IRT Tests in Media Storage Networks

EBU Media Storage Workshop

Markus Berg, Madeleine Keltsch
Network Technologies

Agenda

Project partners

Motivation

Test build-up

Tests/Results

Conclusions

Next steps

Background

- Networked production becomes „standard“
- Very high requirements for networks in production
- The (often unpredictable) bursty characteristics of file transfer increase the requirements towards (storage-) networks even more
- How can the different requirements be realised with standard network technology?
- What are the problems to be expected?
- The test project was initiated at an internal ARD/ZDF workshop at IRT in 2010.

Partners in the test project

Institut für Rundfunktechnik

Cisco

Dimension Data

CandIT Media

AVID

Motivation

IRT

- Analysis of the bursty behaviour of editing systems and its negative impacts i.e. packet loss.
- Build up of a realistic test environment (also as a showcase)
- Build up of know how to support broadcasters
  - There are already concrete requests concerning the burst issues
- Build up of measurement expertise
- Development of a software to simulate AVID and FCP clients

Motivation

Dimension Data

- To position Dimension Data as a knowledgeable partner for broadcast networking projects
- To show the capabilities and limitations of different broadcast storage solutions
- To show the capabilities and limitations of different network protocols for broadcast storage networks.
- To show the capabilities and limitations of different network devices for broadcast storage networks.

Motivation

CandIT Media

- To demonstrate the WARP cluster as a powerful central storage solution for FCP based editing
- To demonstrate the WARP cluster as an alternative for the ISIS storage for AVID based editing
- To test the behavior of a client network in between.

