

Lab course

Networked Multimedia Systems

Spring term 2017

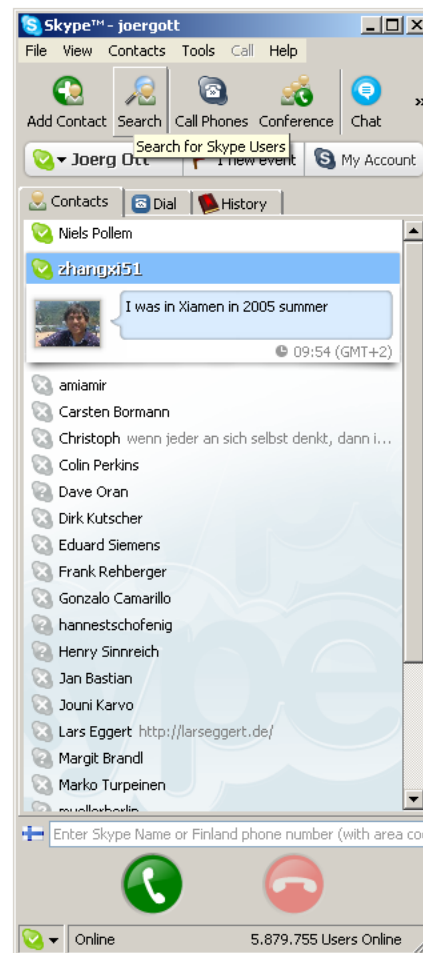
Sample Flavors of Internet Multimedia

- Real-time interactive media [was: telephony]
 - sipgate, Google hangouts, skype, WebEx, ...
 - Very likely your fixed phone line (over cable or DSL, or indirectly)
- Semi-interactive [was: walkie talkie]
 - Push-to-talk
- Messaging [was: voice mail, pagers]
 - Snapchat
- Offline media [was: VHS tapes, DVD rental, original Netflix]
 - Podcasts
- On-demand streaming [?]
 - YouTube, Netflix (2007), Amazon Prime, Google Play, Spotify, ...
 - Radio stations all over the world
 - P2P streaming
- Live streaming [TV]
 - IPTV solutions by ISPs, over-the-top (OTT) streaming
 - P2P streaming (e.g., PPlive)

Interactive Multimedia, Messaging, Presence: Hardware SIP phones, soft clients, (mobile) phones



[yesterday]




Web-based Real-time Media + Mobiles



Do-It-Yourself


Search for friends:

 Logged in as Varun Singh (<http://www.facebook.com/vr000m>) | Logout

(14:58:17) Varun Singh: joins
(15:03:00) Varun Singh: hi
(15:03:02) Albert Abello Lozano: gasdf
(15:03:18) Varun Singh: hoi
(15:03:23) Varun Singh: it works
(15:03:27) Albert Abello Lozano: hello
(15:03:29) Albert Abello Lozano: asdf
(15:03:34) Albert Abello Lozano: asdfgv
(15:03:44) Varun Singh: facebook+websocket+webrt


