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

Chintan Vaishnav
chintanv@mit.edu

Core-Edge Working Group
Communications Futures Program
Massachusetts Institute of Technology

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
- Circuit Switching - Same Operator and Service Provider (e.g. AT&T, Sprint, MCI)	- Packet Switching - Same Operator and Service Provider (e.g. VoCable, VoDSL, VoIP over Wireless)	- Packet Switching - Different Operator and Service Provider (e.g. Vonage, SkypeOut, SkypeIn)	- Packet Switching - Operator agnostic Service Provider (e.g. FWD, Skype, Yahoo!, IM)

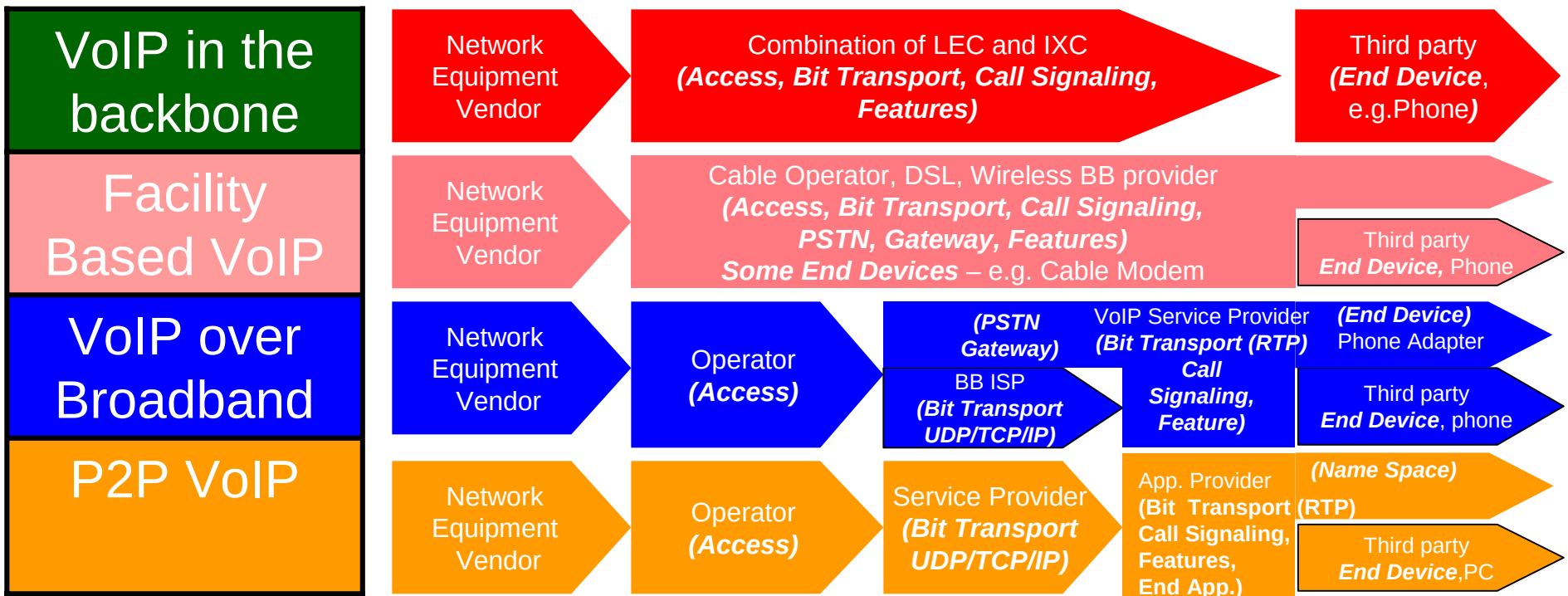
Business Models (Contd.)

Who owns the control points

Communications Value Chain

NETWORK EQUIPMENT MANU-FACTUROR	FACILITIES PROVIDER (NETWORK OPERATOR)	SERVICE PROVIDER	FEATURE (APPLICATN . PROVIDER	CPE (PHONES, MODEMS ETC.)