Motivation

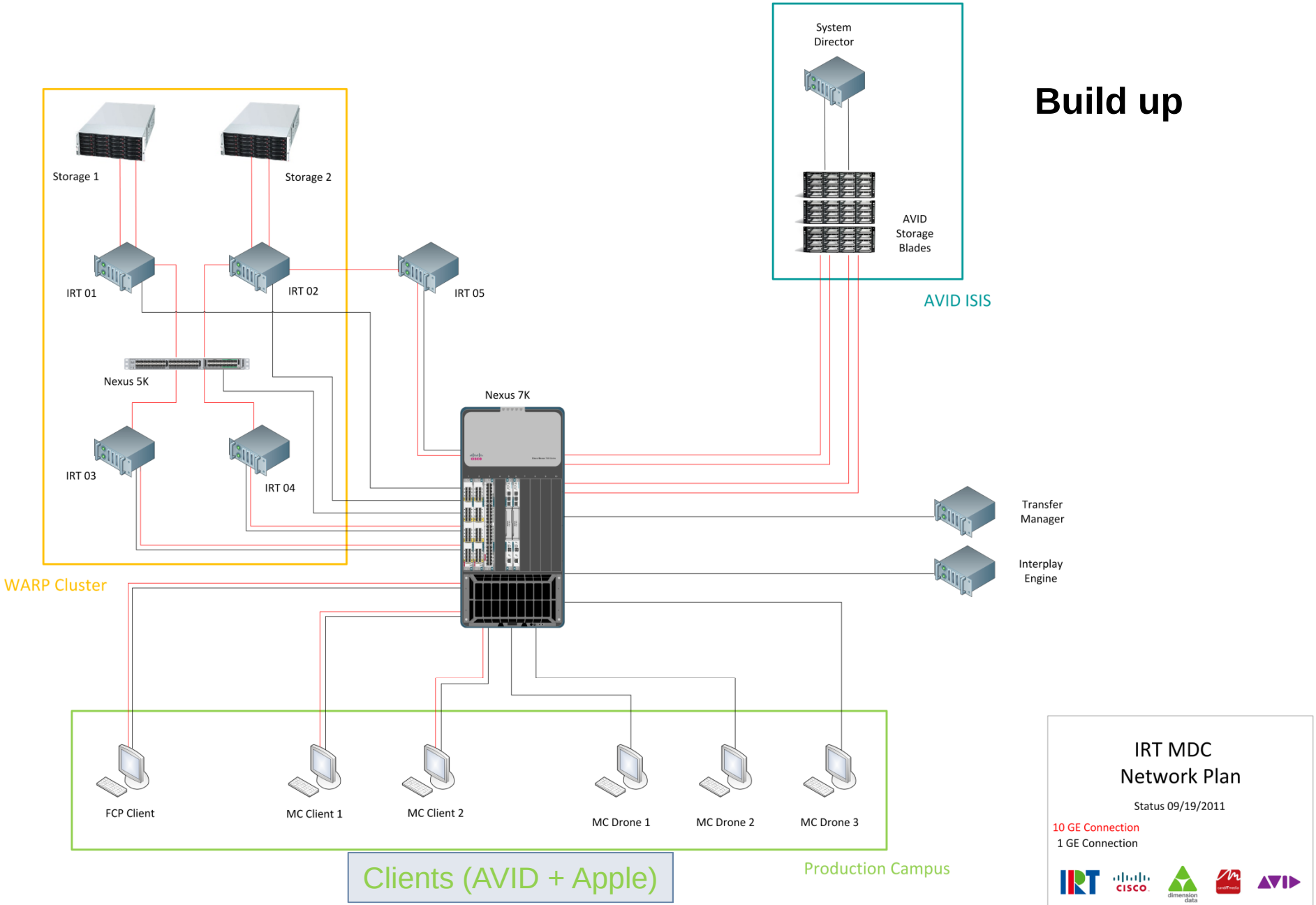
Cisco

- Media Datacenter Solutions for Production and Distribution as integral part of the overall Cisco Broadcast & Media architecture
  - Focus here is on Cisco components, which address the extremely demanding media traffic and as such are able to build a solid fundament for a digital EtE workflow infrastructure.

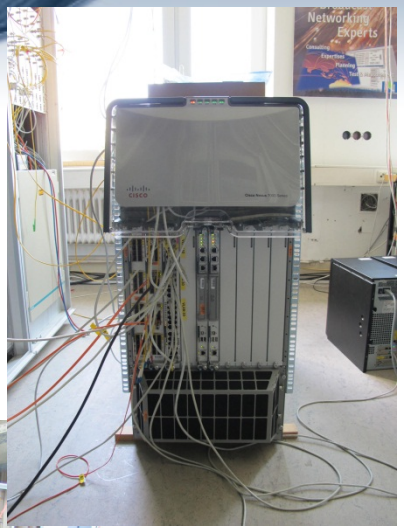
Cisco goals

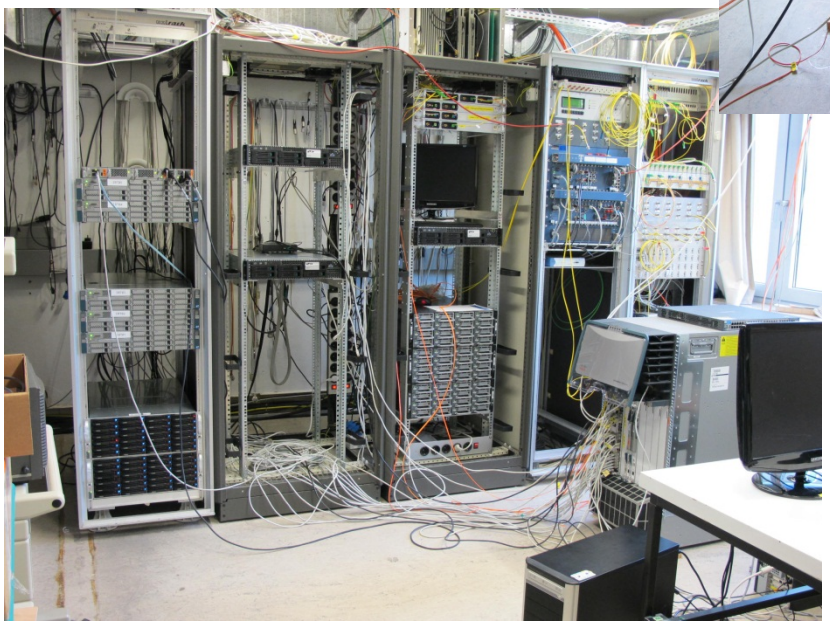
- Demonstrate and prove the eligibility of the Cisco Nexus 7000 within a broadcast-production environment targeting cost reduction based on consolidation of media applications and –infrastructures.
- Demonstrate and prove the user-friendliness (usability) of sophisticated IP networking functionalities such as e.g. virtualization, QOS and high-availability within a broadcast media workflow environment.
- Definition of a collaborative, network based Media Datacenter Architecture for quicker and easier access to creative assets based on the Cisco USC server platform
- Supporting the IRT while developing test methods for such infrastructures.

