRACT: This contribution addresses ENUM architectural issues raised at the SG-A Ad Hoc ENUM meeting held on February 12th, 2001.

NOTICE:

This document is offered to the SG-A Ad Hoc on ENUM as a basis for discussion and is not a binding proposal on Telcordia Technologies, Inc. Telcordia Technologies, Inc. specifically reserves the right to amend or withdraw the statements contained herein.

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Issue statement

Quote from SG-A February 12-13 ad hoc :

“What is the overall architecture/hierarchy?”

With multiple providers what are the functions, definitions, relationships, and flows between:

- Registries
- Registrars
- NAPTR (T2) Providers
- Telephone Service Providers
- Application Service Providers
- End Users

How can interconnection between multiple entities be efficiently accomplished?

What kinds of tools and mechanisms are necessary?”

Purpose of this contribution

- Observations:
 - ENUM contributions differ in terms, definitions, functional groupings
 - ENUM contributions are text-centric
- Purpose of this contribution:
 - stimulate contributions on terms, definitions, functional groupings, and flow pictures
 - point to key items
- Benefit of developing this approach:
 - Increased effectiveness of our joint work

Contents

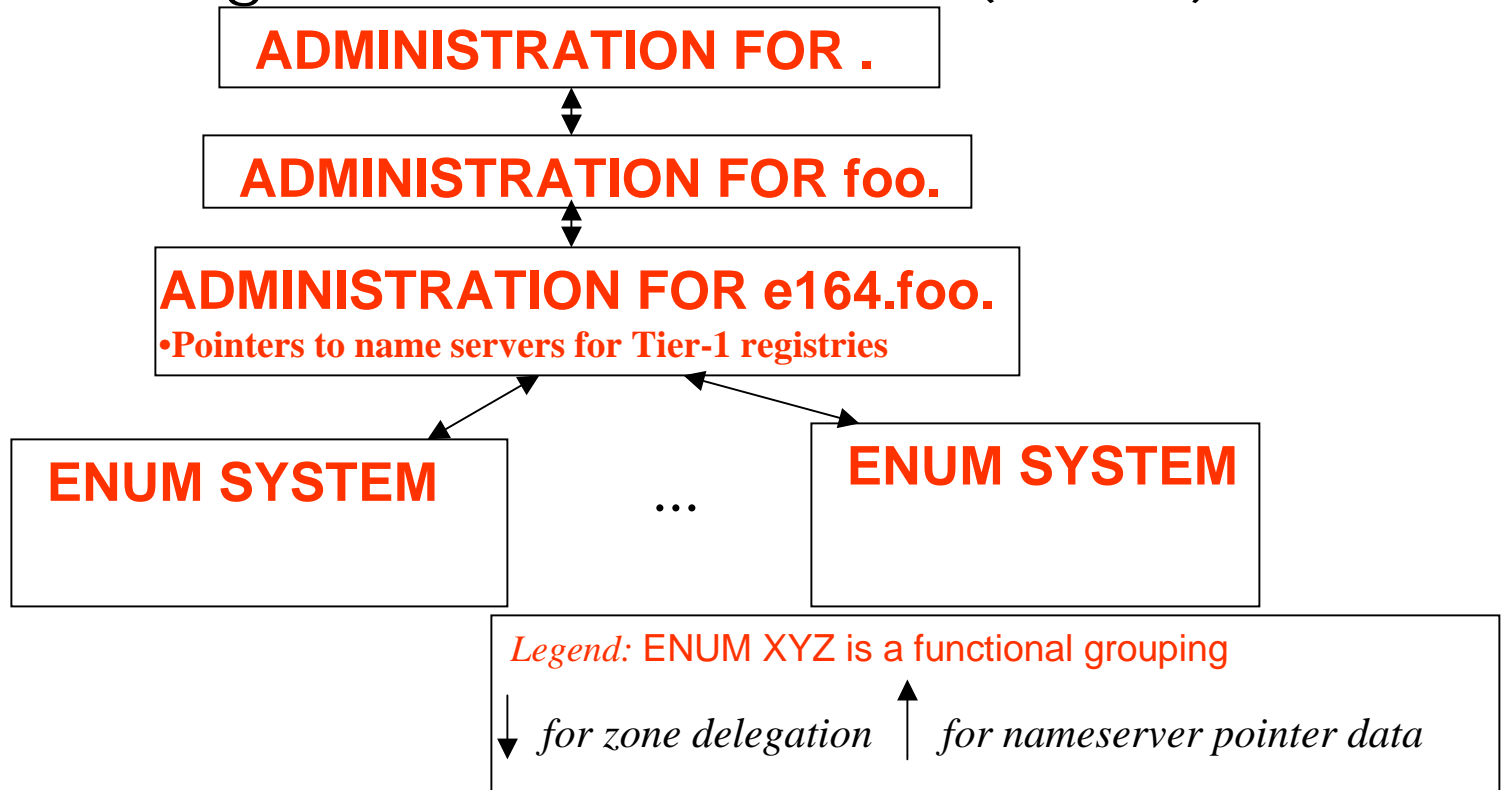
- Terms and functional groupings
- Flows
 - Provisioning flow for DNS zones
 - Provisioning flow for NAPTR records
 - Resolution flow
 - Authentication flow
 - Directory information flow

