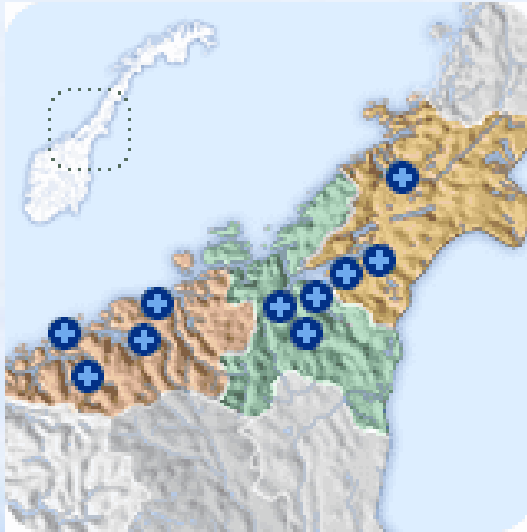# Implementing User Read- and Write-LOGS in existing Pathway Applications -
(without changing the application code)

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GTUG – Dresden 27/9-2012

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HEMIT (**He**lse **M**idt-Norge **IT**)

Norway is a small (but long) country:
Approx. 5,0 million inhabitants with
Approx. 80 hospitals spread out

- Healthcare in Norway is a "free" public service, organized by the government

- Ministry of Health and Care Services has the responsibility of all hospitals

- Hospitals are organized in 4 Health regions, located by geography

- Helse Midt-Norge (HMN) is the "central" region ref. the map

- Helse Midt-Norge (HMN) have organized IT into one branch office – HEMIT

- HEMIT has 250 employees, operate 300+ applications, servs17.000 users.

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The most important Applications

- **EMR** (Electronic Medical Record):
    - Currently 30 mill. documents
    - One new record entry per second
- **ROS** (Laboratory referrals and results)
    - W2K / Intel Platform + SAN

- **PACS/RIS** (XRAY applications)
    - HP UX/Oracle + W2K /Intel + Hitachi SAN

- **PAS (Patient Administration) In- and Out-patient, Bookings + Waiting list, Economics and Statistics**
    - **Includes the PATIENT demographics for most systems**
- **LAB (laboratory systems) :**
    - **NSL - Medical Biochemistry and Pharmacology**
    - **NSML - Microbiology,**
    - **HP Nonstop Platform since 1987**
- **LAB Pathology**

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WHY logging?

- Accreditation:
    - The labs in Helse Midt-Norge are given accreditation according to ISO 9001
    - Gets regular audits, and deviation pinpointing logging is given.
    - The labs are in danger of loosing their accreditation, due to missing logs
    - Deadline for implementation is given
    - http://www.akkreditert.no/en/

- The Norwegian Data Protection Authority
    - The Data Protection Authority shall facilitate protection of individuals from violation of their right to privacy through processing of their personal data
    - (**http://www.datatilsynet.no/English/**)

- Document "Code of conduct for information security"
    - The healthcare, care, and social services sector
    - Published with the support of: Helsedirektoratet
        http://www.helsedirektoratet.no/publikasjoner/norm-for-informasjonssikkerhet/Publikasjoner/code-of-conduct-for-information-security.pdf
    - An attachment to this document is 52 related documents called «Faktaark» (detailed description and recommendations), and # 15 is about access to data and logging and tracing logs

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Activities before deciding a solution

- Lots of meetings with customers (primarily laboratories in 2011)
  - Focus: How to solve this huge challenge
- Clarify the regulations and governmental demands
  - Needs precise answer to the question: «What to log?»
  - Conclusion: «We have a huge problem»
- Meetings with existing application vendor on possible technical solution
  - Tieto had already started a pre-project in one application
  - Changes made in application servers – write existing info to a extra log table.
    - Expensive and time consuming
    - Final solution predicted far into the future for all our applications
    - No benefits to the end users
    - Application programmers are occupied with the wrong tasks, seen from users
- Hemit finished a pre-project in October 2011, looking for alternatives
  - Insure to meet the legislation - dialogue with Datatilsynet
  - POC – workshops with Comforte
  - The pre-project concluded to invest in SDATA from Comforte
- Decided a formal project with December 2011
  - Started January 2012 with necessary funding

