Communication Systems Design (CSD) IK2200: 2014

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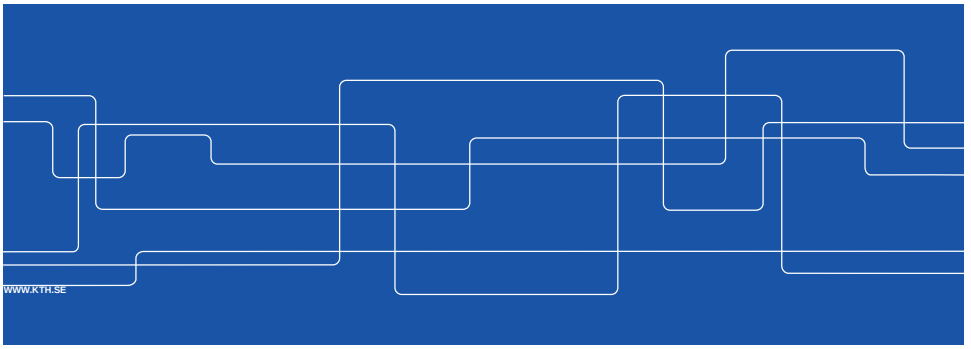


Course mechanics

Course web page

- KTH Social https://www.kth.se/social/course/IK2200/
- Notice *only* IK2200, 15-credit version

Project web pages

KTH Social https://www.kth.se/social/course/IK2200/

Kickoff, Midterm, and Final Workshop

Electrum 301

Workspace:

All project teams can make use of the shared workspace in room 211 in the Electrum building for their work.

Communication with the teaching team

Moodle, https://moodle.ssvl.kth.se/course/view.php?id=30

Email dmk@kth.se for enrolment key if you don't have it

Teaching team

Teacher, examiner:	Dejan Kostic, dmk@kth.se
Teaching assistants:	Georgios Katsikas, katsikas@kth.se
	Kirill Bogdanov, kirillb@kth.se
	Maciej Kuzniar, maciej.kuzniar@epfl.ch
	Peter Perešíni, peter.peresini@epfl.ch

Agenda for Tuesday, August 26

09:00	Introduction
10:00	Project presentations (Georgios)
11:00	Project presentations (Maciej, Peter)
12:00	Project presentations (Kirill)
12:45	Lunch
14:00	Students read course memo
15:00	Students introduce themselves
16:00	Discuss projects and group creation
17:00	End

Agenda for August 27-29

09:00-17:00 Discuss projects and group creation
On-demand meetings with the teaching team

Teaching team's expectations of students

Students taking this course are expected to:

- Fulfill the prerequisite requirements.
- Not underestimate the challenge of the course.
- Pull-their weight in the project.
- Contribute to the course by being engaged in the dialogue during seminars and on the web.
- Observe KTH rules and regulations.

Timing

Kickoff workshop week 0 (35): 26-29 Aug.

- Draft plan outline on website: 4 Sep. 12:00
- Complete version 1.0: Wed 11 Sep. 12:00

Midterm workshop week 10 (45): 22-23 Oct. 9-17

Including peer reviews, presentations, feedback

Final Workshop week 19: 07-08 Jan. 2015

- Press release, Video, Report, and Presentations 07 Jan.
- Exhibition 08 Jan.
- Lessons learned

Progress reporting

- Reports are due every Sunday noon
- Meetings with the teaching team every Monday 13:00 tentatively

Forming project teams

- Team size is six people
- Teams have to be formed by Sunday midnight, August 31
- As soon you have formed a team, email dmk@kth.se with
  - Team name
  - Team members (⇒ **one** email per team): name, master program
  - Your ranking of projects in decreasing order of preference (one ranking per team)
- If you fail to join a team, send an individual email to dmk@kth.se with your desired project ranking and a CV before Friday, August 29

  ⇒ The teaching team will assign you to team+project
- The teaching team announces the teams and projects on Sep 1

Working within a team

- Create a group on KTH social for the project web site
- Work together on the project plan
- Subdivide the work (volunteer?) and document in the plan
- Agree who will be updating the project web site, compiling weekly reports, midterm report, and the final report
- Decide who will give a demo, put together the poster, etc.
- Note: every team member should be able to give the final presentation (in full) and answer questions

Project plan overview (main points)

1. Introduction
2. Goals, objectives, deliveries, unique contributions
3. Approach: Methods and tools
4. Resources
5. Timing and dependencies: tasks/activities, milestones/tollgates, Gantt or PERT
6. Risk analysis: risk, severity, mitigation, contingency
7. References
8. Appendices

Project management

Agile rather than traditional methods, Scrum
www.rallydev.com/sites/default/files/intro_to_scrum_presentation.pdf