Distinction between functional grouping and business entity

- **Functional grouping: “E.164 NUMBER PROVIDER”**
e.g., original TSP*, ported-to TSP, agent for TSP
- **Functional grouping: “ENUM REGISTRANT”**
e.g., individual, enterprise, agent for individual or enterprise
- **Functional grouping: “ENUM REGISTRAR”**
e.g., original TSP, ported-to TSP, domain name registrar, Application Service Provider
- **Functional grouping: “ENUM TIER-1 REGISTRY”**
e.g., domain name registry, telephone number registry
- **Functional grouping: “ENUM TIER-2 PROVIDER”**
e.g., original TSP, ported-to TSP, other network service provider, Application Service Provider, domain name registrar
- **Functional grouping: “ENUM TIER-3 PROVIDER”**
e.g., enterprise with data behind a firewall

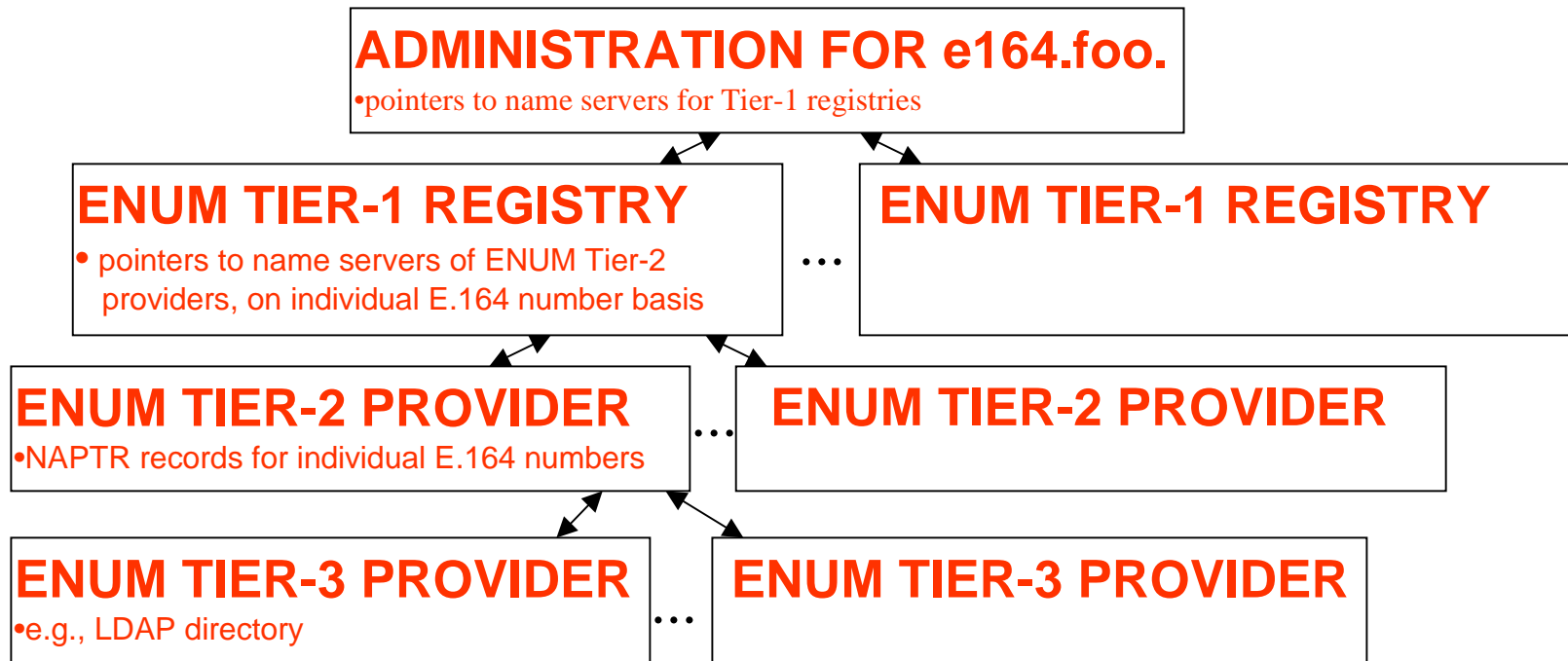
- Separate concerns between functions and who provides them
- Functional groupings are related to, but different from, business entities
- Functional groupings can be combined into a business entity

