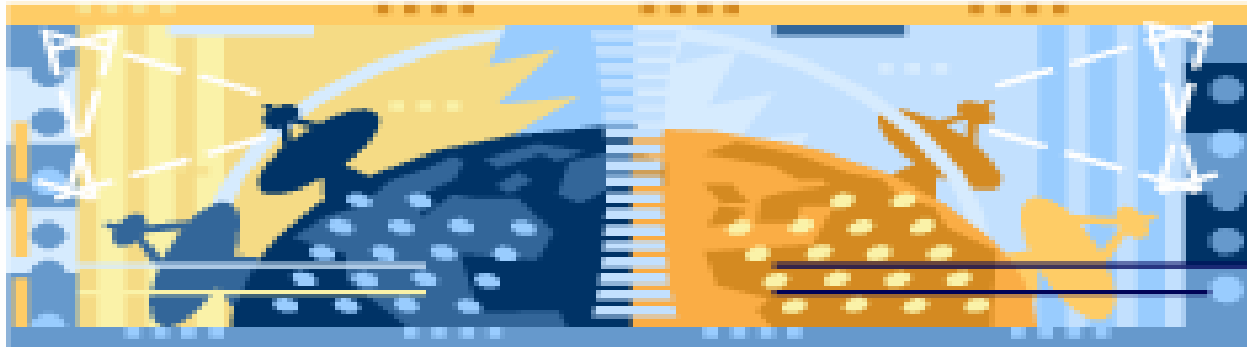


Merit IPTV WorkShop

U M I P T V
I N V E S T I G A T I O N



[Password Reminder](#)

[FAQ](#)

[UM IPTV Survey](#)