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Elementes of the design

- The goal of having a minimum of health information in the physical log.
  - To avoid that the log is a health info database itself
- One physical log pr. logical application (system PAS, NSL, NSML)
- Same log definitions planned for all applications for Helse Midt-Norge
  - The only way to compile operator/health info across all applications.
  - Many of our applications is tightly integrated and is called from many clients/applications
- Two different logical log types in the same physical file, due to different demands:
  - Read and access log.
  - Write/update/delete log = Change log
  - Different elements per function (service) will be logged, giving us flexibility
- The log file will be automatically exported to a client platform for analysis
  - No lock-in for use of clients tools, will be decided in the future, not in this project
- The log will be electronically sealed, not to be tampered with even from technical skilled people.
- Applications are developed in PATHMAKER
  - One big benefit: The message structures of the servers are maintained in a dictionary
- Easy to extend logging to new functions

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Solution overview
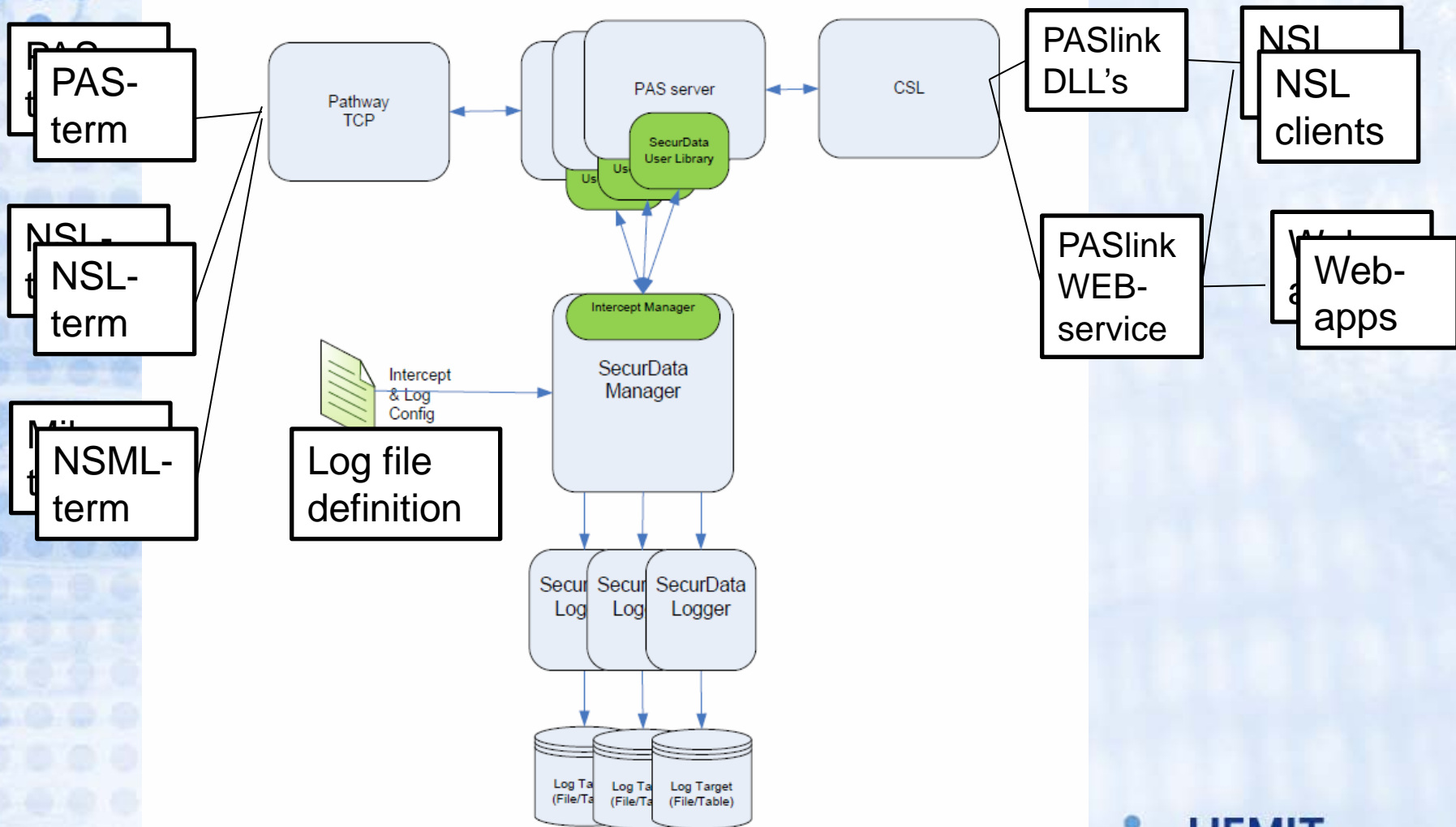
Examples from the SDATA configuration (I)