Provisioning flow for DNS zones (1 of 4)



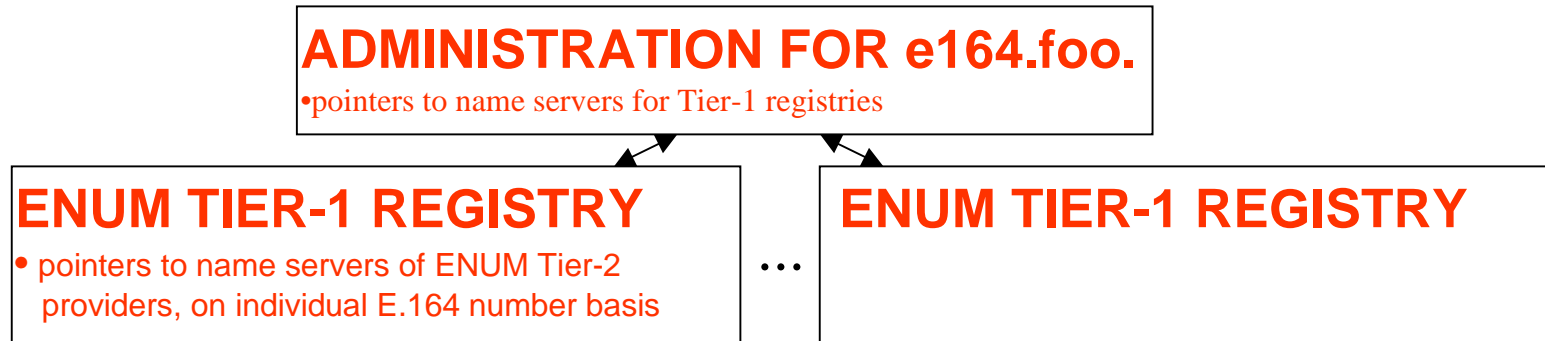
- For US:
 - How many ENUM Tiers?
 - How many ENUM Tier-1 registries?
 - How many ENUM Tier-2 providers?

Provisioning flow for DNS zones (2 of 4)



