



SICS Center for
Networked Systems

SICS Center for Networked Systems Demo and poster descriptions

1. Implementing security in product lifecycle

The foundation of security in IT-products is based on firmware and processes for managing components over the entire lifecycle. Effective handling of worst case HW and/or SW malfunction, it allows for great cost savings, independent if targets are connected over wire, wireless or even disconnected.

Contact: Hans Thorsen, T2 Data AB, hanst@t2data.se

2. Anomaly detection for disturbance monitoring in mobile networks

We illustrate how statistical anomaly detection can be used to sieve through the large amounts of alarms generated in the mobile phone network, to find units with strange behaviour. Such behavior may indicate a need for service, and may if unnoticed cause more damage which may lead to larger disturbances.

Contact: Anders Holst, Ph D., SICS CNS, aho@sics.se

3. Skiselector

SkiSelector is a registered trademark of patent pending technology for measuring and defining the features of cross-country skis. SkiSelector have set the ground for delivering new valuable services for the world of cross-country skiing. SkiSelector is offered as a full service to retail stores, manufacturers, national teams, and rental businesses. SkiSelector Services includes: The SkiSelector measuring machine, service, support, spare parts, and transportation in Europe. SkiSelector has been used at the Olympics in Turin 2006 and is used by world leading companies. In 2006 the SkiSelector has been established in Sweden,

Norway, Germany, Austria, Switzerland and, in the beginning of 2007 Finland will also have access to the SkiSelector services.

Contact: Peter Stenlund, Vendolocus Development AB, peter@skiselector.com

4. Generating Controlled Radio Interference

Radio interference plays a central role for the performance of Wireless Sensor Networks (WSN). Interference not only leads to packet loss, but it also affects the function of MAC and routing protocols. Hitherto, testing the impact of interference on WSN experimentally has been difficult because of the unavailability of low-cost tools to create reproducible and well-controlled interference patterns. In this demo we present a simple and inexpensive method to generate controllable and repeatable interference patterns for 802.15.4 devices.

Contact: Thimo Voigt Ph D. group manager and project leader, SICS CNS, thimo@sics.se

5. A Software Radio-Empowered Sensor Network

Low power wireless sensors are limited by current radio technologies to short communication range and low throughput. We envision that future radios with advanced software programmable encoding and modulation will bring sensor networks unprecedented flexibility and performance. We have taken a step towards realizing this vision by designing a software-based, narrow-band transceiver using the GNU Radio software and the Universal Software Radio Peripheral hardware. We have verified the compatibility of our implementation with existing wireless sensor platforms. We demonstrate the flexibility of our design with sensing applications running on a sensor network communicating over hybrid radios.

Contact: Zhitao He, M Sc., zhitao@sics.se

6. SunSPOTify: Combining Internet of Services with Internet of Things

Today the Internet mainly consists of large servers and desktop or mobile clients. This is now changing, and in a near future there will be millions and millions of smaller units making the Internet larger and more fun! This demo will show one basic example of how to combine these new embedded devices with traditional Internet services.

Contact: Joakim Eriksson, Researcher, SICS CNS, joakime@sics.se

7. Future directions for IPTV distribution scheduling

Today it has become popular to distribute TV over IP, so called IPTV. One way of limiting the bandwidth requirements is to employ peripheral storage devices (caches) located closer to the customers. These can also be used for pre-distributing TV-style content based on predicted demand.

Basic mechanisms for scheduling such distribution as been investigated in work done during the first phase of CNS. During this year we plan to generalise these results to settings where the available bandwidth varies throughout the network and where cache placement, size and replacement policies are also parameters to the scheduling problem.

Contact: Per Kreuger, Ph D., SICS CNS, piak@sics.se

8. Interest Driven Large Scale Publish/Subscribe Systems

A key pre-requisite for supporting Internet-scale distributed applications is the ability to efficiently distribute multicast messages to multiple subscribers dispersed across numerous multicast groups. In this poster we present a completely decentralized gossip-based publish/subscribe system which achieves that by dynamically organizing peers with similar subscriptions into dissemination structures which preserve locality in the subscription space. In doing so, we are able to significantly reduce the message propagation and data replication costs.

Contact: Sarunas Girdzijauskas, Ph. D, Post-doc researcher, SICS CNS, sarunas@sics.se

9. Trade-offs in Distributed Content Caching

Analysing how different distributed caching strategies effect performance is very important when a network provides services to higher level applications. Strategies ranging from highly optimized caching for specific data to best effort heuristics all comes with some overhead to the network. Our aim is to create realistic models of content distribution networks and, by analysing the dynamics of the model, understand the trade off between overhead and performance of different caching strategies. The theoretical tools used in the analysis are master equations used to treat dynamical stochastic systems in physics, chemistry and economic.

Contact: John Ardelius, Researcher, SICS CNS, john@sics.se

10. Simulation of IPTV caching strategies

IPTV, where TV channels are distributed using IP multicast, has become popular and wide spread. IPTV also means an evolution to time-shifted TV where viewers can choose to watch the programs at anytime. But distributing individual TV streams to each viewer requires a lot of bandwidth and is a big challenge for TV operators. We simulate IPTV distribution and investigate how caching can be used to limit the bandwidth requirements.

Contact: Henrik Abrahamsson, Researcher, SICS CNS, henrik@sics.se

11. yactoNS: A minimal, ultrafast network simulator

The network simulator yactoNS is dedicated to the sole purpose of evaluating algorithms for measuring available capacity. On an ordinary PC, it is able to simulate over 10 million packet transmissions per second, corresponding to a real-time bit rate of 120 G bit/s. This allows accurate estimation of capacity parameters using straight-forward Monte Carlo methods.

Contact: Martin Nilsson, Assoc.Prof, SICS CNS, mn@sics.se

12. A statistical method for detection of latency shifts and network faults

We demonstrate an adaptive approach to detection of latency shifts and network faults, focusing on reduced requirements on manual configuration. The statistical method that we use for detecting variations in the network behaviour is based on observing current network conditions via probing. Algorithm parameters are autonomously adjusted to new statistical observations, while gradually forgetting older observations. User parameters are set as costs or probabilities, facilitating configuration and management efforts. Detected anomalies are isolated to a certain link or node based on collaboration between network equipment.

Contact: Rebecca Steinert, Researcher, SICS CNS, rebste@sics.se

13. Robust routing in IP networks

Routing configurations that have been optimized for a nominal traffic scenario often display significant performance degradation when they are subjected to real network traffic. These degradations are due to the significant traffic variations caused by demand fluctuations, component failures and network reconfigurations. Within CNS project seven we have studied how traffic variations can be captured in a mathematical model that can be incorporated in an optimization problem. Furthermore, we have outlined methods to efficiently find routing settings that are optimized for all traffic variations described by the uncertainty model.

Contact: Anders Gunnar, Researcher, SICS CNS, aeg@sics.se

14. Networked System Virtualization for Security

We will present an approach to build a secure virtualized execution environment for networked systems that operate on regular machine code, by modifying it at run-time, by injecting software checks that limit the application. As these checks can be arbitrarily complex, the technique is well suited for applying advanced resource constraints, spanning multiple hosts.

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