Build up



Impressions





Test cases (excerpt) – main focus: network
Tests are still performed currently!

Bursty behaviour of editing systems

Final Cut Pro 7 Client Connection to WARP Cluster

- NFS examination
- Network stress test (1 GbE - 1 GbE)
- Network stress test (10 GbE - 10 GbE)
- Network and buffer-stress tests (10 GbE - 1 GbE)

Media Composer Client Connection to WARP Cluster

- SMB examination
- Network stress test (1 GbE - 1 GbE)
- Network stress test (10 GbE - 10 GbE)
- Network and buffer-stress tests (10 GbE - 1 GbE)

Test cases (excerpt) (2)

Media Composer Client Connection to AVID ISIS

- ISIS protocol analysis
- Network stress test (1 GbE - 1 GbE)
- Network stress test (10 GbE - 10 GbE)
- Network and buffer-stress tests (10 GbE - 1 GbE)
- QoS test
- Link aggregation between Nexus7K and ISIS (AVID initiated test)
- Media Composer Client via 1GbE IP-phone with switching functionality (AVID initiated test)

Test cases (excerpt) (3)

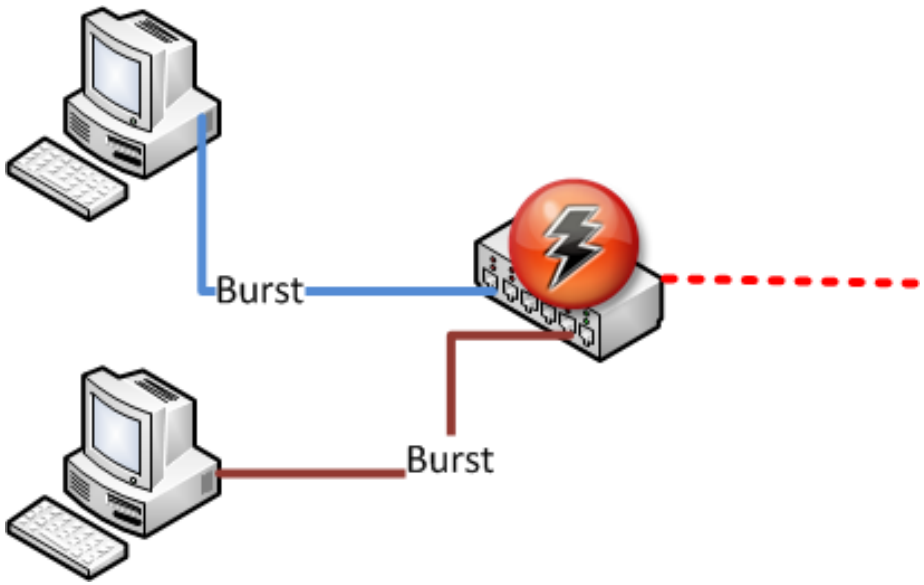
Storage Hardware Test (WARP) – to be confirmed

- Redundancy/Loss of connectivity
- Simulation of a power supply failure
- Hard disc crash