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

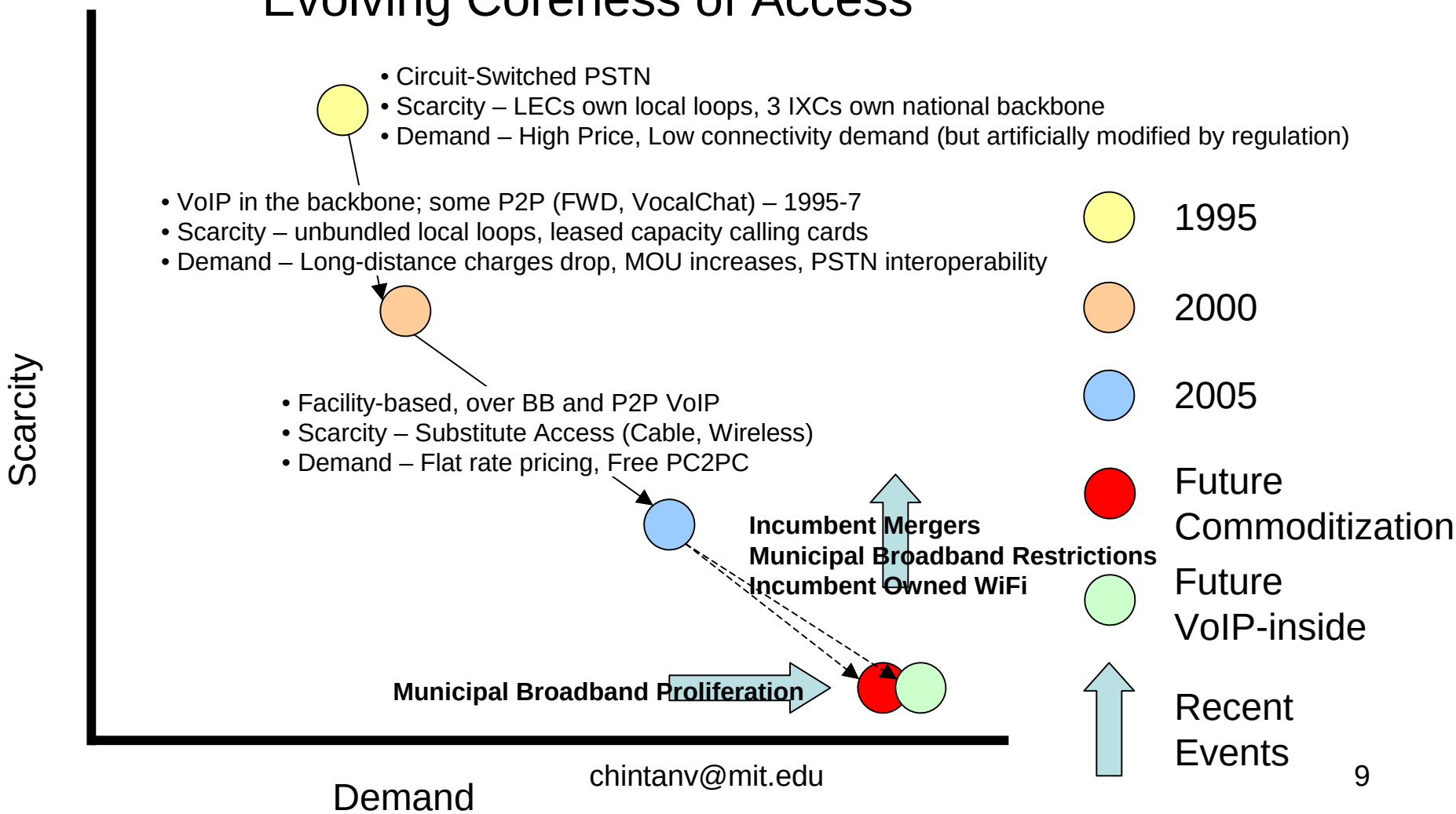
Scenario 2:
Growth of Innovative, VoIP-inside Communication Services

