



Voice over Internet Protocol (VoIP) Exploring the Coreness of VoIP Control Points

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Outline

- Basic Elements (VoIP Control Points) -- *Constellations*
- Business Models (Classes of VoIP) – *Static Intra-Product*
- Two Scenarios
 - *Commoditization* of Basic Voice Service
 - Growth of Innovative, *VoIP-inside* Communication Services
- Coreness of Control Points – *Dynamic Intra-Product*
- Summary – *Inter-Product*

Basic Elements (VoIP Control Points)

- Local Access
 - National Backbone
 - International Backbone
 - Bit Transport (Voice Quality)
 - Call Signaling
 - PSTN Gateway
 - Features
 - End Device/Software
 - Name Space
- } Access

Business Models (Classes of VoIP)

Based on who manages which control point and how (centralized/decentralized)

VoIP in the backbone	Facility Based VoIP	VoIP over Broadband	P2P VoIP
A	B1	B2	C
<ul style="list-style-type: none"> - Circuit Switching - Same Operator and Service Provider <p>(e.g. AT&T, Sprint, MCI)</p>	<ul style="list-style-type: none"> - Packet Switching - Same Operator and Service Provider <p>(e.g. VoCable, VoDSL, VoIP over Wireless)</p>	<ul style="list-style-type: none"> - Packet Switching - Different Operator and Service Provider <p>(e.g. Vonage, SkypeOut, SkypeIn)</p>	<ul style="list-style-type: none"> - Packet Switching - Operator agnostic Service Provider <p>(e.g. FWD, Skype, Yahoo!, IM)</p>

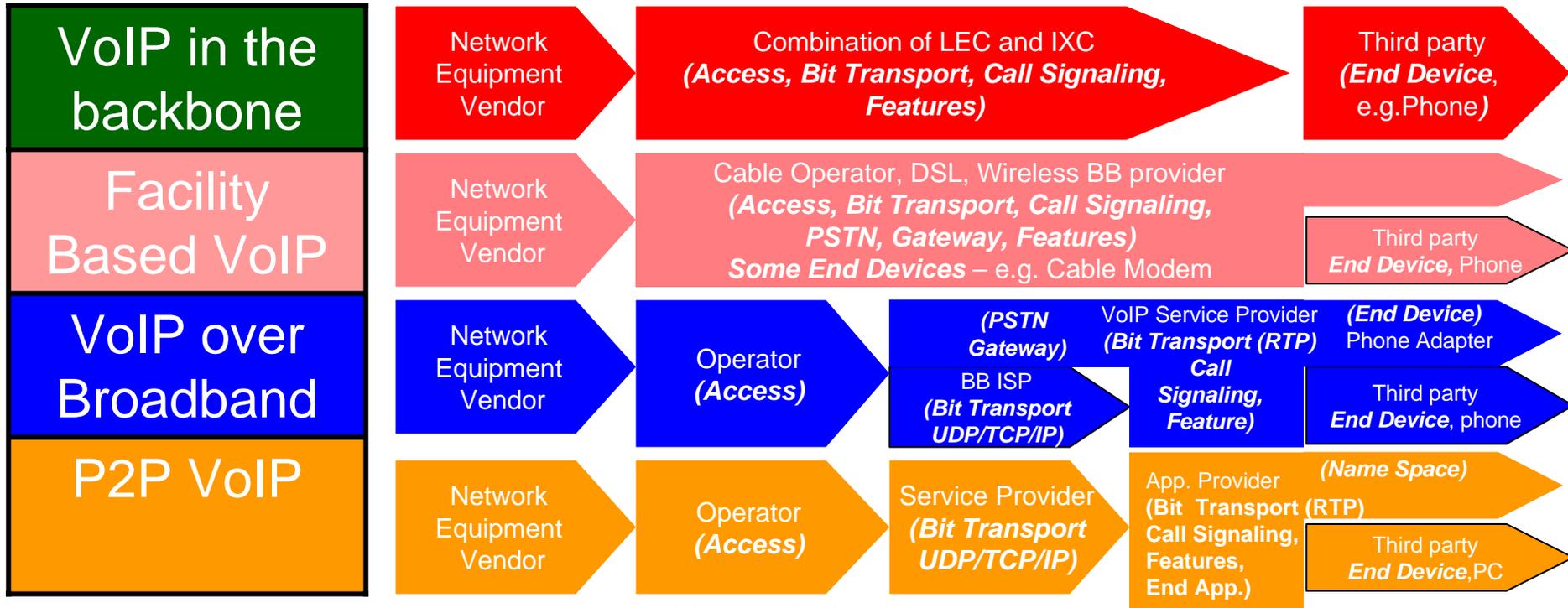
Business Models (Contd.)