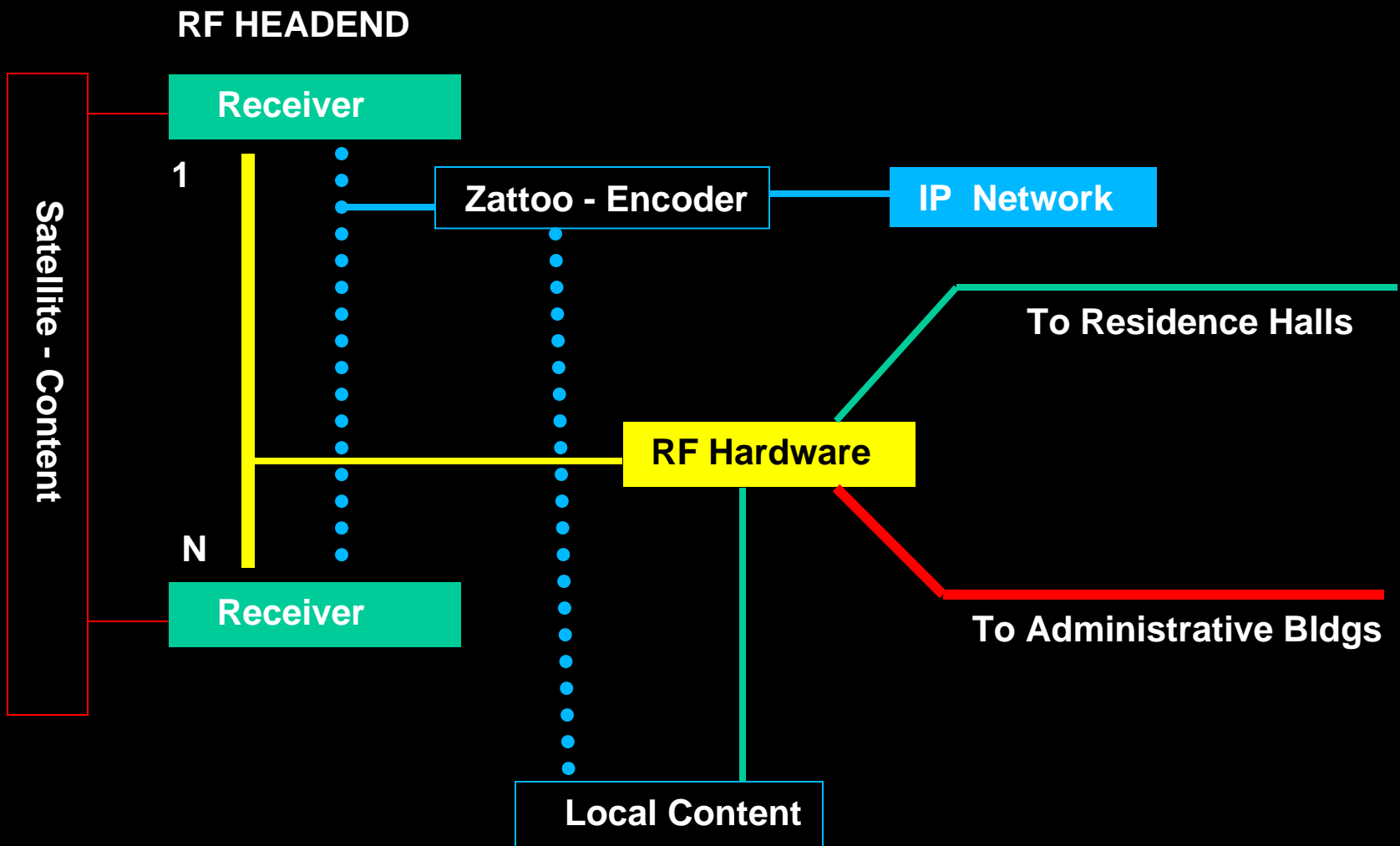
Pradip Patel

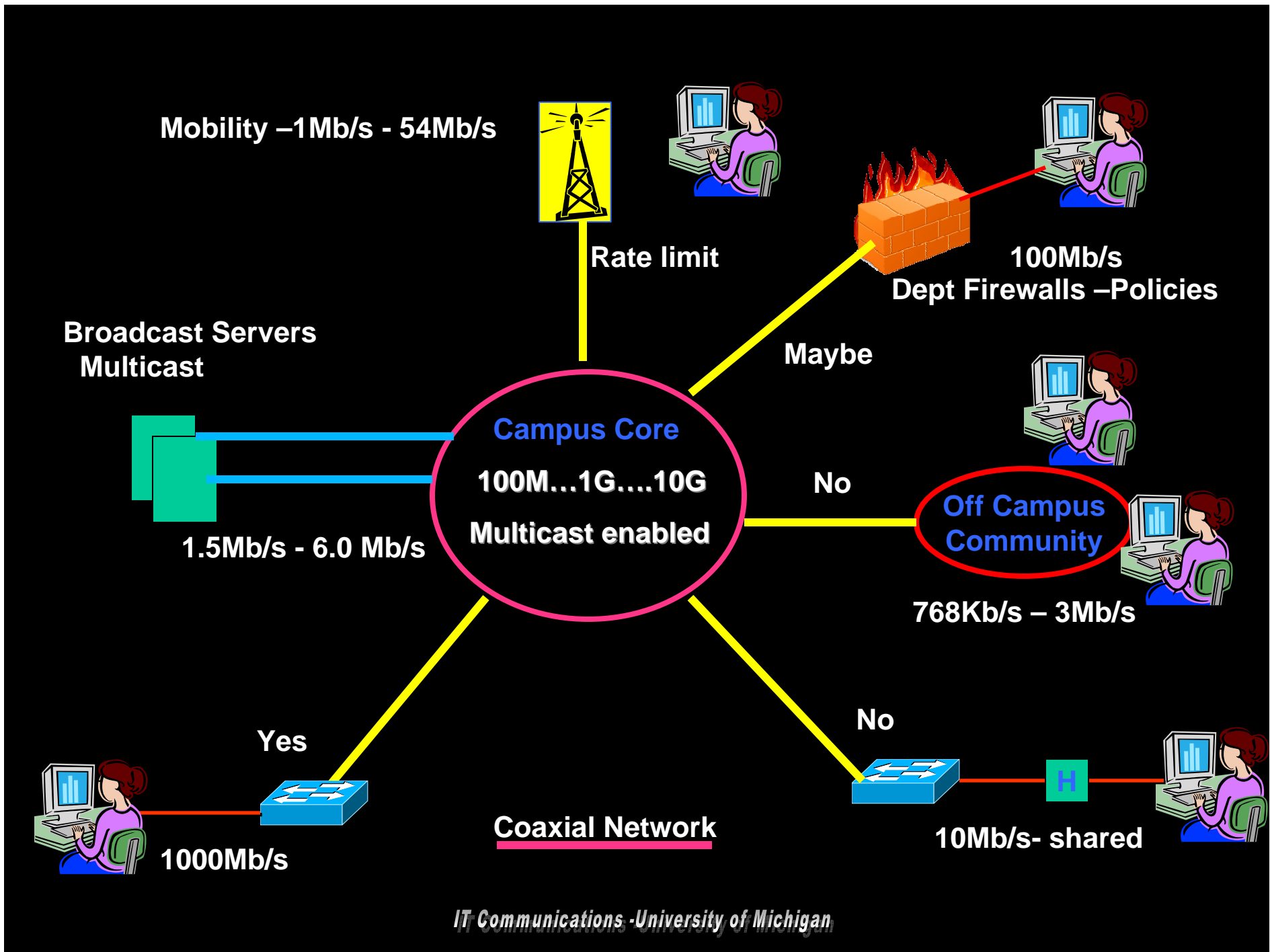
University of Michigan

ppatel@umich.edu

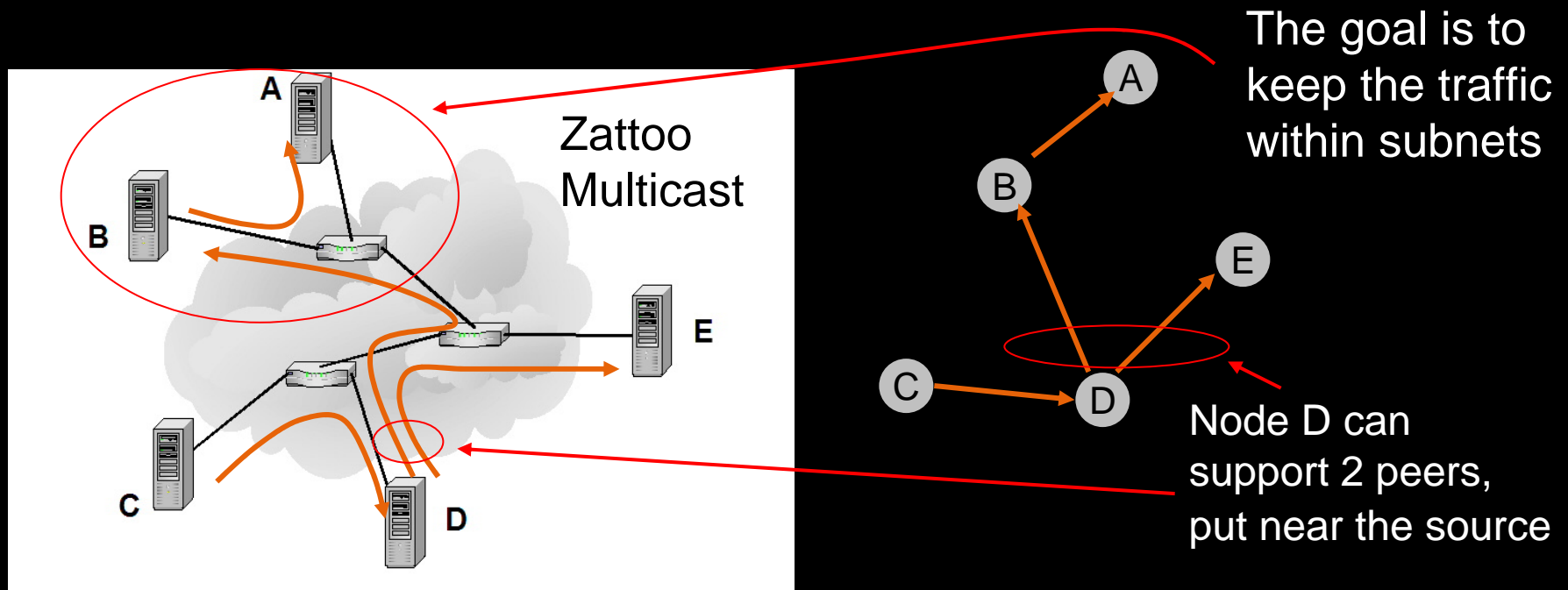


- Campus CATV Network Implementation
- IPTV Transport Challenges
- IPTV Zattoo P2P Architecture
- IPTV Zattoo Investigation System
- IPTV Investigation Results
- IPTV Technology Demonstration





- Hosts on the Internet connect to each other to form a peer-to-peer (P2P) multicast network
- TCP or UDP sessions form the P2P links
- Topology aware peering architecture