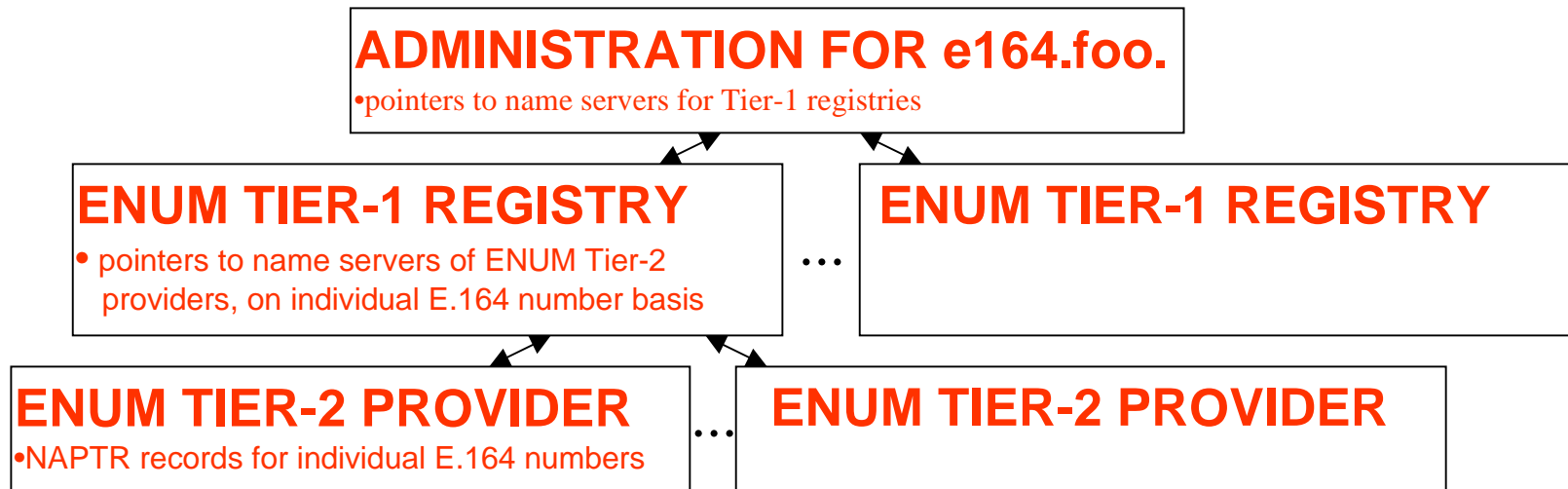
- One or multiple US Tiers?
 - Technology model => more than one but not too many:
 - scalable as demonstrated by existing DNS
 - resolution performance must meet human factors requirements
 - Business model => 3 Tiers fits industry needs:
 - enables synergistic combinations, e.g., Telephone Service Provider as Tier-2 provider for its customers
 - meets privacy needs, e.g., enterprise data in Tier-3 behind firewall

Provisioning flow for DNS zones (3 of 4)



- ENUM Tier-1 functional grouping
 - data management of a list of nameservers (uniqueness per E.164 number, authenticity, availability ...)
- One or multiple US Tier-1s?
 - Business model => multiple, up to some maximum:
 - (ENUM is going to involve multiple Tier-1's worldwide)
 - business opportunity for multiple competent industry players & eggs not all in one basket => >1
 - viable business => not too many
 - service level requirements => industry qualification and performance criteria?
 - industry agreed distinction mechanism, e.g., by set of area codes?