Individual weekly progress reporting: time spent on what with pointers to outcomes, input for grading

Analysis of deviation from the project plan with conclusions

Constructive vs. destructive frustration

Course Modules

- Project Website
- Technical Modules
  - Using Mininet
  - Lessons from Google
  - SDN in general
- Project Management
- Team Building
- Entrepreneurship
- Video production

Learning goals/Deliverables Matrix

1 = primary objective with the deliverable

2 = secondary objective with the deliverable

NA = not applicable

Learning goals/deliverables	Solve real-world problems	Independent learning skills	Effective project management	Communication skills when working	Communication skills when presenting	Work as a successful team
Project plan	1	1	1	2	1	2
Lessons learned	2	2	1	1	2	1
Midterm presentation	1	1	2	NA	1	2
Individual contribution	2	2	1	1	2	1
Final report	1	1	2	NA	1	2
Video	1	1	2	NA	1	2
Oral presentation	1	1	2	NA	1	2

Examination

Individual grades averaging on team result:

- Extra bonus for helping others to learn
- Individual grading based on progress reports, quality of deliverables and workshop performance

Conclusion: Make sure that individual contributions both to project results and to the learning of others are acknowledged

Research in (Experimental) Networked Systems

You “build” a system

⇒ Produce a piece of software

You evaluate your system

Publishable work satisfies one or both conditions:

- Your system is better (faster, more reliable more secure) than state-of-the-art
- Provides functionality that was not previously available

Research in (Experimental) Networked Systems

Benefits

- You build a working system (that becomes state-of-the-art!)
  ⇒ Immediate gratification
- You can deploy it over the Internet
- Others can use it
  ⇒ Get recognition in the research community and perhaps even global
- Often, it is impossible to correctly model a system
  ⇒ Have to demonstrate properties empirically

Detailed look at your projects (1/2)

- Research-inspired projects
- But you are **not** expected to create a contribution that goes beyond the state-of-the-art
- The aim is to get you ready to do your master thesis the following semester
- If you like what you are doing, you might take your software artifact and use it in your master thesis

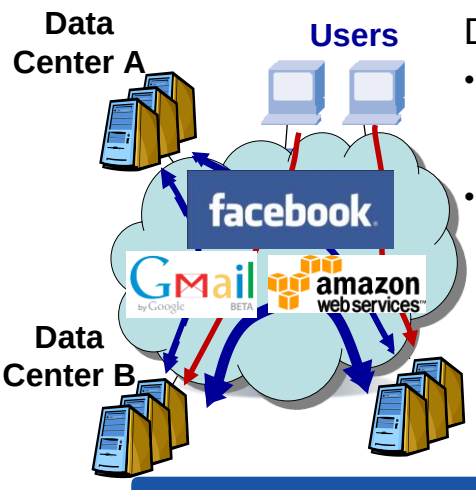
Detailed look at your projects (2/2)

- Projects are open-ended real-world problems that require significant effort
  - Locating information
  - Programming
  - Understanding what the system is doing
  - Debugging
  - Evaluating
- But, if you devise a thorough project plan and follow it you can successfully complete your project

  In many cases the proposed projects are based on ideas that have been verified (e.g., in Python)

Research Landscape

Challenge: Cloud Computing



Dictates new objectives

- 100% reliability
  Not there yet: Facebook, Amazon S3, Gmail outages
- High consistency, high throughput, and low latency
  Hard to achieve over changing network conditions

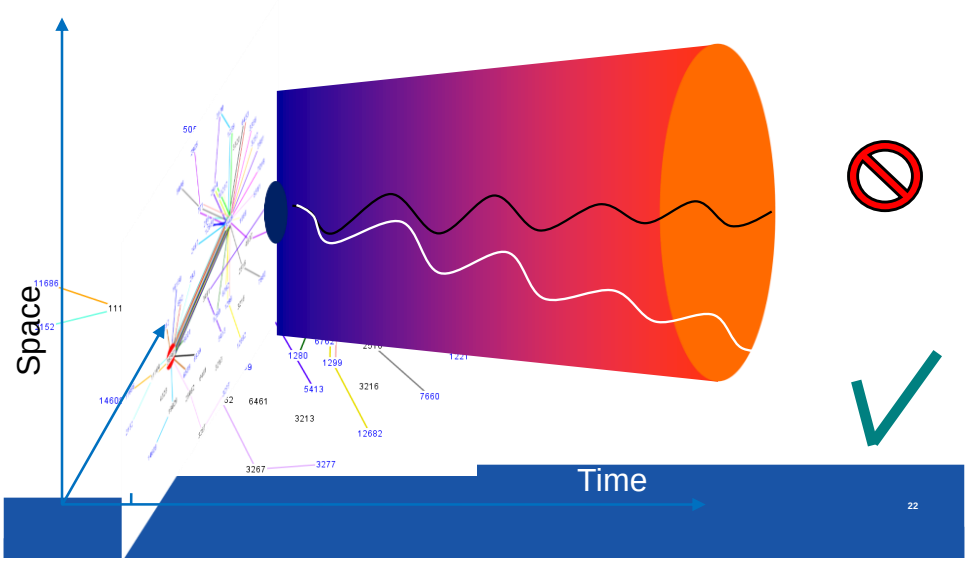
PROPHET Vision (ERC Project)