Who owns the control points

Communications Value Chain

NETWORK EQUIPMENT MANUFACTURER	FACILITIES PROVIDER (NETWORK OPERATOR)	SERVICE PROVIDER	FEATURE (APPLICATION PROVIDER)	CPE (PHONES, MODEMS ETC.)
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Business Models





Scenario 1: Commoditization of Basic Voice Service

- Many Access Substitutes – PSTN, Cable, DSL, Wireless and now WiFi/WiMax
- Cheap PSTN interoperability
- More Signaling Substitutes – Cheap service from SIP servers and gateways
- Many SIP enabled devices and applications
- Voice comes bundled with Internet Connectivity
- No VoIP Blocking



Scenario 2: Growth of Innovative, VoIP-inside Communication Services

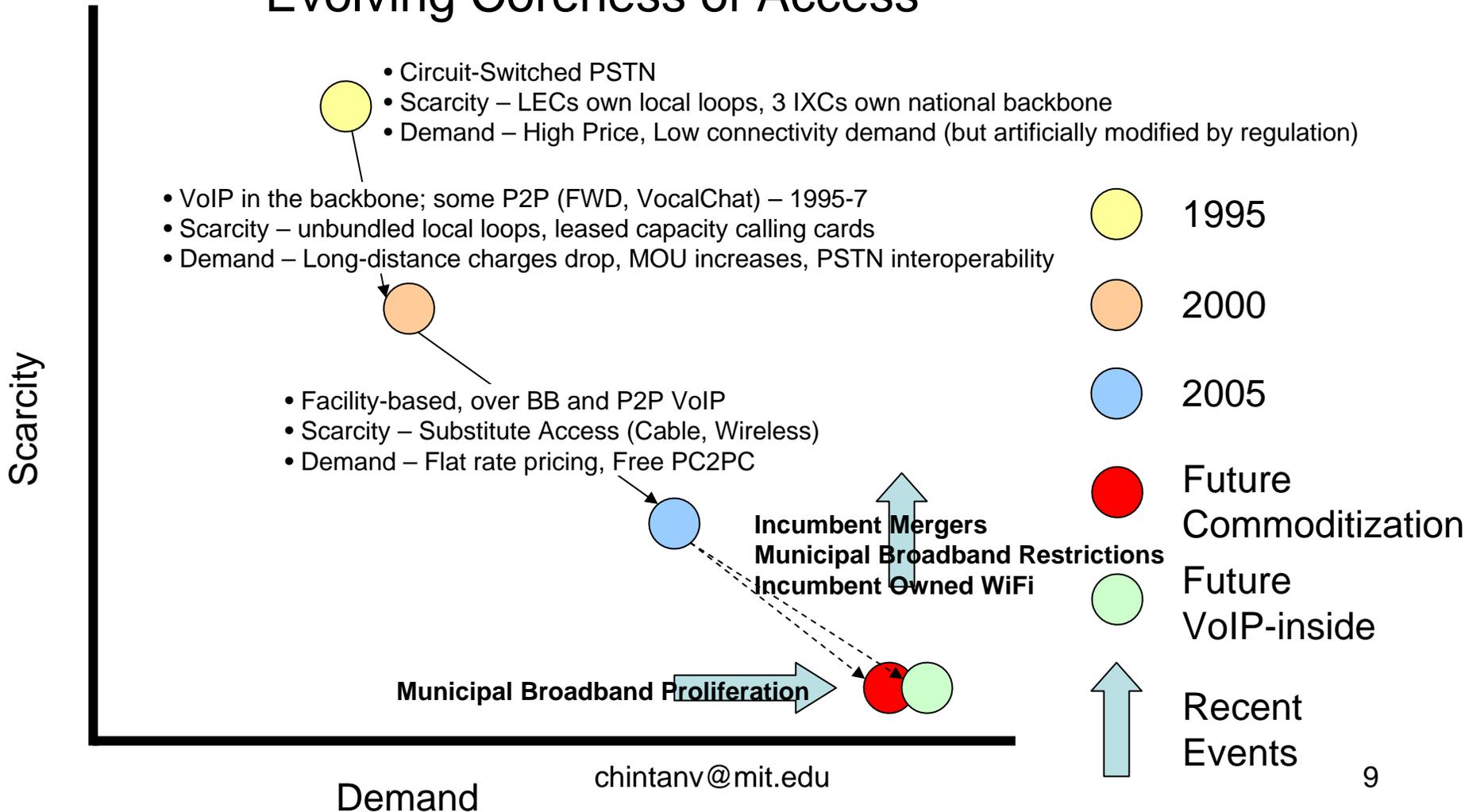
- Application beyond Internet Telephony
 - Gaming
 - Distance Learning
 - Internet Radio, Internet TV, Webcast
- SIP support in operating systems and easy application programming interface (API)
- Many SIP enabled devices and applications