BeHero Home Tap Dance Tap BeatBox About Contact

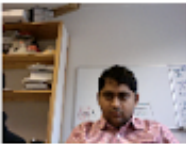
Score: 41625



Send

Leave





Hang up

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5

Telepresence



Market in 2016

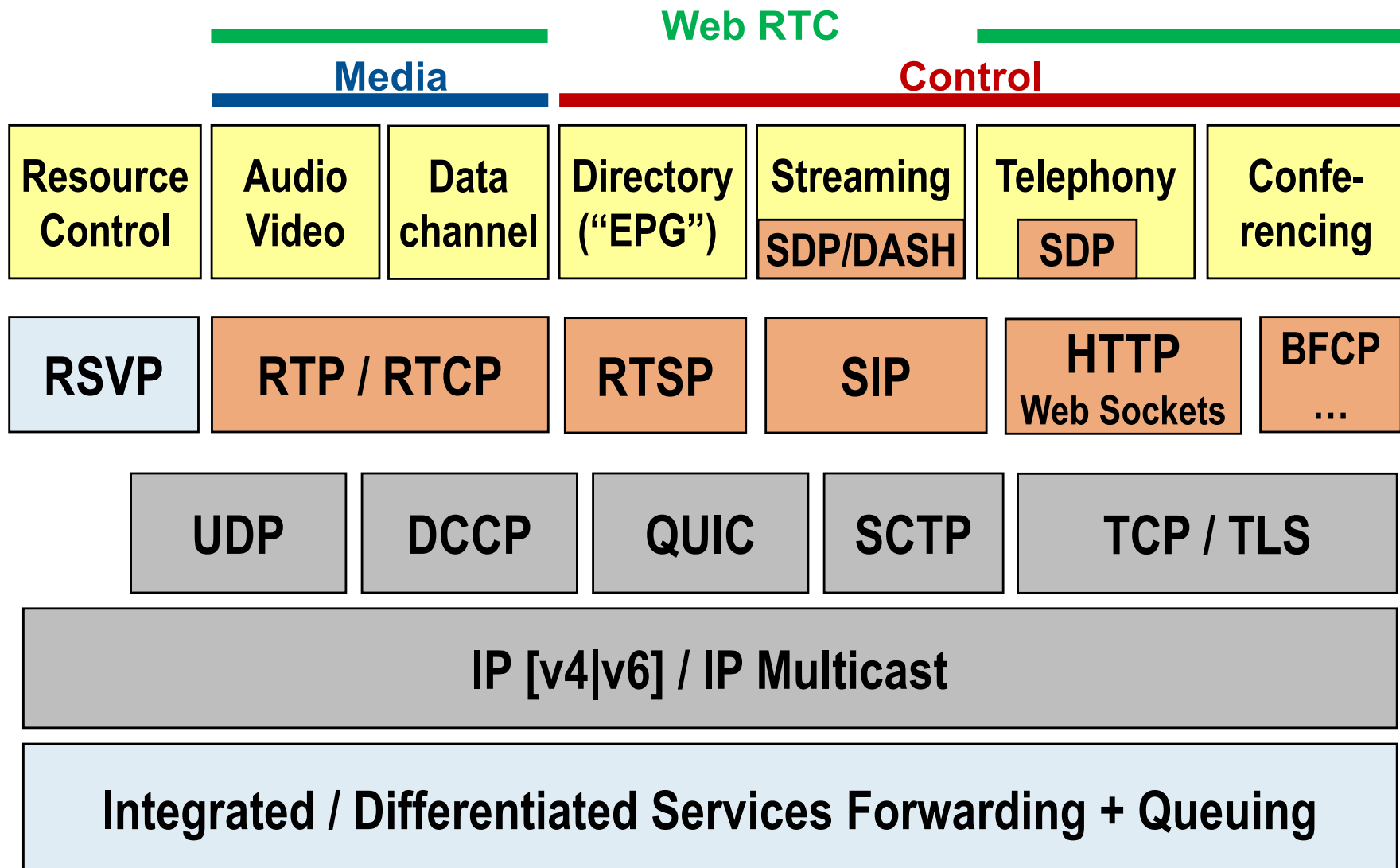
Upstream		Downstream		Aggregate	
BitTorrent	18.37%	Netflix	35.15%	Netflix	32.72%
YouTube	13.13%	YouTube	17.53%	YouTube	17.31%
Netflix	10.33%	Amazon Video	4.26%	HTTP - OTHER	4.14%
SSL - OTHER	8.55%	HTTP - OTHER	4.19%	Amazon Video	3.96%
Google Cloud	6.98%	iTunes	2.91%	SSL - OTHER	3.12%
iCloud	5.98%	Hulu	2.68%	BitTorrent	2.85%
HTTP - OTHER	3.70%	SSL - OTHER	2.53%	iTunes	2.67%
Facebook	3.04%	Xbox One Games Download	2.18%	Hulu	2.47%
FaceTime	2.50%	Facebook	1.89%	Xbox One Games Download	2.15%
Skype	1.75%	BitTorrent	1.73%	Facebook	2.01%
	69.32%		74.33%		72.72%