Nexus7K Hardware Test

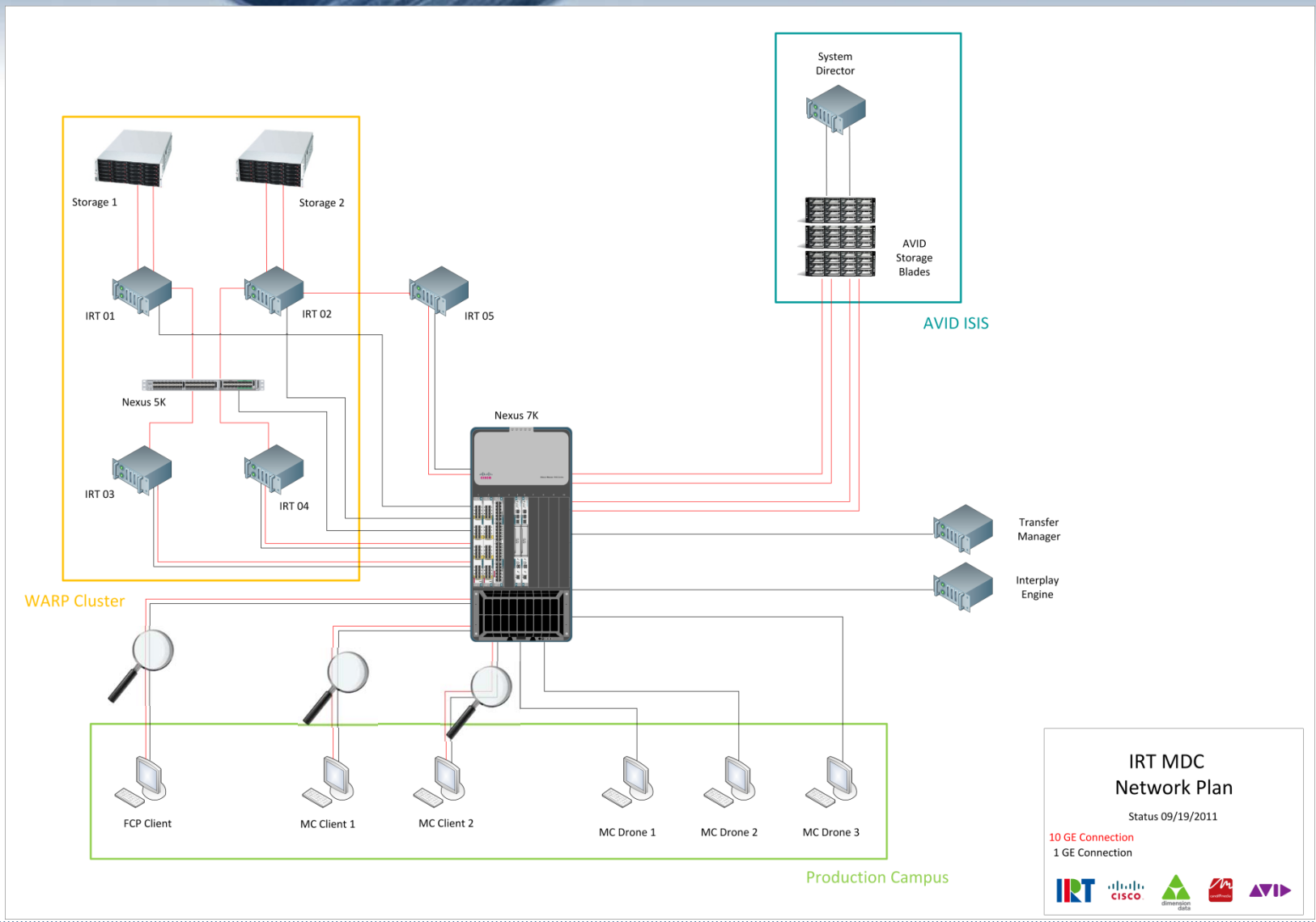
- Simulation of supervisor/controller failure
- SW-Update during operation
- Simulation of a power supply failure
- Failure of single processes
- Failure of a switching fabric