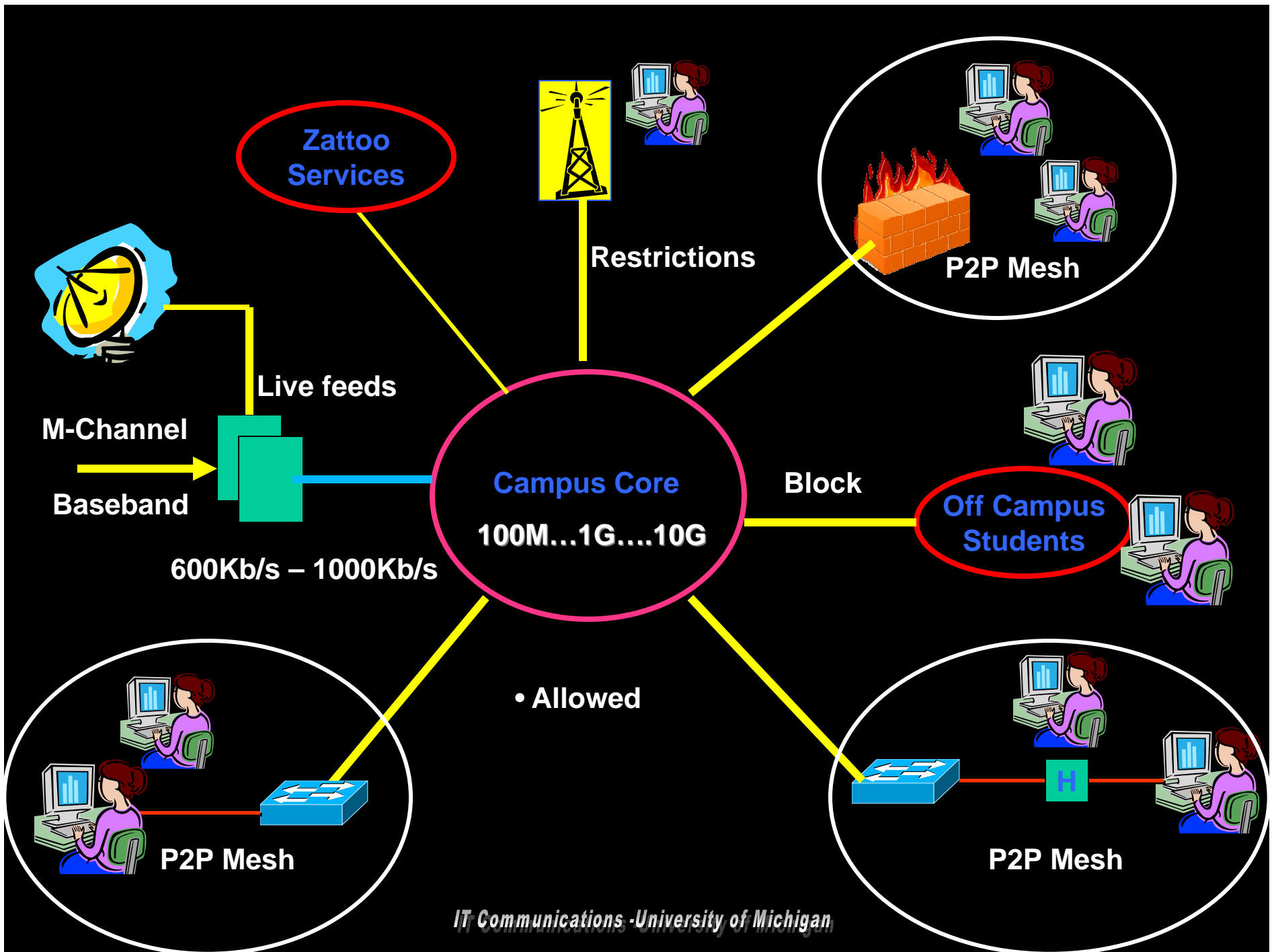
Lab Trial Headend equipment

- FTA and dish Receivers
- Campus HFC extension
- Linux Servers (100Mb/s)
- Number of Channels = 10

Encoders (MPEG-4/H.264/AVC)

- 384X288 – 600Kb/s
- 512x384 - 800Kb/s
- 624x468 - 1000Kb/s



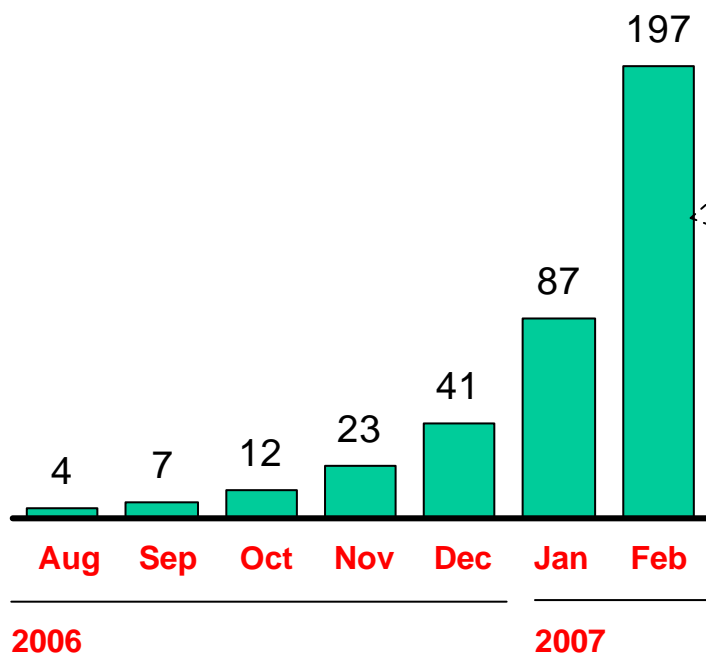


- Low bit rate - Excellent audio/video quality
- Client available for Linux, windows (XP/Vista) and Macintosh Machines
- CPU usage- acceptable on majority of the computers
- Channel switch time- 2 – 5 seconds (*Ad insertion*)
- Meets EU commercial content provider DRM requirements
- User and or network based reception service possible

Zattoo – User

Survey

Swiss Zattoo subscribers
Thousands



Triggering factors driving adoption
Percentage

“I use Zattoo because...”

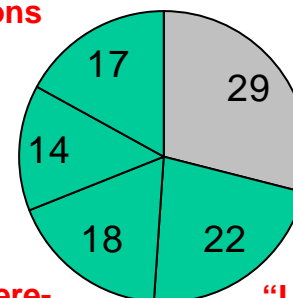
“I want to watch TV while doing other stuff with my PC”

Other reasons

“The TV is occupied”

“I’m in a different place than my TV”

“I don’t have a TV”