 sandvine

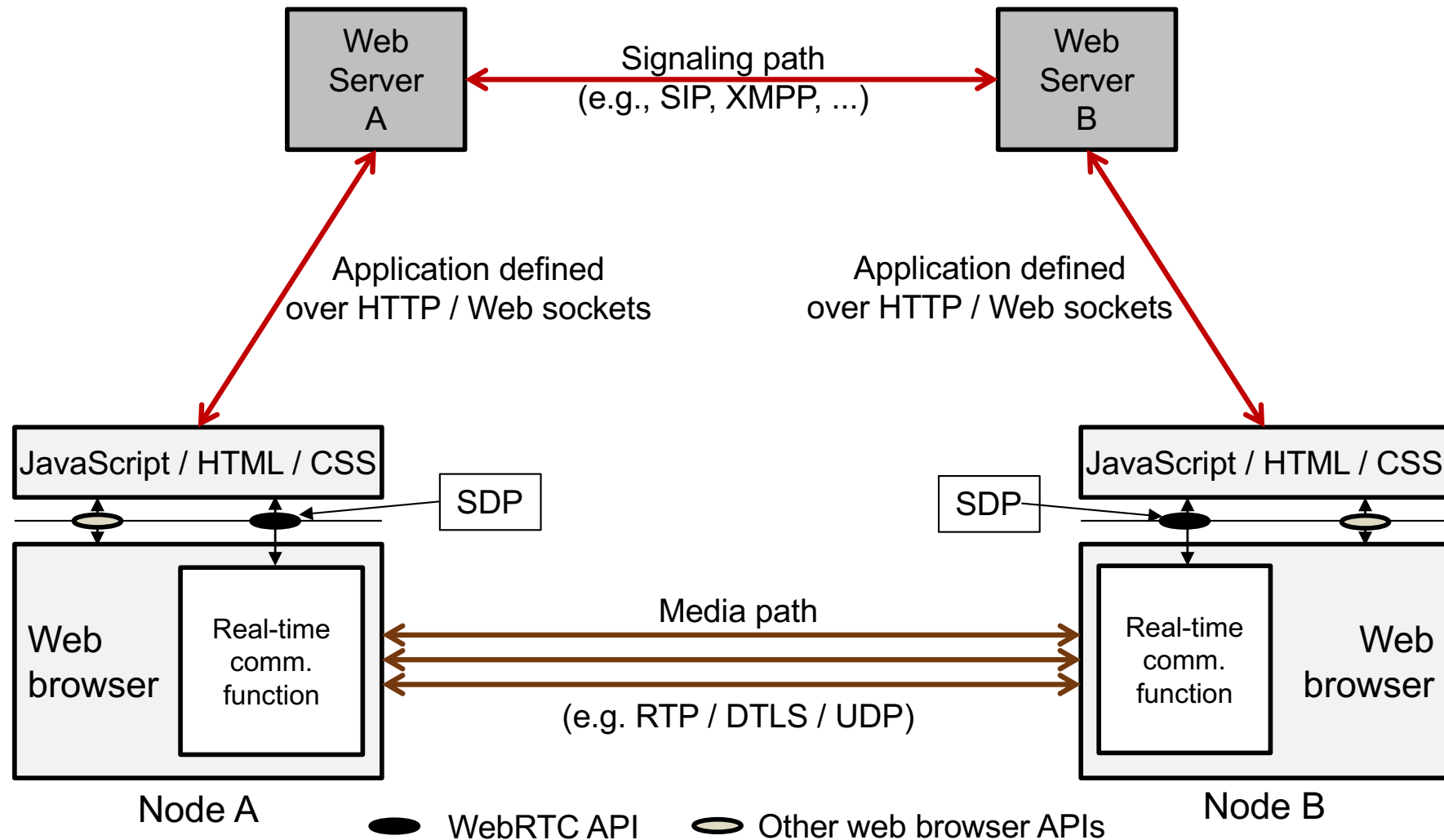
Source: <http://www.geekwire.com/2016/study-amazon-video-now-third-largest-streaming-service-behind-netflix-youtube/>

What?