Make it easy to produce and manage distributed systems that achieve objectives

- High Reliability
- High Performance
- …

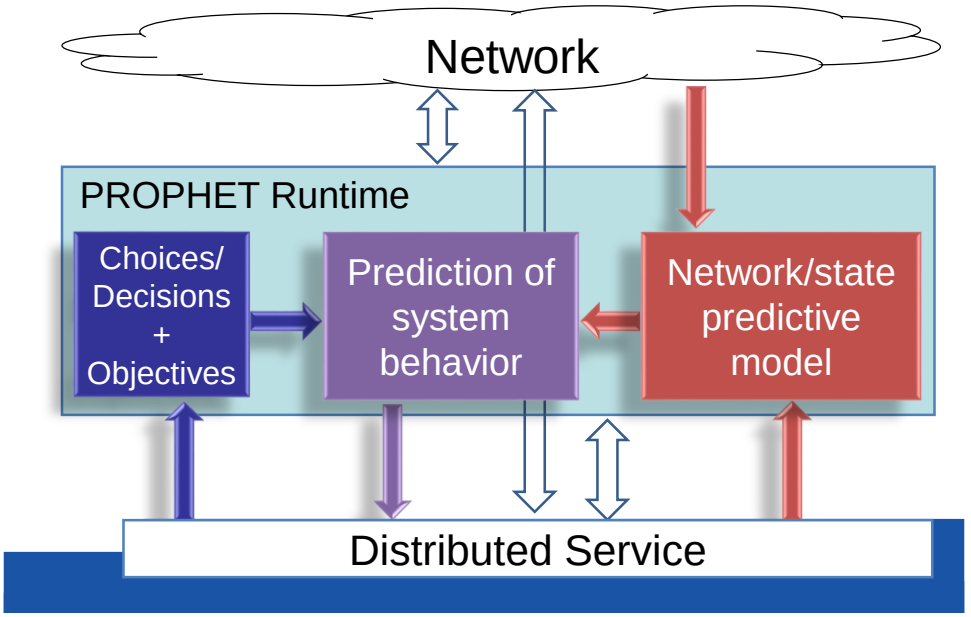
21

Key Insights: Online Testing and Execution Steering

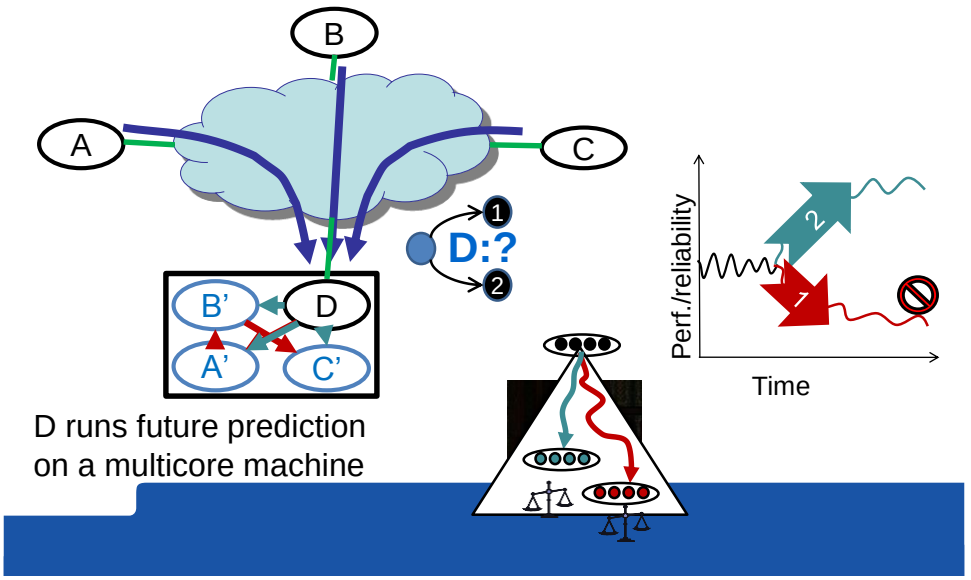


22

Explicit-Choice Architecture

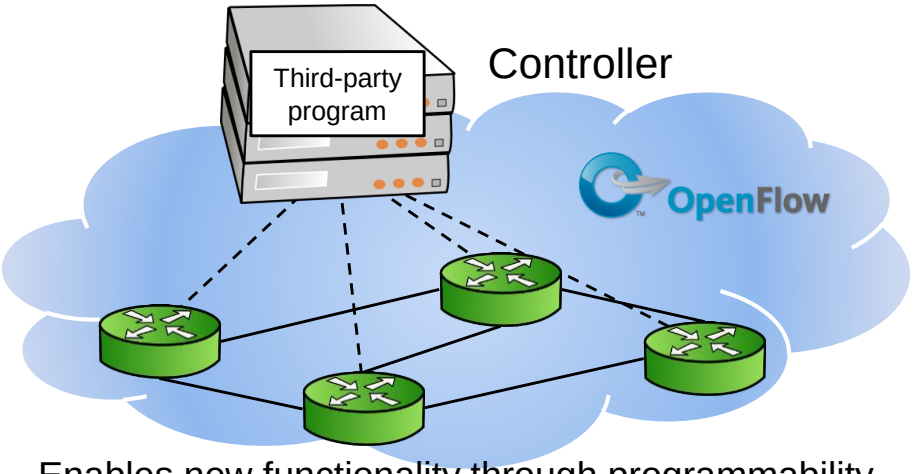


#1: Leverage Increases in Computational Power, Bandwidth, and Storage