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

Scenario 3:
Recent Events

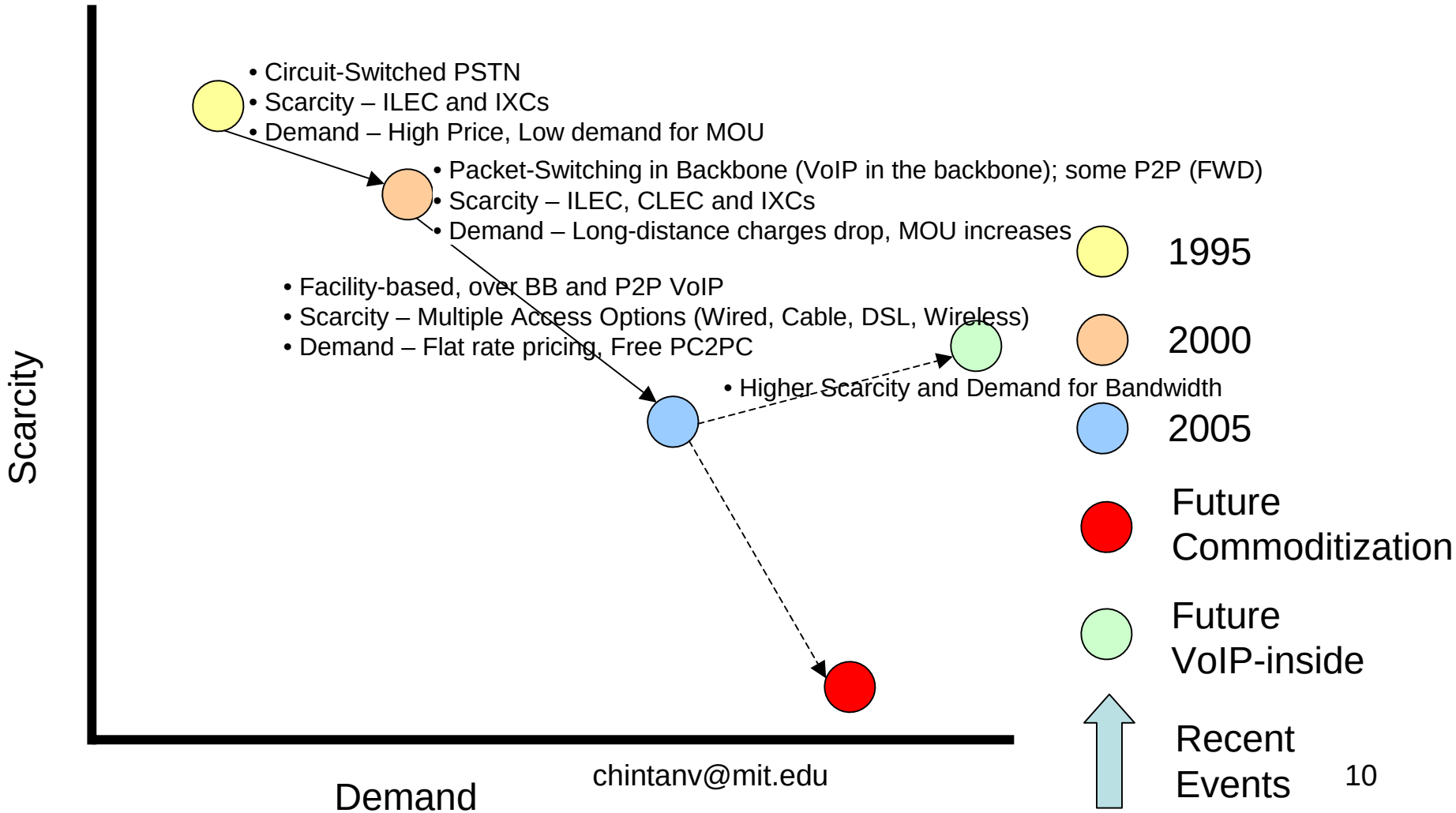
- Incumbent Mergers/Acquisitions – likely Verizon-MCI
- Municipal broadband proliferation (UTOPIA)
- Municipal broadband restrictions (PA, FL)
- Incumbent owned WiFi Hotspots (T-Mobile Hotspots)
- Server-less SIP (Damaka, X-ten)
- SIP Service Inter-operation (FWD-Vonage/Packet8)