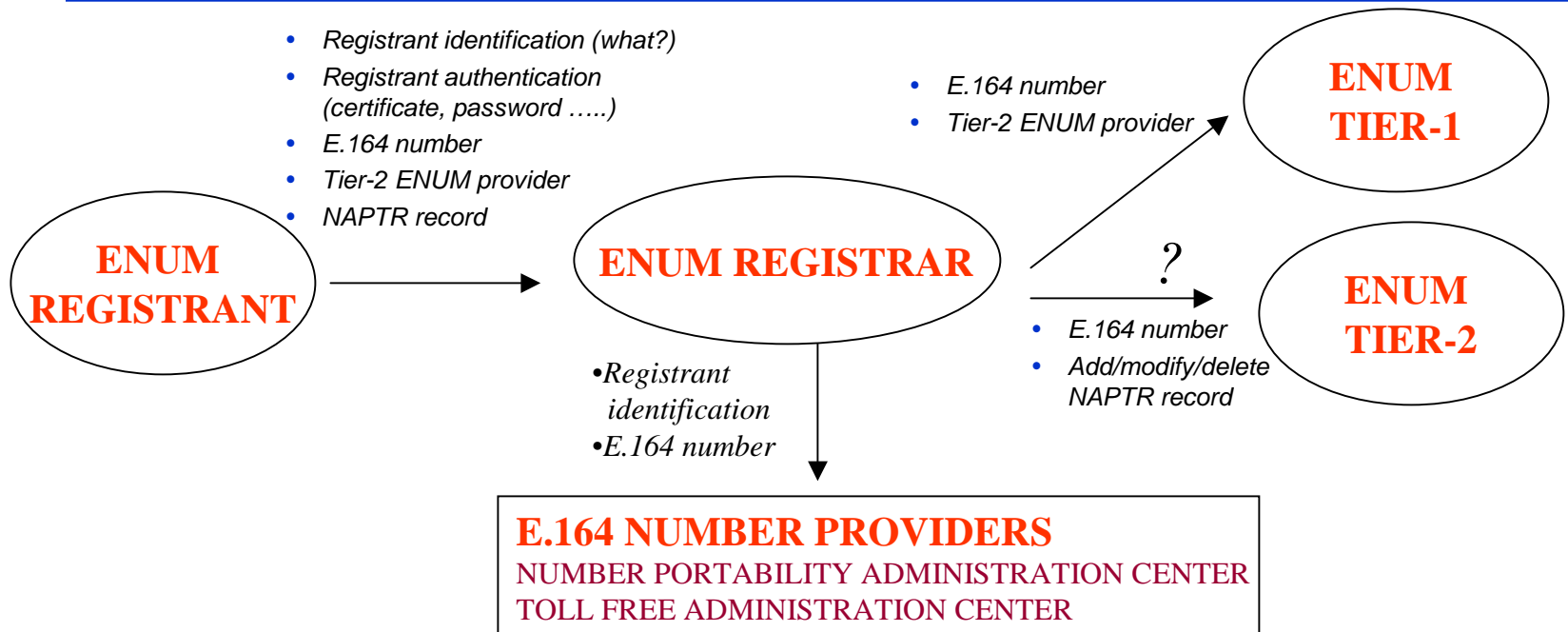
Provisioning flow for DNS zones (4 of 4)



- ENUM Tier-2 functional grouping
 - NATR record data management (authenticity, availability ...)
 - provision nameservers to Tier1
 - interface Tier-3 directories
- One or multiple US Tier-2s?
 - Business model => multiple:
 - competition can drive down prices, drive up features and responsiveness
 - user requirements, e.g., similar lookups should return similar results, disparate data sources should not require complex configurations
 - => industry qualification and performance criteria?