D runs future prediction on a multicore machine

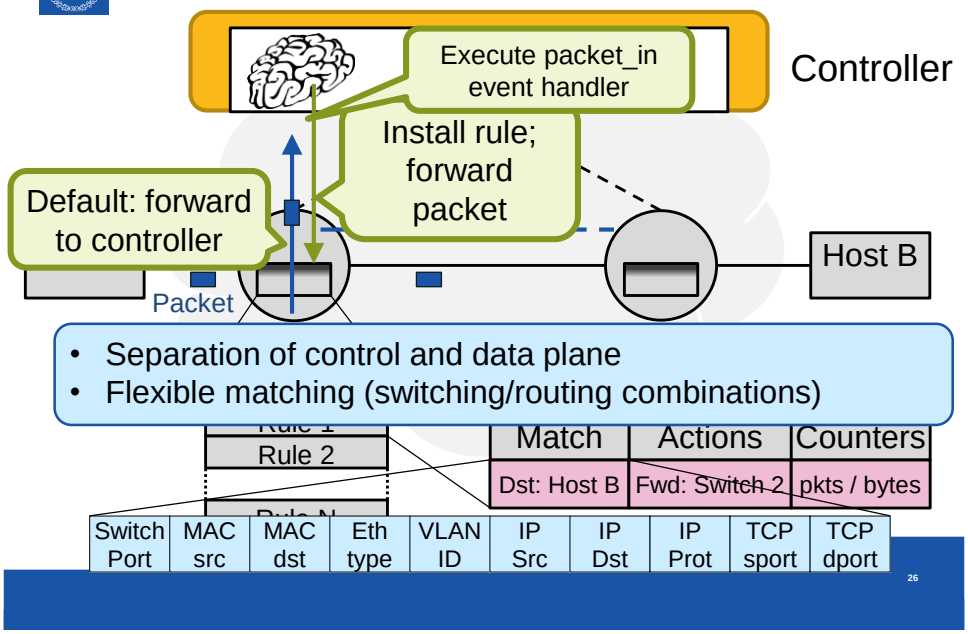
Software-Defined Networking (SDN)



Enables new functionality through programmability

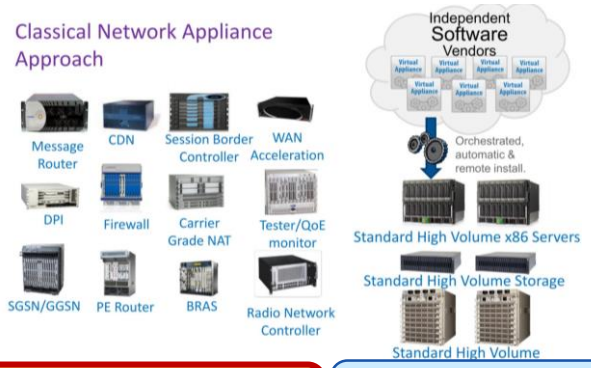
25

Quick OpenFlow 101



26

Network Functions Virtualization (NFV)



How to reduce CAPEX, OPEX, Space and Power Consumption?

Run open source software, on commodity off-the-shelf hardware

Source: *BT*

27