Evolving Coreness of Access



chintanv@mit.edu

Evolving Coreness of Bit Transport (Voice Quality)



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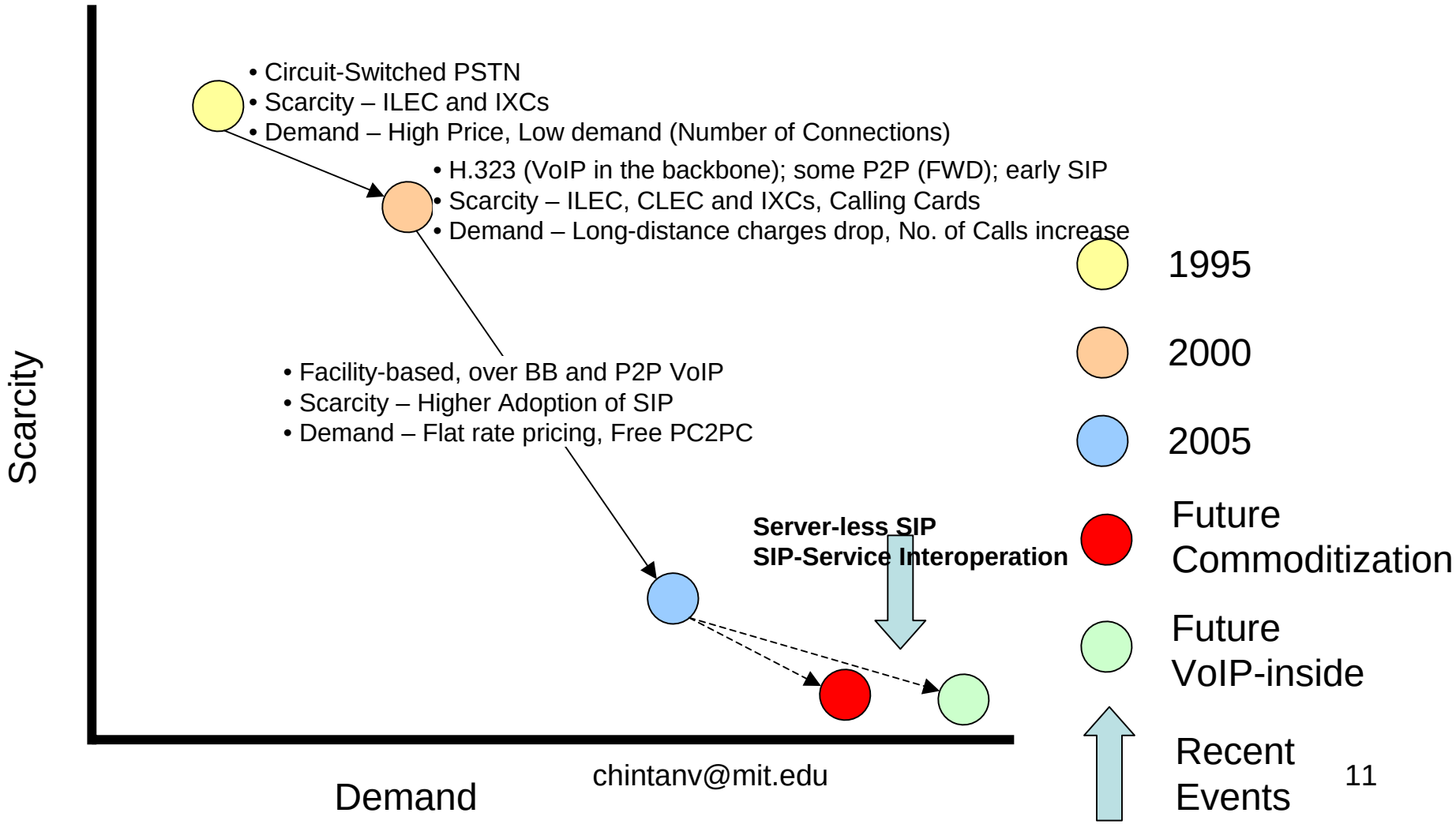
Evolving Coreness of Call Signaling