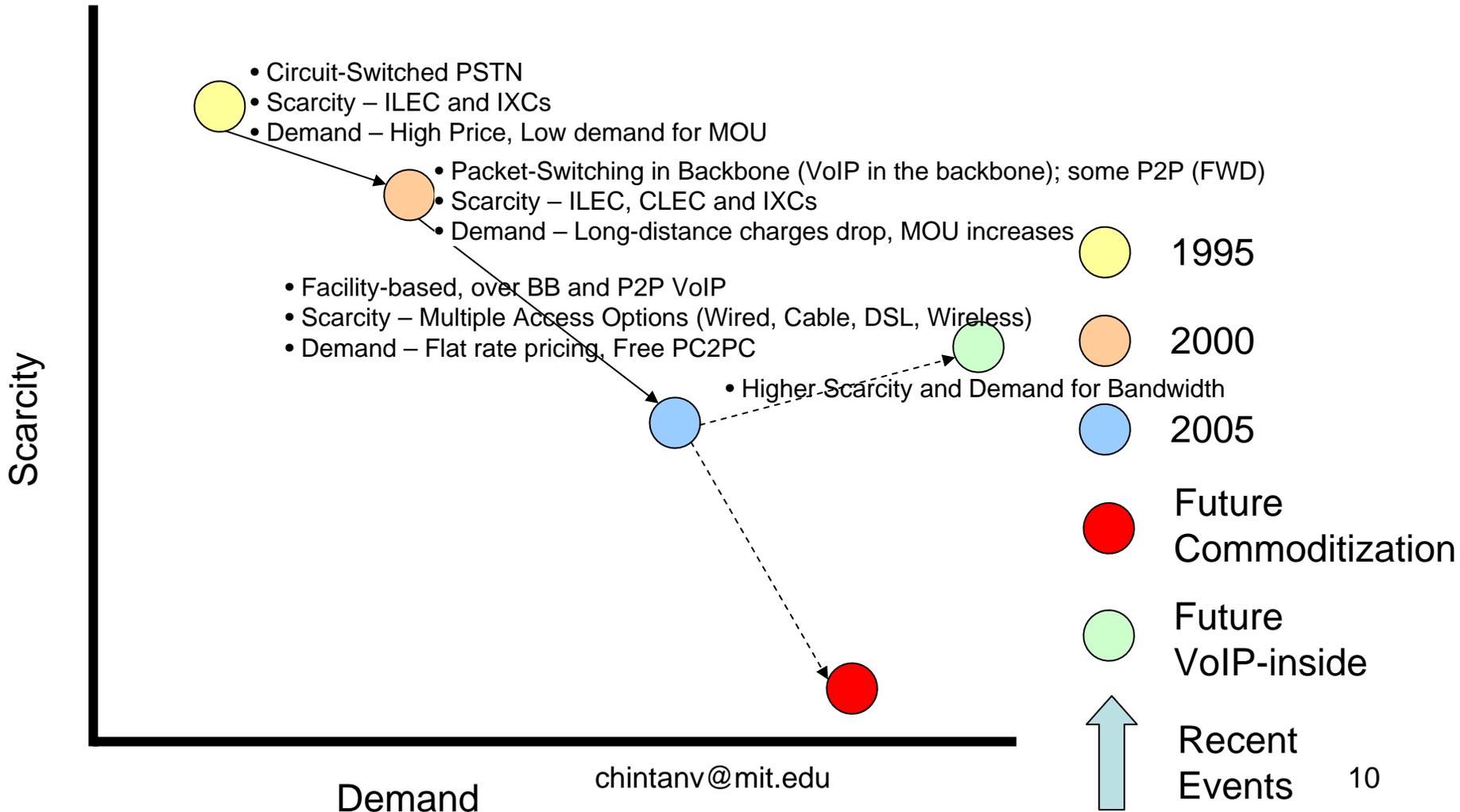
Scenario 3: Recent Events

- Incumbent Mergers/Acquisitions – likely Verizon-MCI
- Municipal broadband proliferation (UTOPIA)
- Municipal broadband restrictions (PA, FL)
- Incumbent owned WiFi Hotspots (T-Mobile Hotspots)