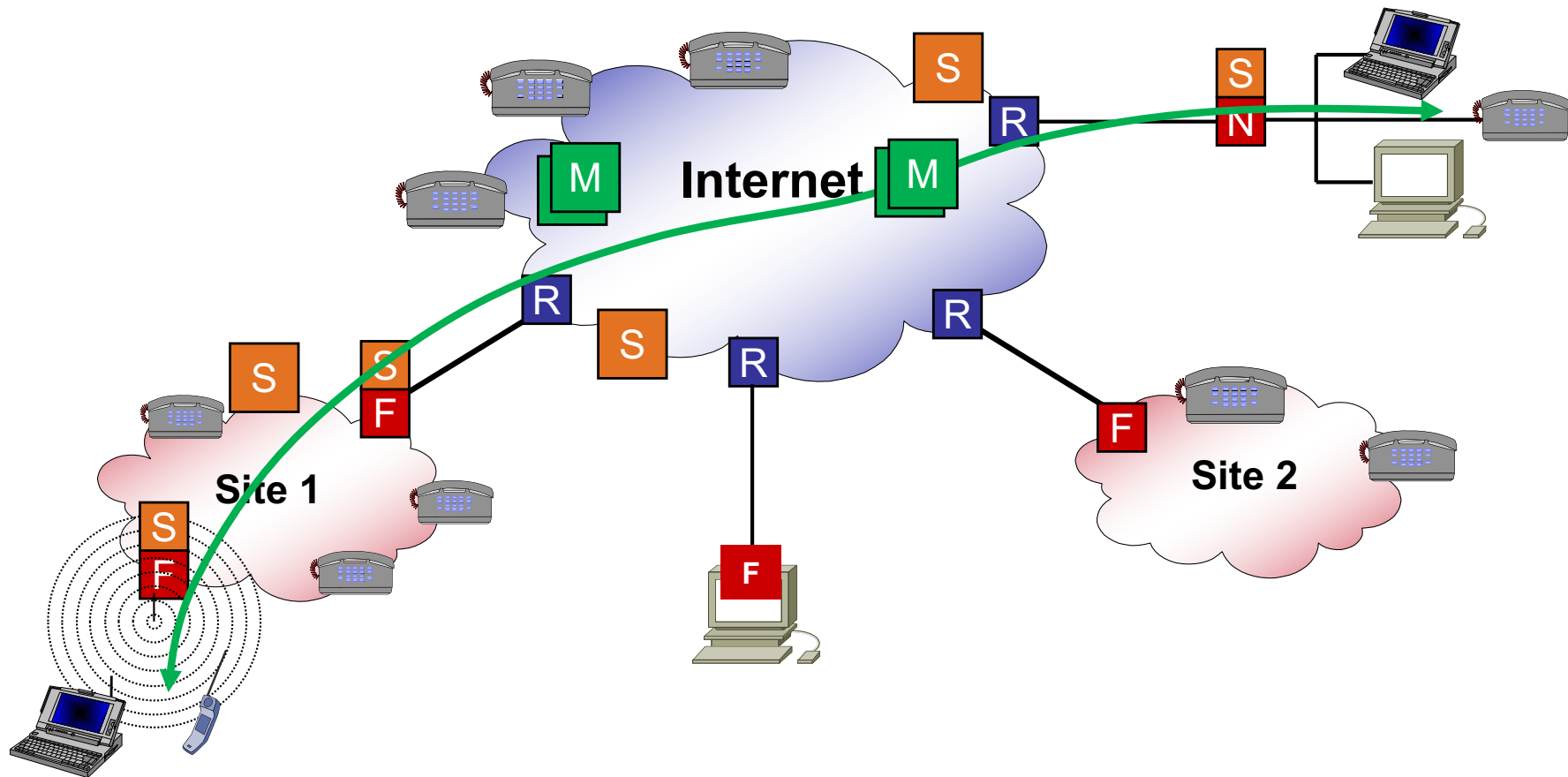
What we'll look at (1): Protocols



What we'll look at (2): Architectures



What we'll look at (3): Systems



How?

NMS class in a nutshell

- Focus: specs, design and implementation
- Interoperability with real-world systems
- Lectures to introduce the background, concepts, tools, ...
- Hands-on exercises for warm-up
- Coding and experimental validation
- 10 ECTS
- Working in groups of 2 – 3
- Grading based upon documentation, running code, contributions

Rough schedule

	Content
Week 1	Lectures on media transport basics
Week 2	Warm-up coding on media transport and infrastructure
Week 3	Media streaming
Week 4	Interactive media
Week 5	Lab assignments start
Week 6	Networking aspects and NAT traversal
Week 7	Multimedia measurements and evaluation
...	Regular exercise sessions
Week 12	Recap & summary; demos and presentations

Tools & prerequisites

- Use your own device
 - Laptop + mic + camera
 - Smart phone or tablet
- Expectations
 - OS knowledge (e.g. Linux)
 - System-level programming experience
 - As appropriate: know your development frameworks
 - C/C++ or Java
 - Scripting (e.g., PHP, python, perl, shell, ... -- whatever you'll need)
 - Web technologies: HTML 5, Javascript
 - iOS or Android native development (optional)

Next steps

- Moodle course details to come shortly
- Lectures + exercise slots
 - Mon 14 – 16
 - Tue 12 – 14
 - Fri 10 – 12
- We'll start in week 17
 - 24 April, 14 – 16
 - 25 April, 12 – 14
 - **27 April, 12 – 14 (Thursday!)**