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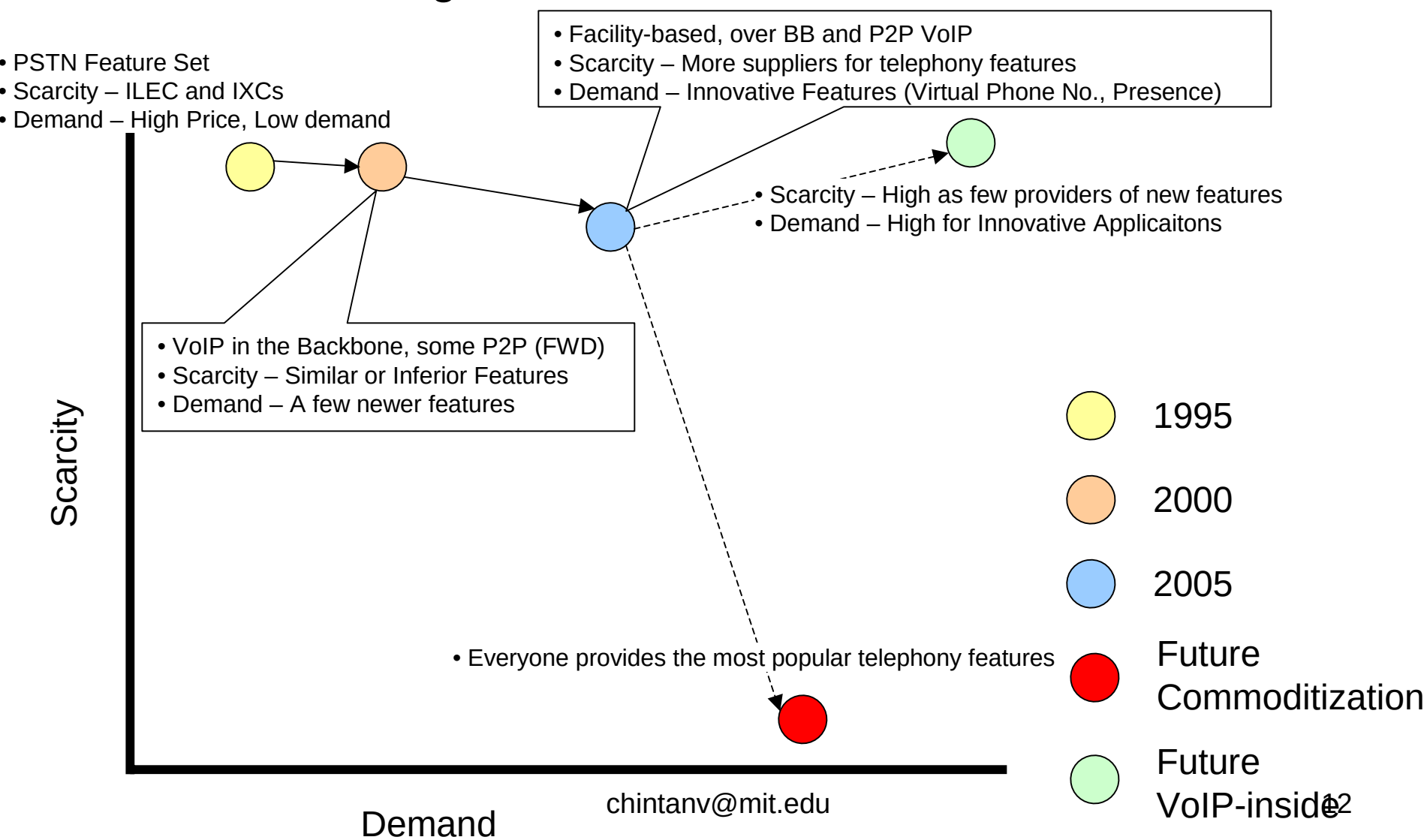
Evolving Coreness of Features