- Server-less SIP (Damaka, X-ten)
- SIP Service Inter-operation (FWD-Vonage/Packet8)

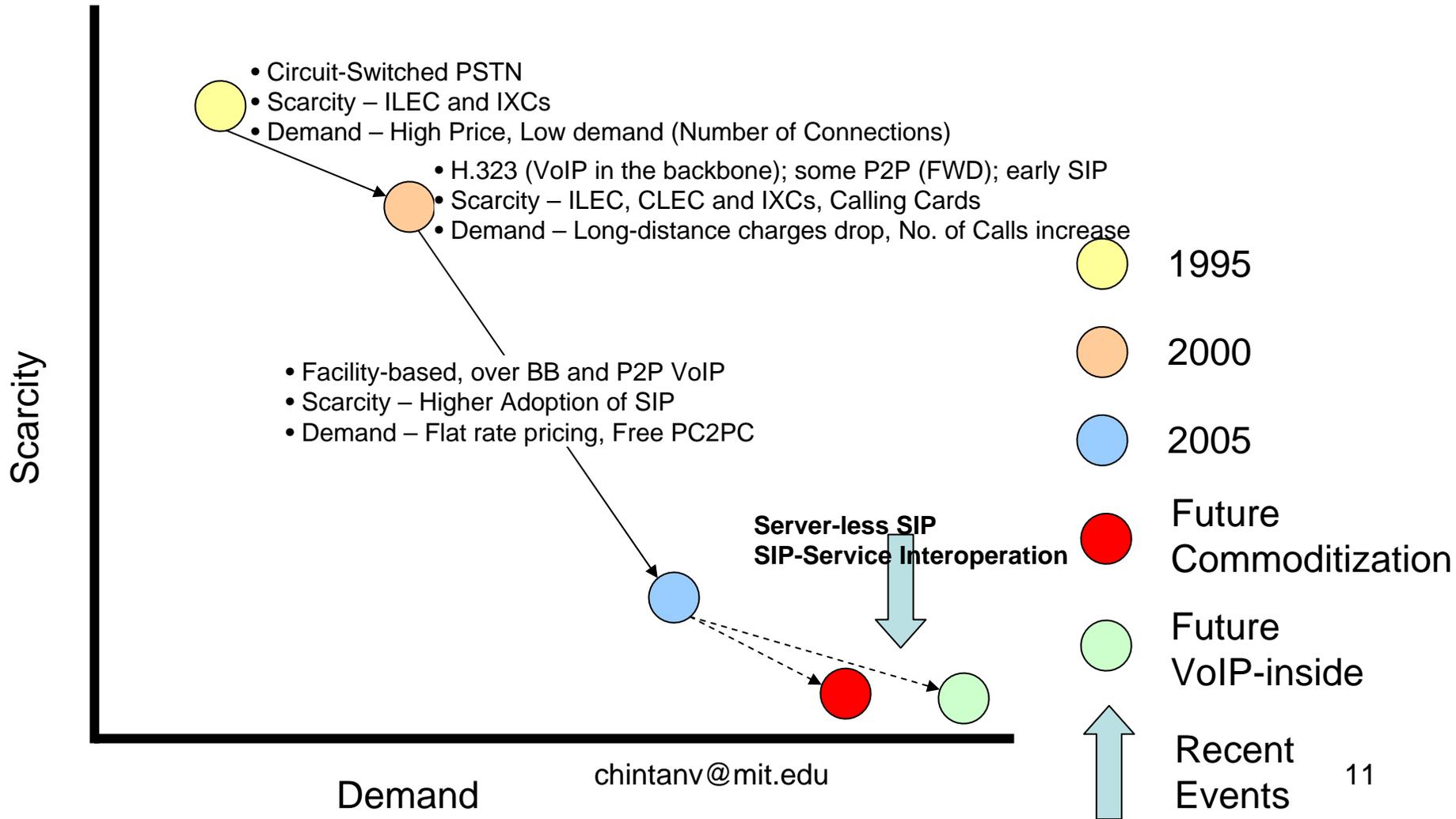
Evolving Coreness of Access



Evolving Coreness of Bit Transport (Voice Quality)