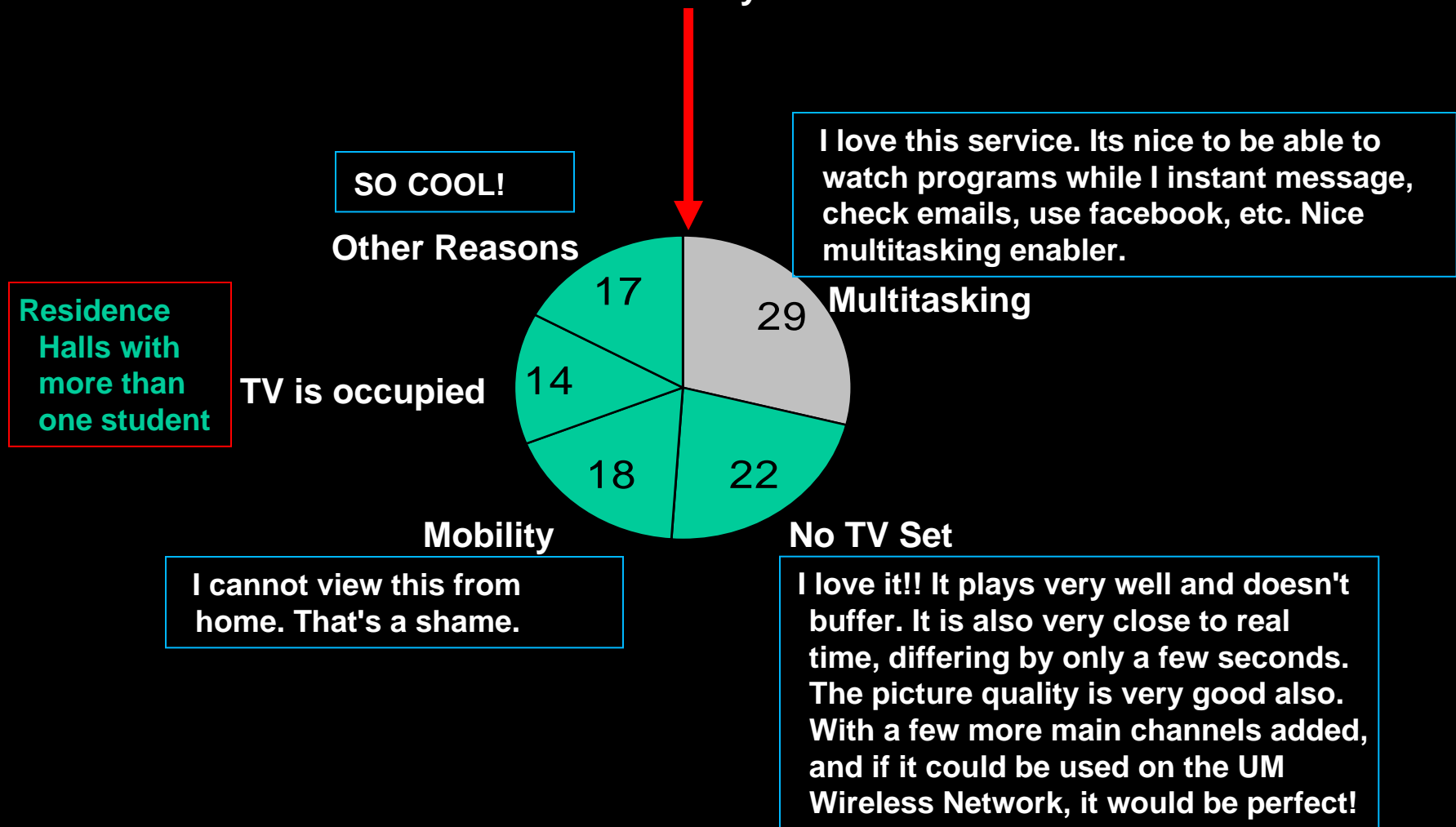
250'000 users in Switzerland (10% of all broadband users) in just over 6 mos.
Only thanks to word of mouth and media coverage

Zattoo is not a substitute but an addition and an extension to classic TV viewing
Broadcasters profit from extended reach

Source: Zattoo user database; Schober Partners Group study of Zattoo users, November 06-February 07