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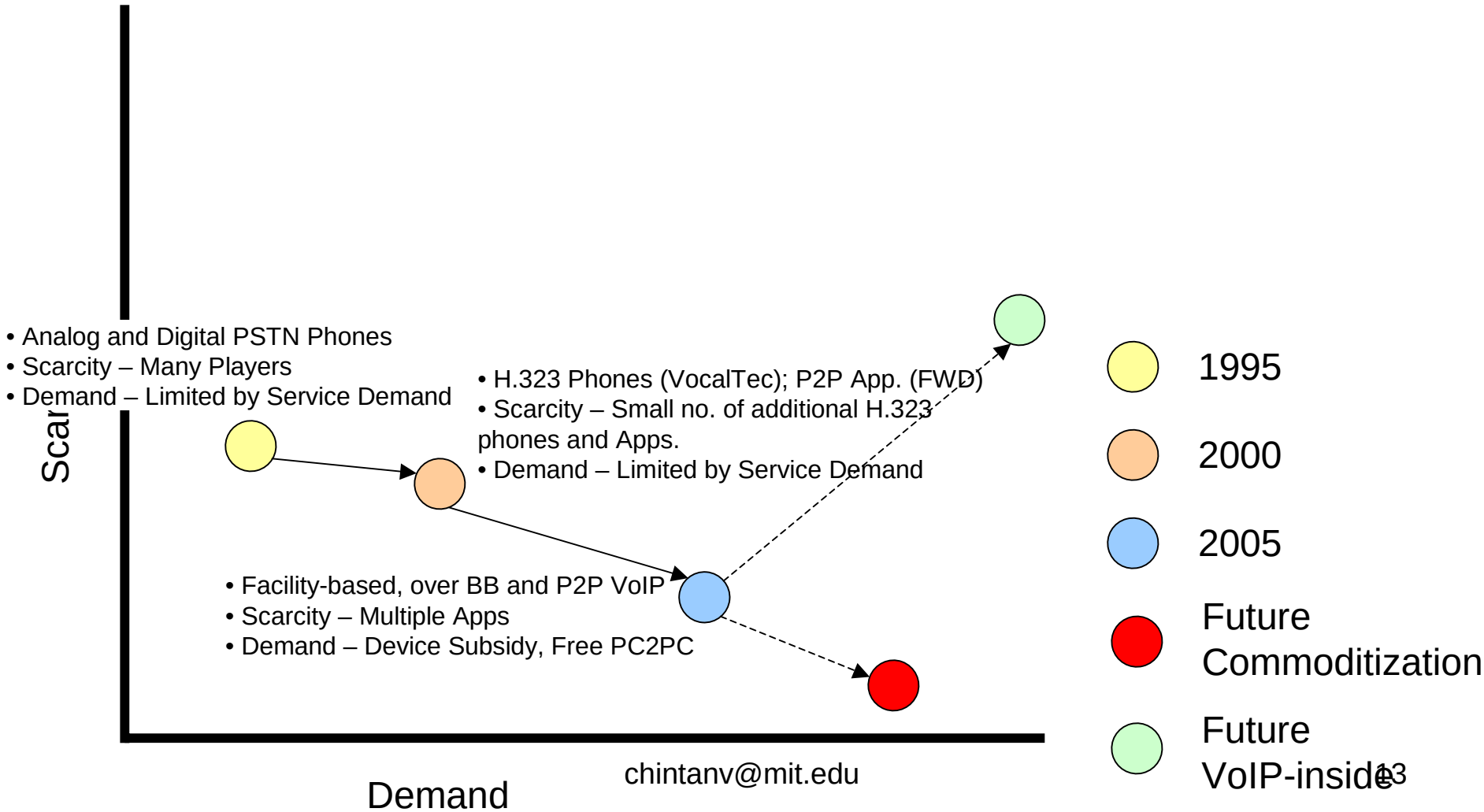