Evolving Coreness of Call Signaling



Evolving Coreeness of Features

- PSTN Feature Set
- Scarcity – ILEC and IXCs
- Demand – High Price, Low demand

- Facility-based, over BB and P2P VoIP
- Scarcity – More suppliers for telephony features
- Demand – Innovative Features (Virtual Phone No., Presence)

- VoIP in the Backbone, some P2P (FWD)
- Scarcity – Similar or Inferior Features
- Demand – A few newer features

- Scarcity – High as few providers of new features
- Demand – High for Innovative Applications

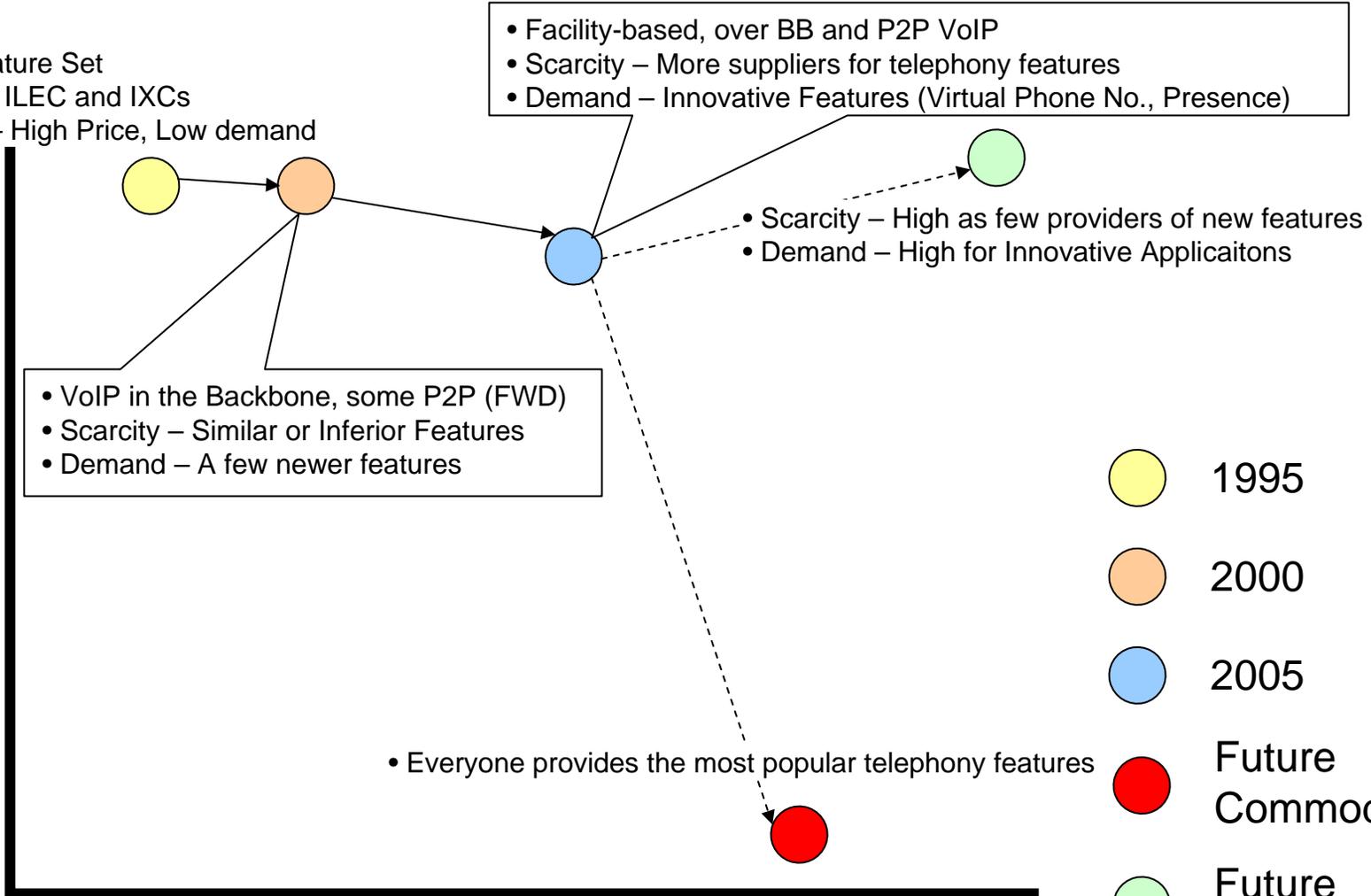
- Everyone provides the most popular telephony features