The „Burst Problem“



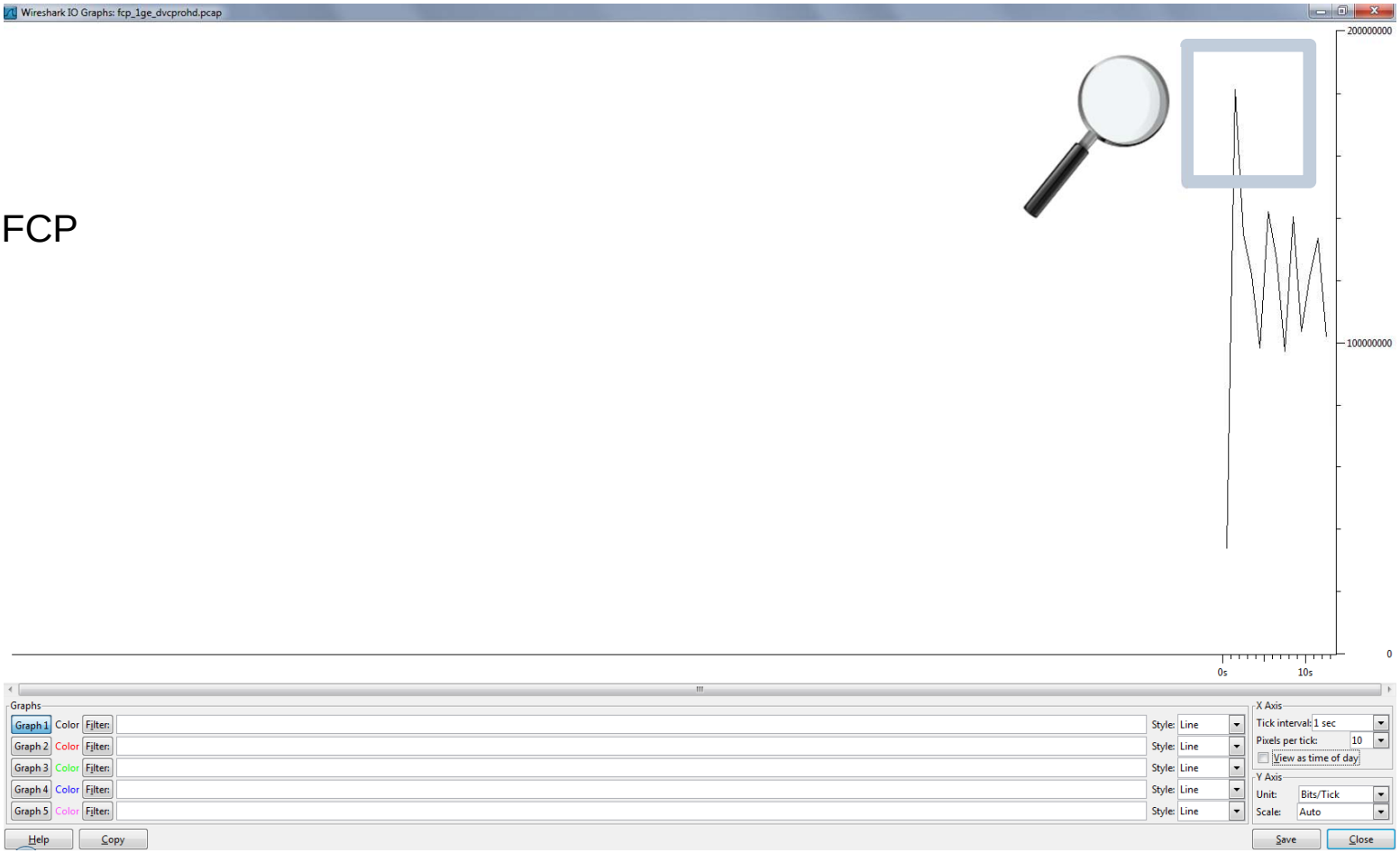
Editing systems create a high amount of extremely fast consecutive bursts!
-> Possible buffer overflow in the switch -> packet loss-> bit rate decreases!
-> Applications are disturbed-> a higher number of clients increases the risk
-> buffer size of switches becomes an important criterion!!

