SECURITY AND NETWORK ENGINEERING
System and Network Engineering Research for Big Data Sciences

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Word Cloud

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“Information technology (IT) now permeates all aspects of public, commercial, social, and personal life. Bank cards, satnav, and weather radar... IT has become completely indispensable.”

“But to guarantee the reliability and quality of constantly bigger and more complicated IT, we will need to find answers to some fundamental questions!”
Reduction of Complexity by Integration

By combining services such as telephony, television, data, and computing capacity within a single network, we can cut down on complexity, energy consumption and maintenance.

- How can we describe and analyze complex information systems effectively?
- How can we specify and measure the quality and reliability of a system?
- How can we combine various different systems?
- How can we design systems in which separate processors can co-operate efficiently via mutual network connections within a much larger whole?
- Can we design information systems that can diagnose their own malfunctions and perhaps even repair them?
- How can we specify, predict, and measure system performance as effectively as possible?

SNE addresses a.o. the highlighted questions!
Fading Trust in Internet

Trust

Dependency

1980

2017

Research Gap!
What Happens in an Internet Minute?

- 20 victims of identity theft
- 47,000 new app downloads
- 204 million emails sent
- 61,141 hours of music
- $83,000 in sales
- 20 million photo views
- 320+ new Twitter accounts
- 100,000 new tweets
- 6,39,800 GB of global IP data transferred
- 135 new mobile users
- 100+ new LinkedIn accounts
- 6 new Wikipedia articles published
- 277,000 logins
- 6 million Facebook views
- 2+ million search queries
- 30 hours of video uploaded
- 1.3 million video views

And Future Growth is Staggering

Today, the number of networked devices = the global population
By 2015, the number of networked devices = 2x the global population
In 2015, it would take you 5 years to view all video crossing IP networks each second
There is always a bigger fish
Reliable and Safe!

This omnipresence of IT makes us not only strong but also vulnerable.

- A virus, a hacker, or a system failure can instantly send digital shockwaves around the world.

The hardware and software that allow all our systems to operate is becoming bigger and more complex all the time, and the capacity of networks and data storage is increasing by leaps and bounds.

We will soon reach the limits of what is currently feasible and controllable.

http://www.knaw.nl/Content/Internet_KNAW/publicaties/pdf/20111029.pdf
SMART Infrastructure
I will follow you!
The chart represents the availability of personal data on Facebook in 2007, with the default settings.

- **You**: The center of the chart, showing your data.
- **Friends**: Data visible to your friends.
- **Network**: Data visible to your friends and mutual friends.
- **All Facebook Users**: Data visible to all Facebook users.
- **The Entire Internet**: Data visible to everyone.

The diagram also shows the number of people with access to your data, ranging from 1 to 1.3 billion (1.3B). The chart indicates that in 2007, your data was available to 1.3 billion people.

Matt McKeon, May 2010
People need to understand that they are the product of Facebook and not the customer, according to media theorist and writer Douglas Rushkoff.

Speaking at the inaugural Hello Etsy conference in Berlin, the author of Program or Be Programmed said: "Ask a kid what Facebook is for and they'll answer 'it's there to help me make friends'. Facebook's boardroom isn't talking about how to make Johnny more friends. It's talking about how to monetise Johnny's social graph."
The constant factor in our field is Change!

The 50 years it took Physicists to find one particle, the Higgs, we came from:

“Fortran goto”, Unix, c, SmallTalk, DECnet, TCP/IP, c++, Internet, WWW, Semantic Web, Photonic networks, Google, grid, cloud, Data^3, App

to:

DDOS attacks destroying Banks and Bitcoins.

Conclusion:

Need for Safe, Smart, Resilient Sustainable Infrastructure.
CHANGE!
With knowledge comes power
With power comes responsibility
Apply your expertise with Ethics!