UM Feedback vs. Zattoo Survey

Zattoo Survey Chart

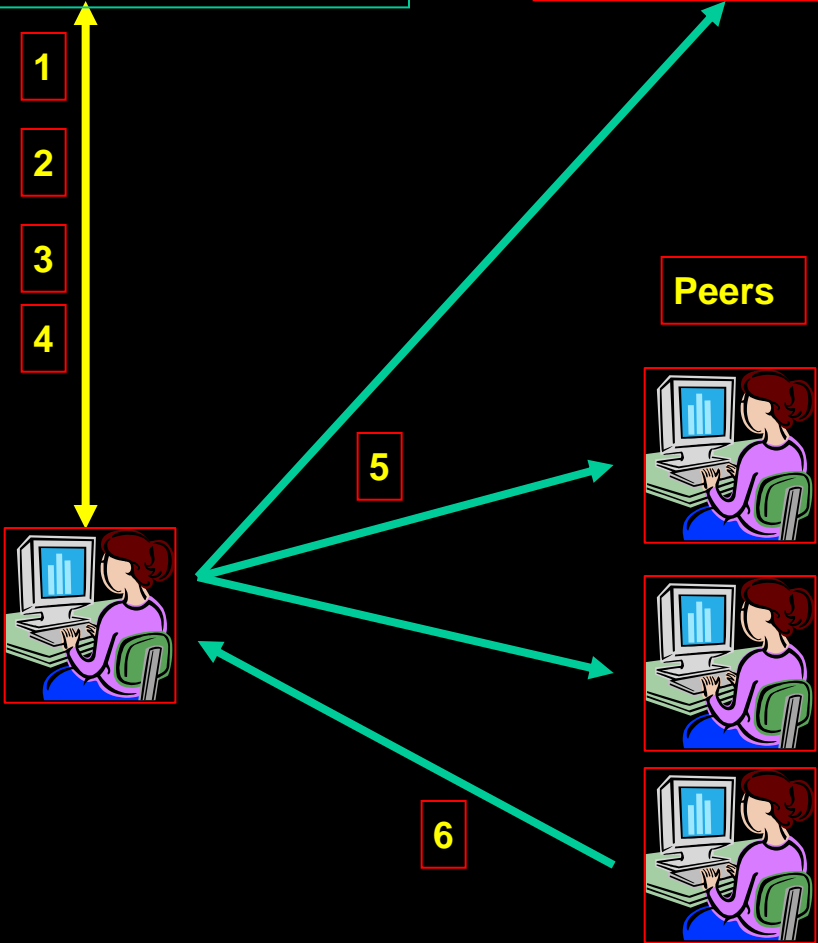


- **SURVEY Data**

- don't let the investigation fail...
- Great product, very enjoyable and appreciated.
- Great product. Keep up the good work!
- Great service!
- i absolutely LOVE Zattoo...keep up the great work!
- I cannot view this from home. That's a shame.
- I love it!! It plays very well and doesn't buffer. It is also very close to real time, differing by only a few seconds. The picture quality is very good also. With a few more main channels added, and if it could be used on the UM Wireless Network, it would be perfect!
- I love this service. Its nice to be able to watch programs while I instant message, check emails, use facebook, etc. Nice multitasking enabler.
- I think this is a GREAT idea and I hope it can become efficient!
- If this proves to be a viable service, I would like to see this available external to campus, via VPN
- its soo cool!
- Please get it to work under WINE in Linux. Thanks
- SO COOL!
- This is a good idea.
- This is a vey exciting application that i cant wait to use more
- This is an amazing idea and I absolutely love the program. One thing that needs to be changed though is the connection because the quality and sound is not perfect and needs a little work before I would be able to heavily use this.
- This is going to be a distraction, but it is so good to have this service
- Why do I need yet-another-password? It should use my kerberos password, or better yet, use accept a kerberos tgt.
- Wonderful service

Common Services
AAA, DRM, Statistics etc

**H.264 AVC
Broadcast Server**



- Authenticate (1,2)
- DRM (3,4)
- Tuning in ((5)
- Getting reception (6)

Demonstrate the Technology

Questions ?