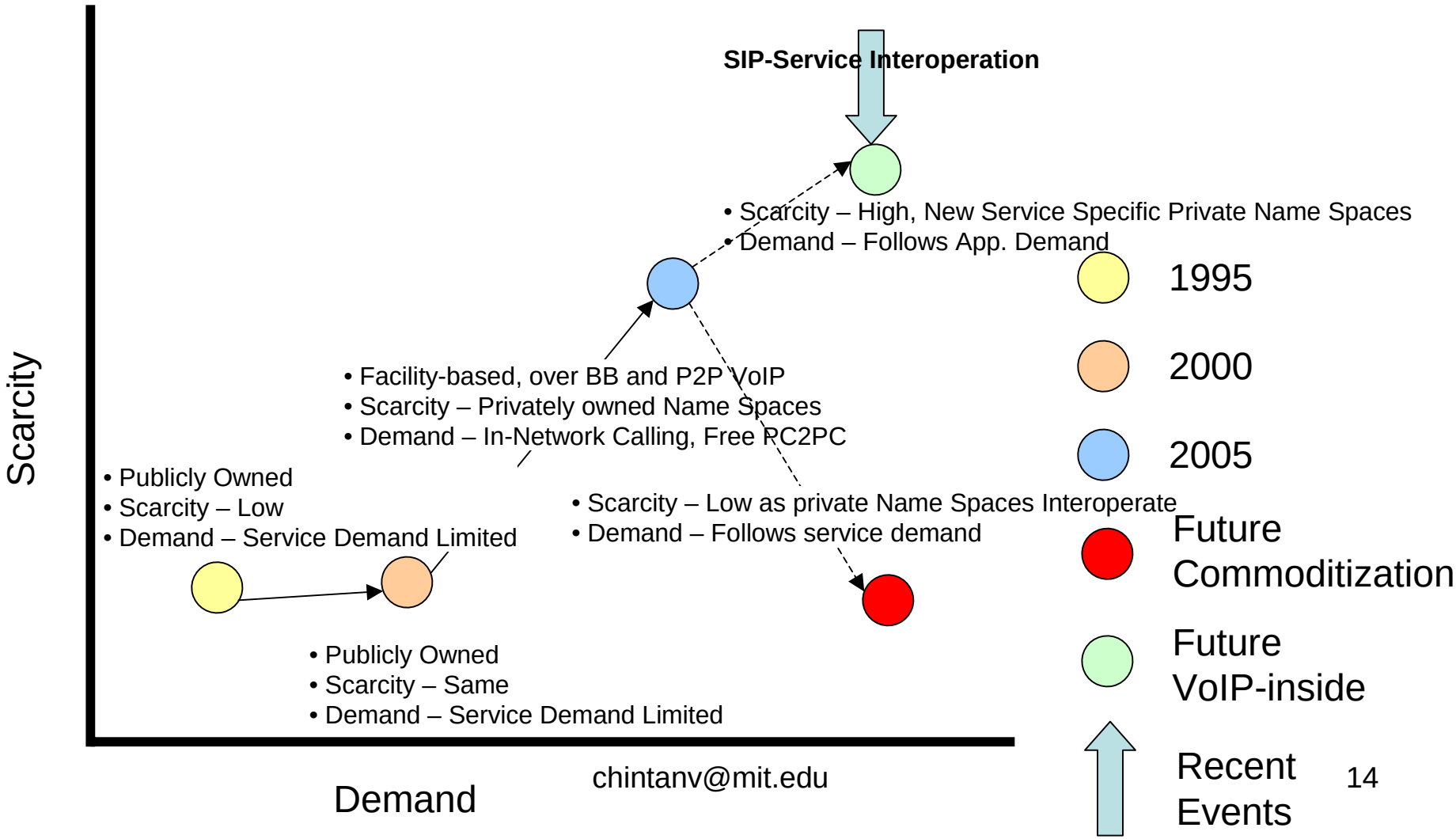
Evolving Coreness of End Device/Software