Scarcity

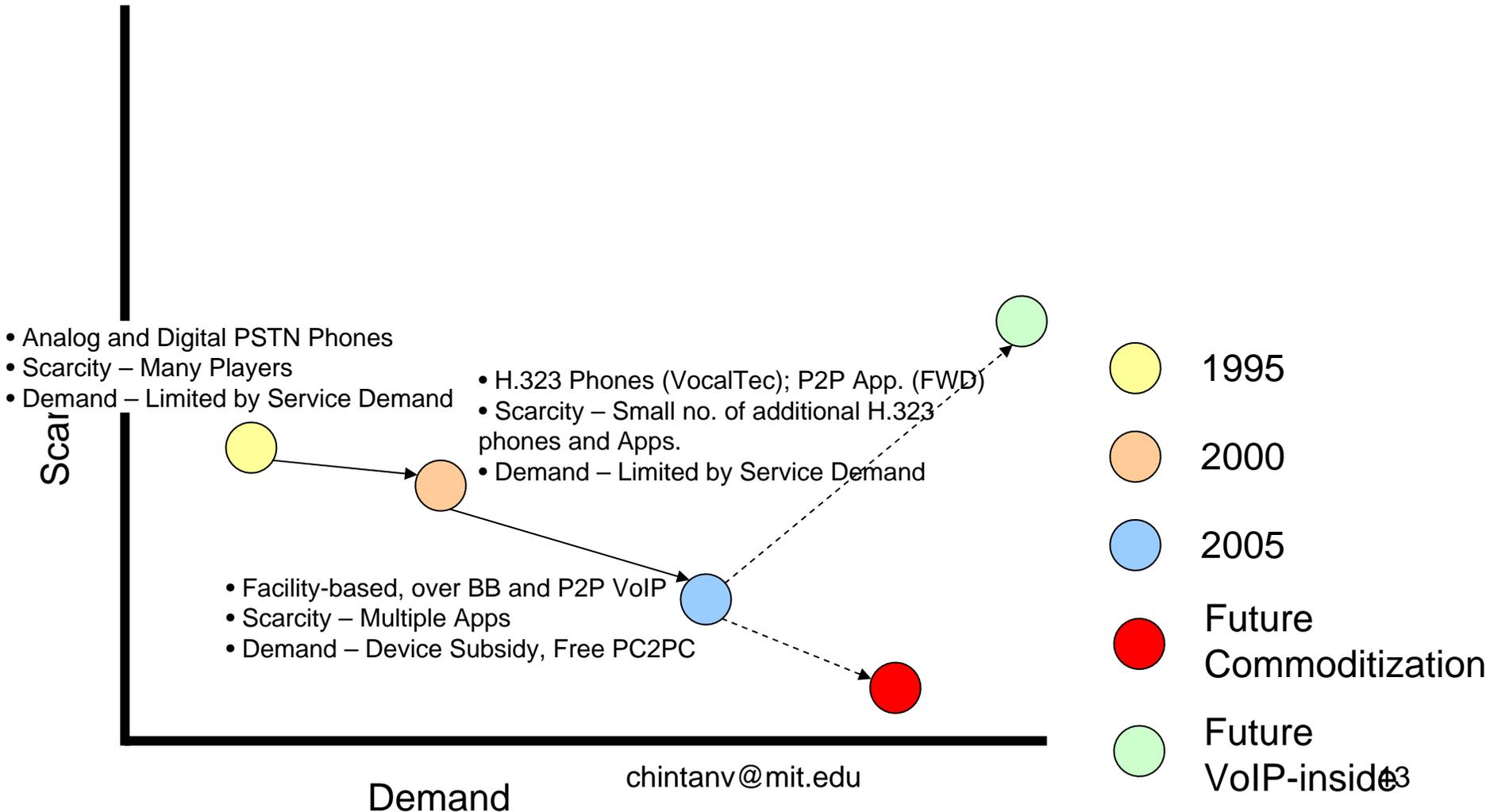
Demand

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