Test case bursts caused by editing systems: A deeper look

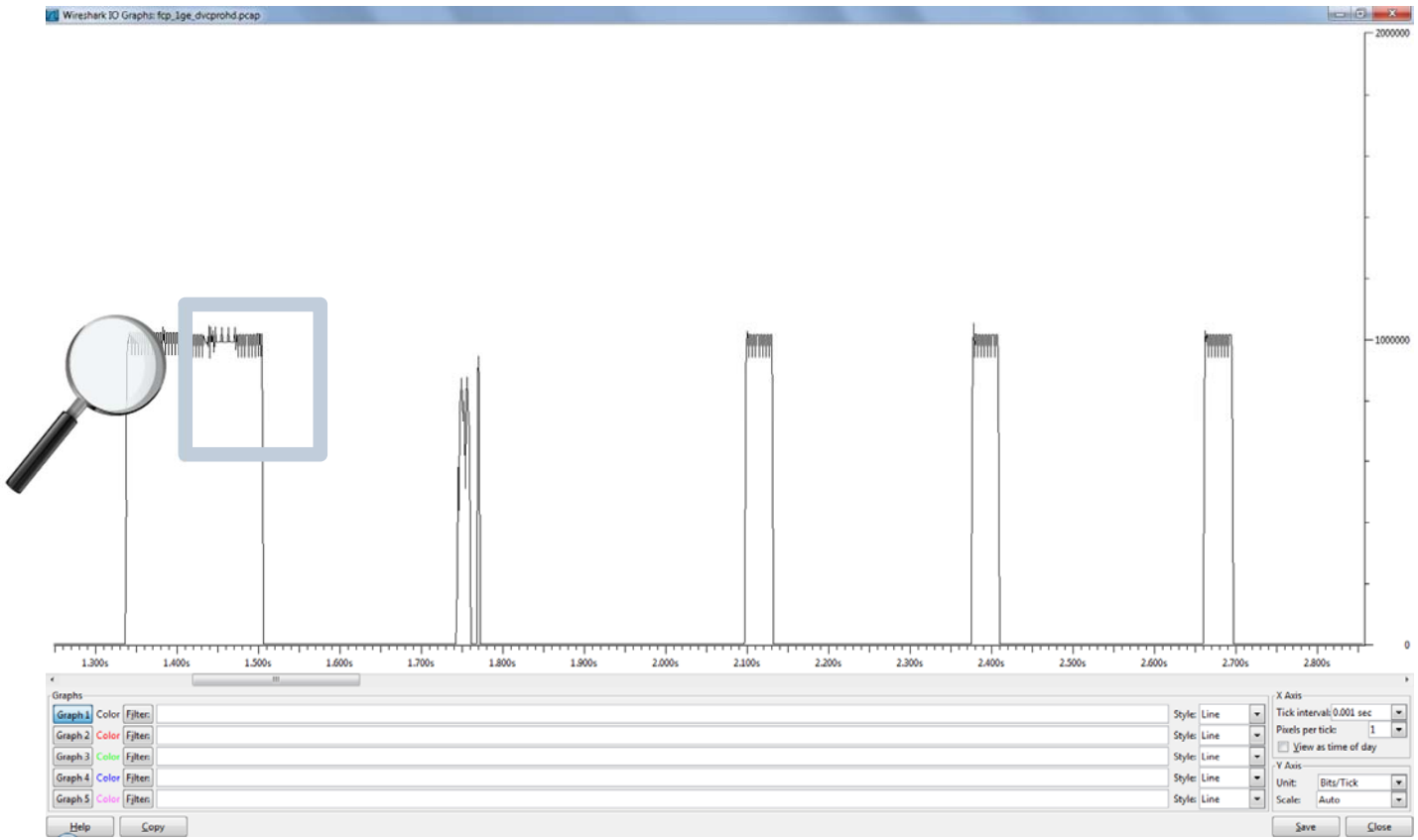


Results: Prefetch = 1 Burst?