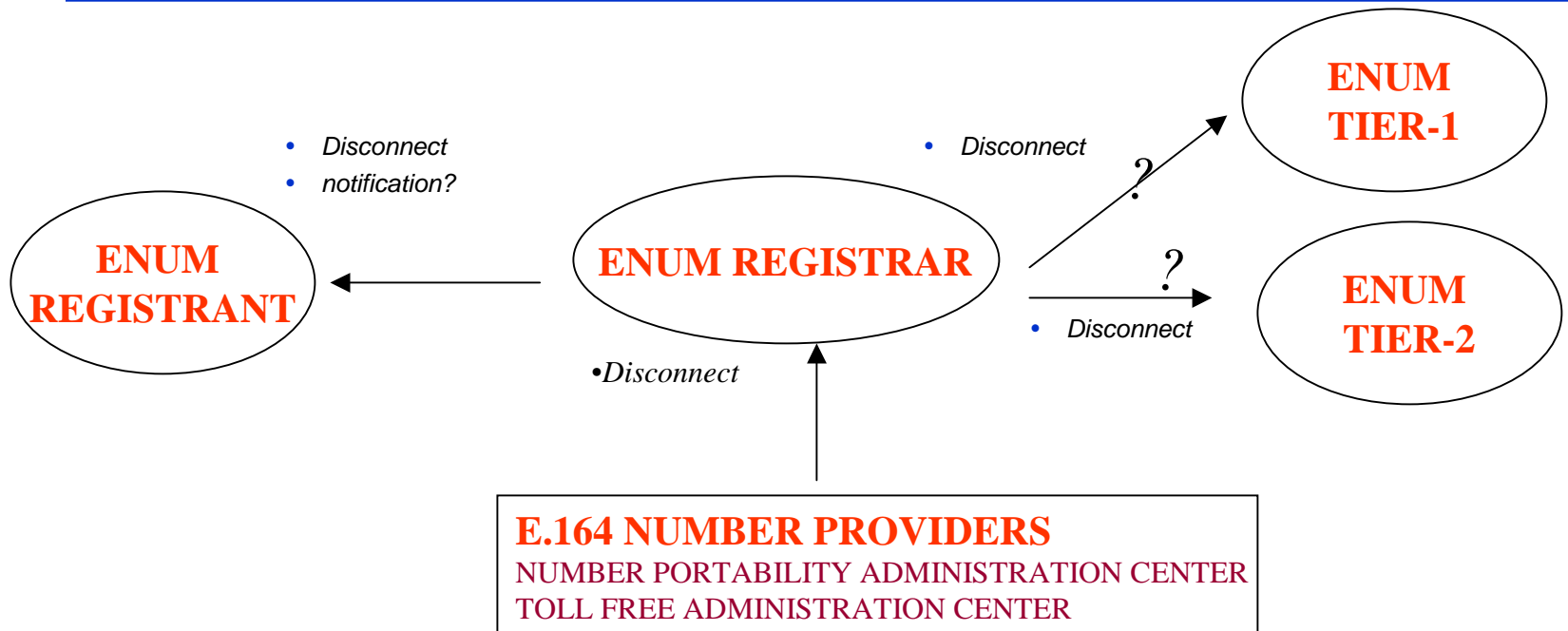


Provisioning flow for NAPTR records - 1 of 4



- ENUM Registrar functional grouping
 - Authenticates ENUM Registrant (how - certificates, password ..?)
 - Validates number authorization - mechanism?
 - Updates ENUM Tier-2?
- One or multiple US ENUM Registrars?
 - Competition can drive down prices, drive up features and responsiveness
 - => multiple

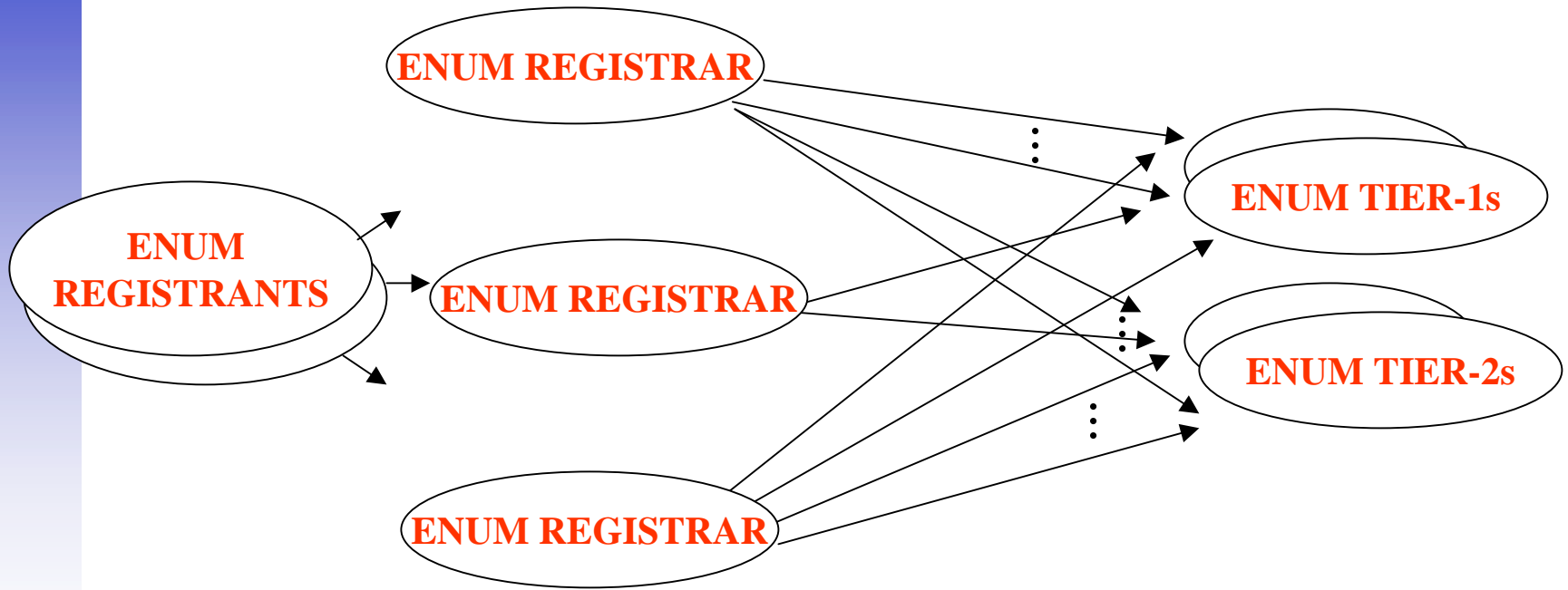
Provisioning flow for NAPTR records - 2 of 4