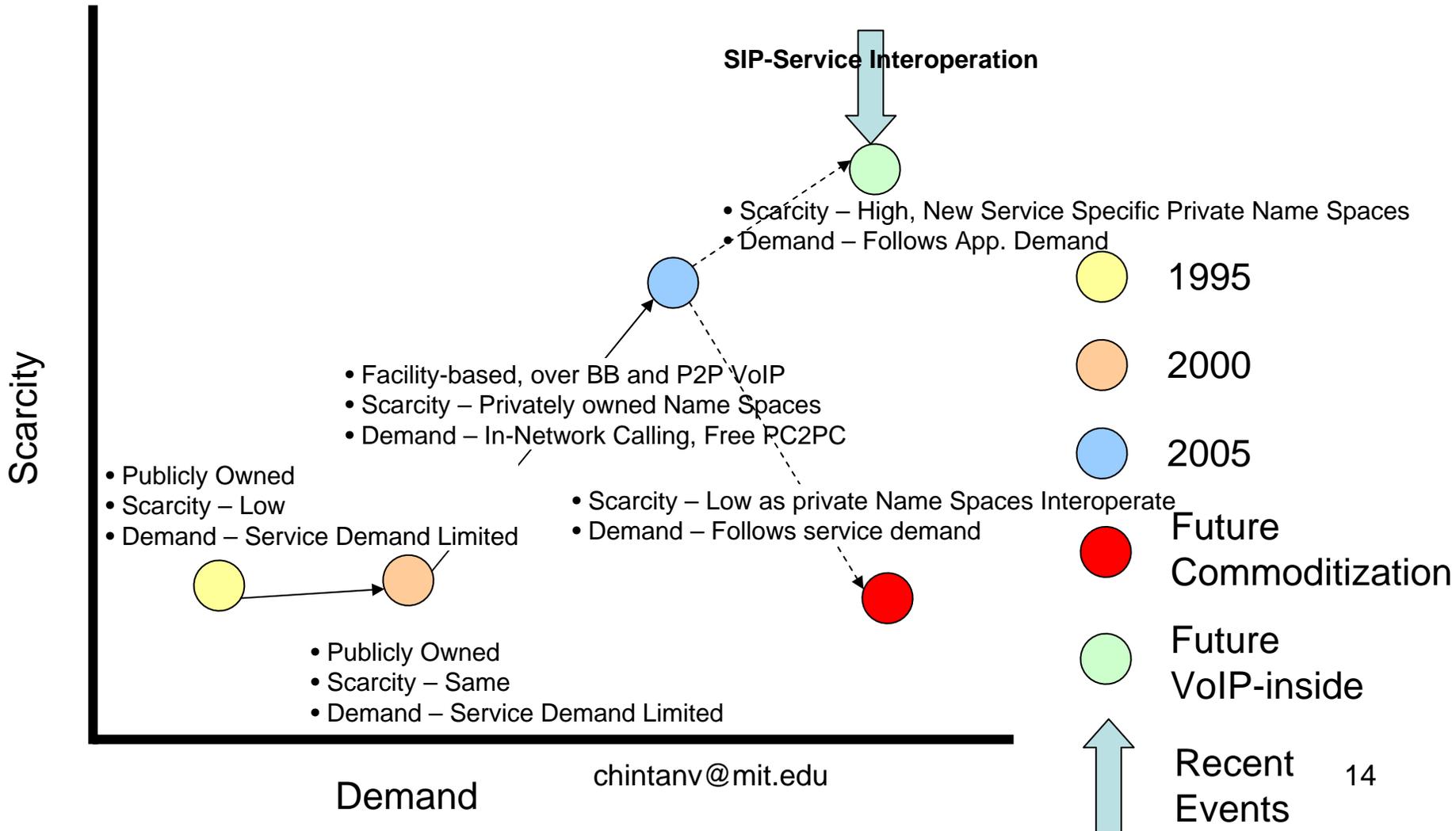
- 1995
- 2000
- 2005
- Future Commoditization
- Future VoIP-inside