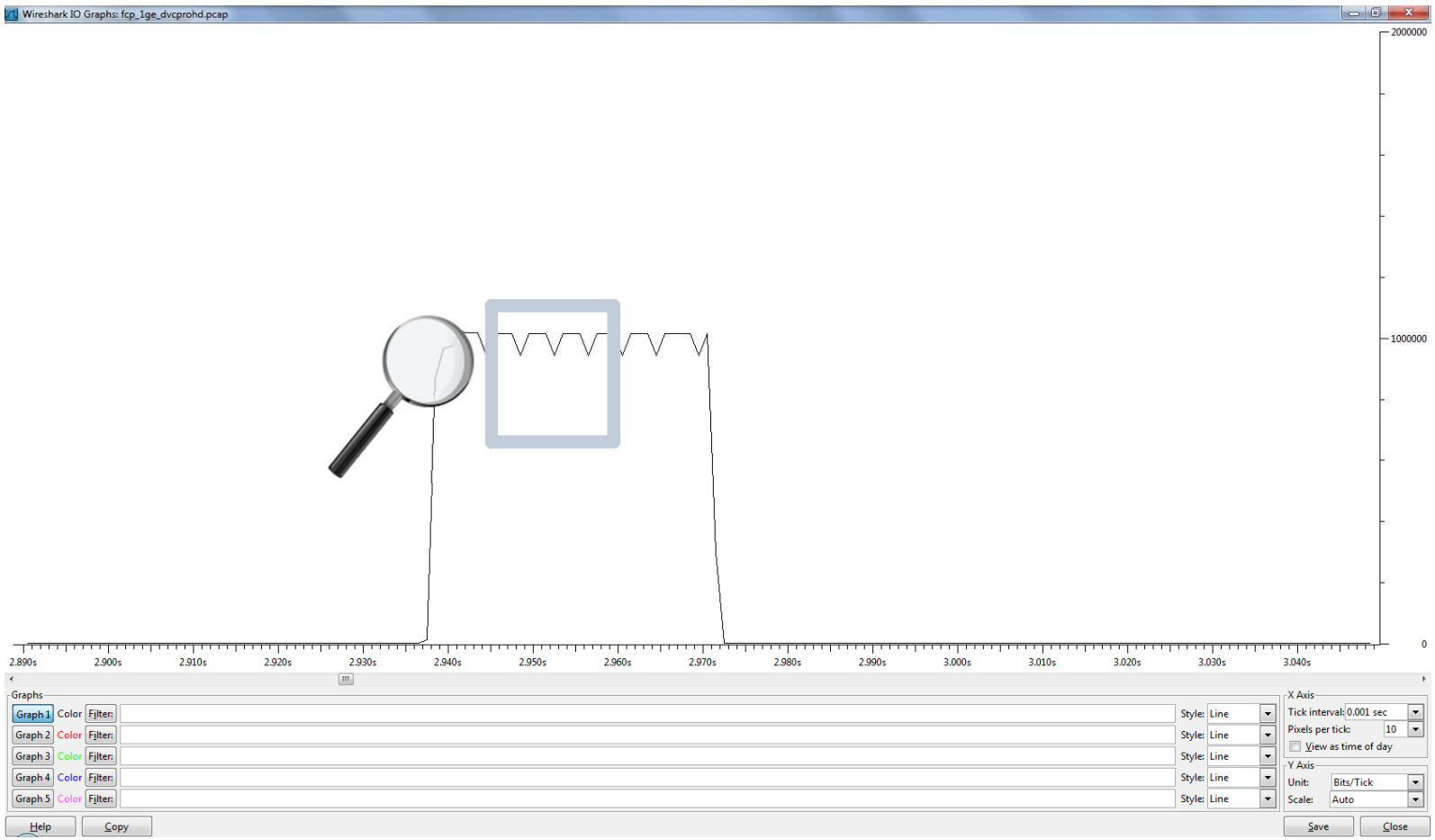
Example: FCP



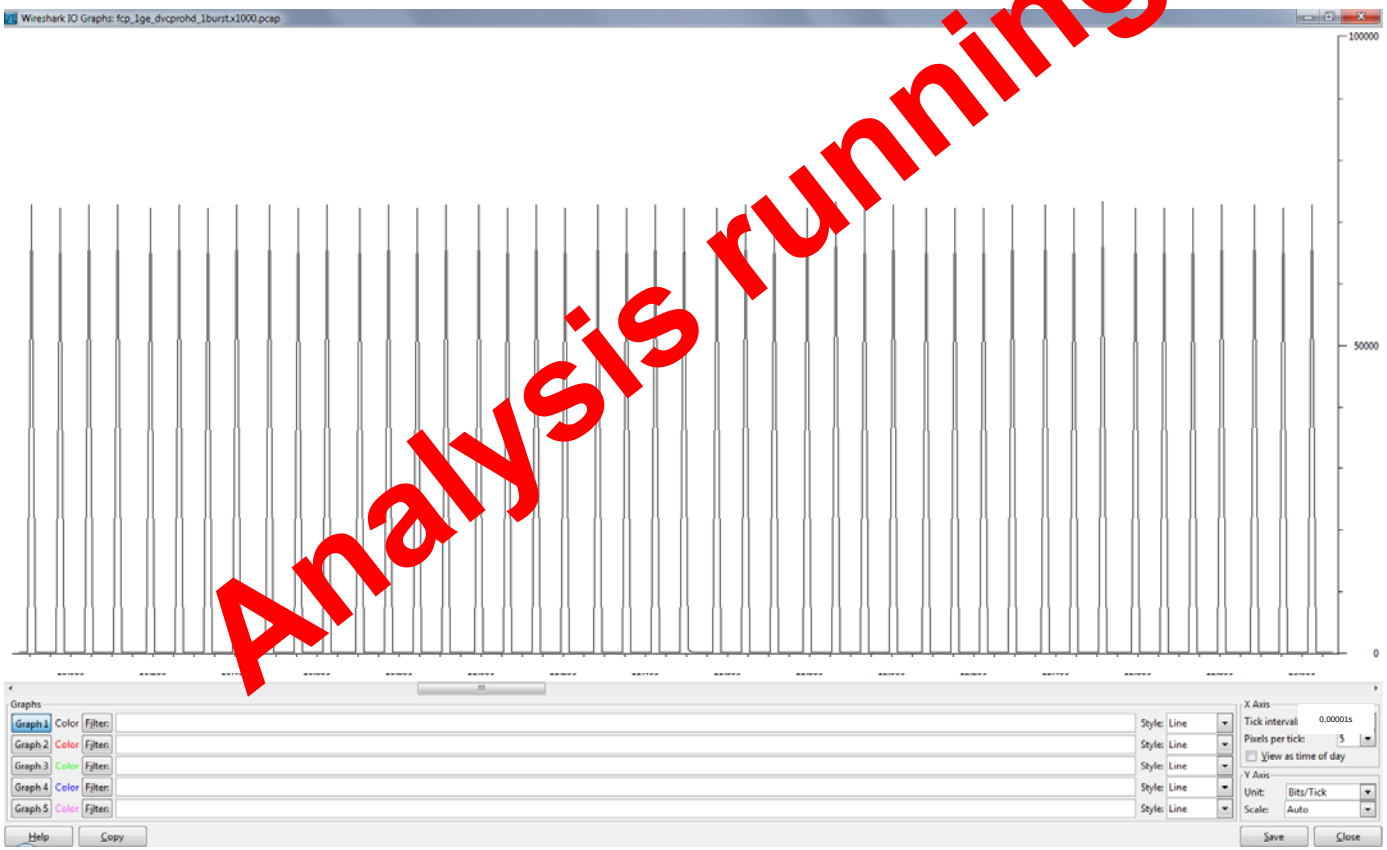
Results:



Results: Maximum view of Wireshark:



Results – deeper zoom (our own SW)!



Analysis running!

Intermediate results

Bursty behaviour of editing systems proofed (AVID and Apple) – deeper analysis needed

- With its large number of consecutive bursts at high speed the prefetch is the most challenging process.
- Size and number of bursts depend on the communication protocol

The buffer configuration of the switch has a large impact on the performance and error rate of the applications.

Our actual test configuration does not allow an overload on the Nexus7k

SMB and its **Implementation** in Windows is less efficient than NFS, since it operates synchronous and needs regular acknowledgements

Next steps

Further tests in preparation (the equipment is mostly loaned until February 2012)

- Deeper analysis of the reasons and impact of the bursts
- Simulation of clients with IRT-SW
- QoS-Tests
- Virtualisation tests (under discussion)
  - Cisco proposal:
    - Optimisation of workflow and application performance with virtualisation
  - New use cases under discussion with ARD/ZDF

Next steps (2)

New test cases under discussion (like usage of smaller switches…)

Demonstrations at IRT

Internal test report (end 2011)

IRT colloquium (Mai 2012, exact date tbd)

Publications to be agreed

Thank you for your attention.

Dipl. – Ing. Markus Berg
Head of Network Technologies

Dipl. – Ing. (FH) Madeleine Keltsch
Network Technologies

Institut für Rundfunktechnik
Floriansmühlstraße 60
80939 München

Tel. +49-(0)89-32399-279
Fax +49-(0)89-32399-351
E-Mail: berg@irt.de

-408
keltsch@irt.de