- Flow?
- Context: subscriber choice, non-payment, provider going out of business

Provisioning flow for NAPTR records - 3 of 4

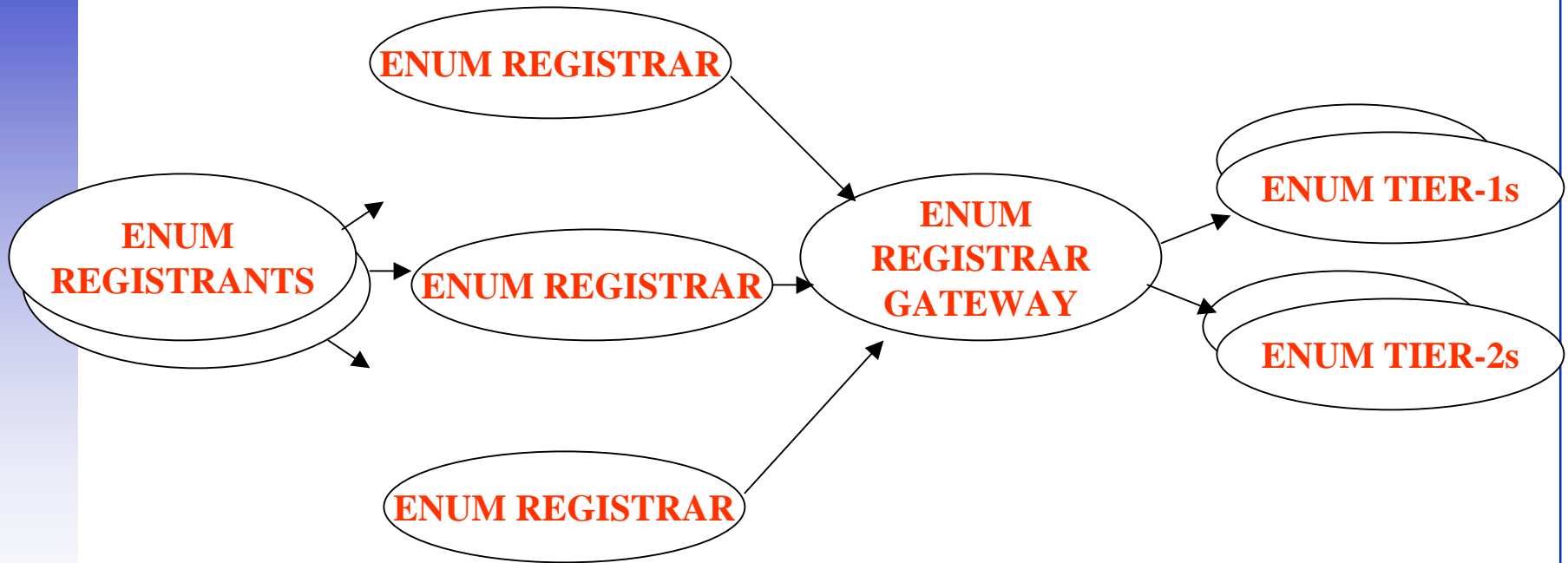
Interconnection efficiency issue



- In general, one ENUM Registrar will interface to multiple ENUM Tier-1s and multiple ENUM Tier-2s on behalf of multiple ENUM Registrants