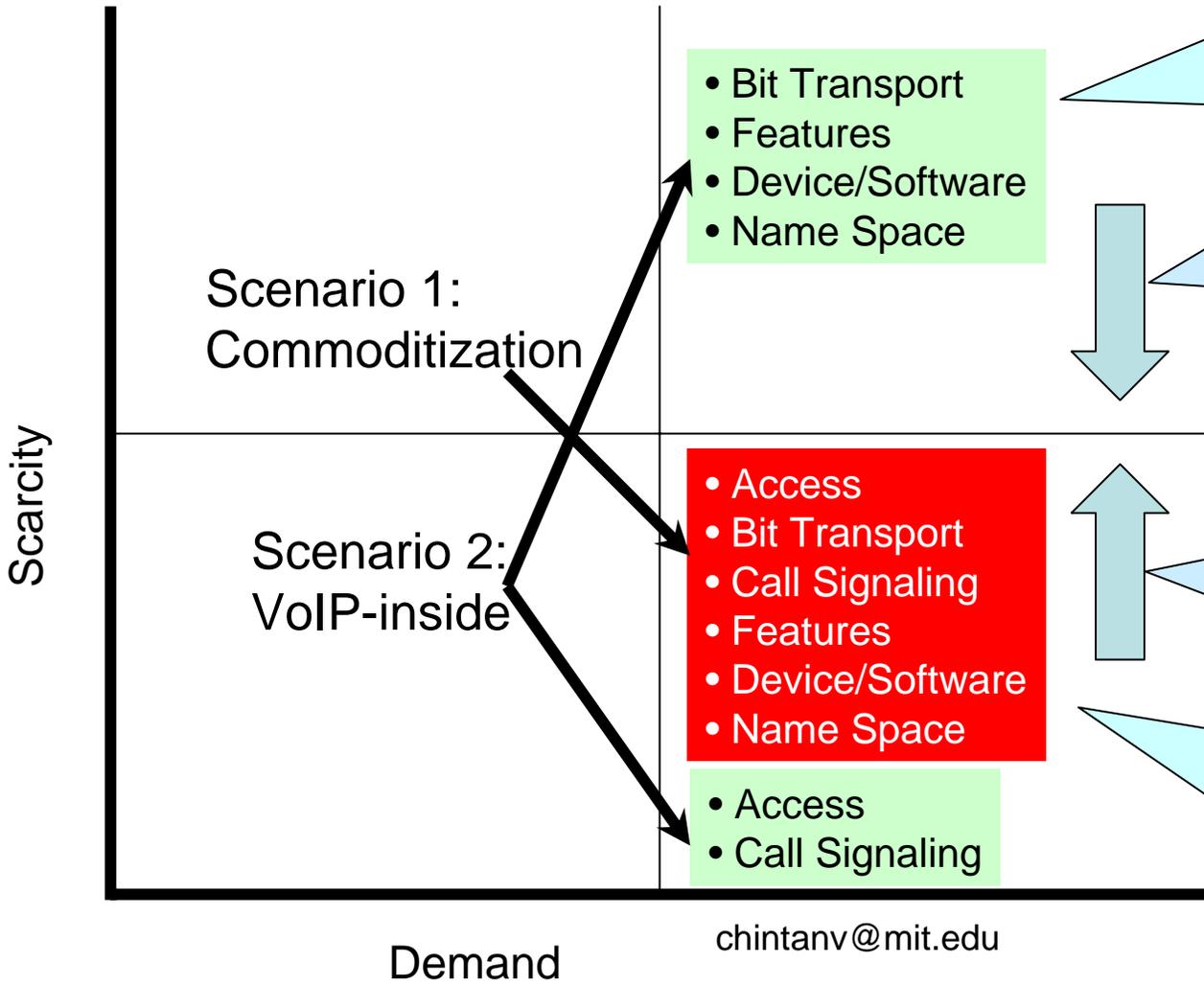
Evolving Coreness of End Device/Software



Evolving Coreness of Name Space



Summary



Other Indicative Triggers

- Acquisition of/ Collaboration with new new app. Providers
- Traditional services become Internet-based, and are voice enabled

Recent Events

- Server-less SIP
- SIP-Service Integration
- Municipal BB Proliferation

Recent Events

- Incumbent Merger/Acquisition
- Municipal BB Restrictions
- Incumbent owned Hotspots

Other Indicative Triggers

- Deregulation
- Standardization
- Open Architecture
- Functionality in end point
- Regulatory Harmonization
- Economic Upswing