Evolving Coreness of Name Space



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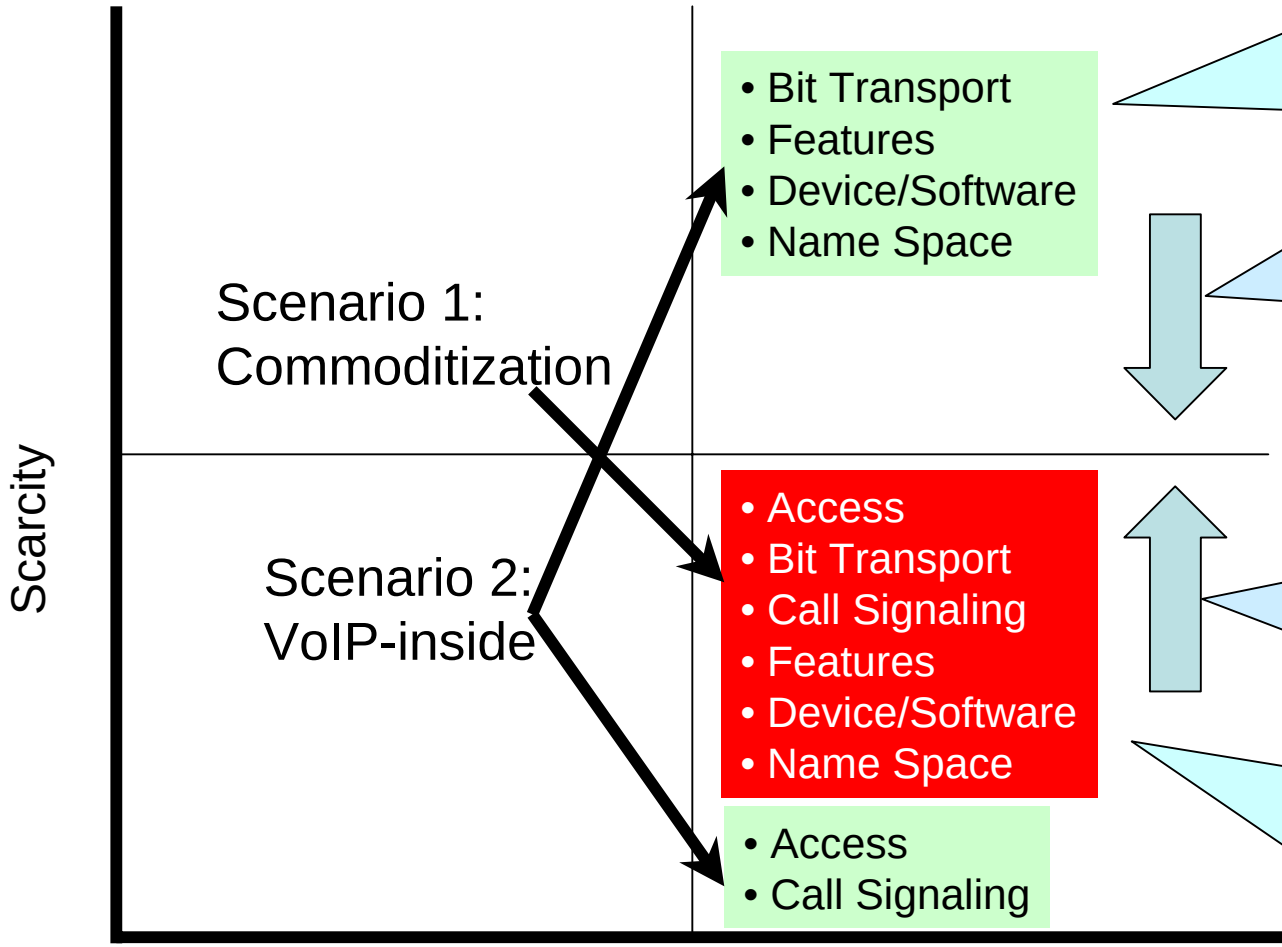
Summary



Other Indicative Triggers
- Acquizition 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

chintanv@mit.edu