Provisioning flow for NAPTR records - 4 of 4

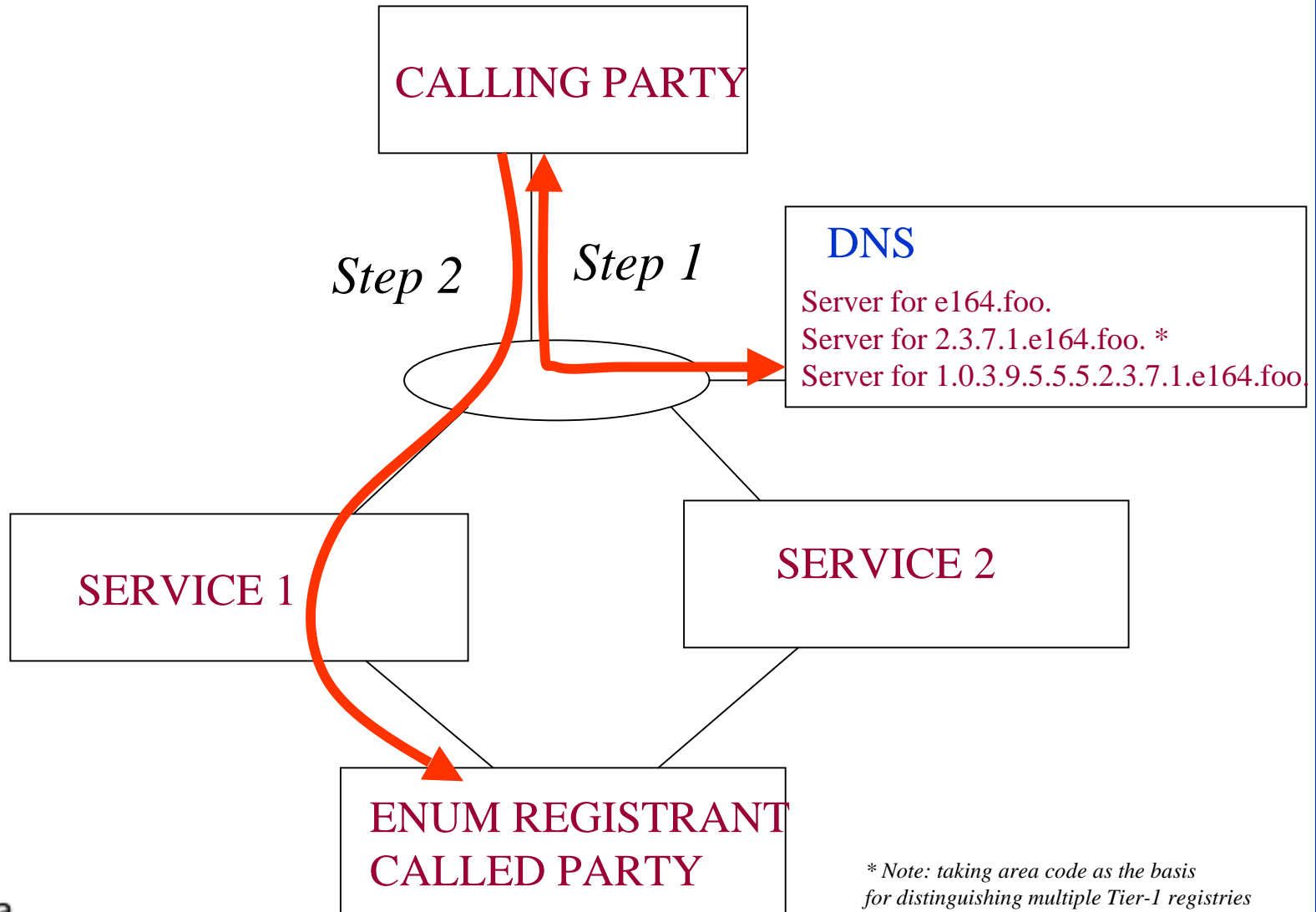
Efficient interconnection



- ENUM Registrar Gateway grouping candidate functions:

- Automated flow-through driven transactions
- Validation of requests before messages are forwarded
- Event timing and notification
- Tracking of message flows and interactions
- Registration and validation
- Communication of disconnects from TSPs to the Registry
- Record Administration

Resolution process



** Note: taking area code as the basis for distinguishing multiple Tier-1 registries for the sake of a worked example*

Other flows

- **Authentication flow(s)**
 - between each pair of functional groupings
- **Directory information flow(s)**
 - e.g., public inquiry

Conclusion

To collaboratively work the question

“What is the overall architecture/hierarchy?”

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let's develop

- **terms**
- **definitions**
- **functional groupings**
- **flows.**