- The SDATA config file defines the following elements:

  - **Pathmon** and which **Servers** targeted for logging ($*.*.* means all)
  - **Audit format** definition – field definition of the log file
    - Variable record length and number of fields
    - Comma separated field name and value
  - **Services** – which service (ref Pathmaker dictionary) to be logged
  - **Requests** – IPC structure of requests to be logged
  - **Replies** – IPC structure of replies are to be logged
  - **Fields** – either global fields for all services, or specific for each service

- Number of elements practical unlimited

- Config file is a good documentation of «What is logged» for audit

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Examples from the SDATA configuration (II)

- **Audit format:**
  - "%_TIME%","%_CLIENT%", "%READWRITE%",
  - "%TRANS-CODE%","%OPER-B-DATE%","%OPER-P-NO%",
  - "UPN-NAME","%SIGN%", "%DEPT-CODE%","%UNIT-ID%",
  - "%ROLE-CATEGORY%","%ROLE-AUT-GROUP%","%ACCESS-LEVEL%",
  - "%APPL-CODE%","%FUNCTION%","%SERVICENAME%",
  - "%READ-OK%","%ERROR-MSG%","%KEY-INFORMATION%","%KEY-VALUE%"

%KEY-INFORMATION%,%KEY-VALUE% example:

```
 - name:            KEY-VALUE
  definition:       IPC-PERS-A.PATIENT-ID
  match-type:       off
  audit-tokens:
     KEY-INFORMATION: PASIENTID
```

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Positive spinoff effects of the project:

- Single Sign-on functionallity is made possible with this delivery
  - The users no longer needs to fill in username/ password/ department as a logon in the applications
    - Estimated benefit for 80% of the users
  - User authenification ticket from the Windows (AD) logon
  - Hemits Call center is positiv – expects 15-20% less incidents
  - Many cases relates to logon /password problems
  - The most common user problem
  - Remove «systemusers» (Eks EMR user) from security system
    - Use the «real» users accesslevel instead of a system user.

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The Different project phases

- The project is complex so it is necessary to split into phases:

  - To Establish a «read» log for NSL October 2012

  - To Establish a «change» log for NSL November 2012

  - To Establish a «read» and «change» log for NSML Dec. 2012

  - To Establish a «read» and «change» log for PAS (done)

  - To Establish a «read» and «change» log for other clinical applications i.e WEB-services 2013

- The project budget is approx. 6,5 mill NOK = 0,9 mill Euro

  - The client tools for analysis excluded (separate project)

Microsoft Word
7 – 2003 Documer

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Project experience so far (I):

- Comforte as vendor:
  - We already run products from Comforte, with a good experience
    - WIN6530, TELNET server (instead of HP's) , CSL family,

  - Delivered SDATA (logging) according to the planned schedule.

  - Some additional features are special developed for Hemit.
    - I.e Open for user feedback/ requirements
    - Very responsive on bug fixes

  - Good project dialogue in implementation phase of the project
    - Regular remote project meetings (Go to meeting)

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Project experience so far (II):

- SDATA product:
  - The goal of not changing the application code is met so far.
  - The goal of having one single log format for all applications is met so far
    - The application changes we are implementing is necessary alignment of message structures that is different in the different applications (Info about the operator and access rights) to meet this goal
    - Some important info is not sent from the requestor to the server needs to be added

  - We are waiting for experience of the performance impact of the application, but we ar not worried at this stage of the project.
    - SDATA is scalable, and SDATA extra run time code is in the millisecond level
  - We do not know and hard to predict the number of log records in full production for each application

  - In summary – the main goal:
    - The SDATA has given us the necessary flexibility to define what to log inhouse
      - Not necessary to order changes from a vendor

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Project experience so far (III):

- One application, PAS, is fully defined and running on our test system
  - Approx. 20 requestors (functions decided to be logged)
  - 50+ Pathmaker services, wrapped into 25 servers
  - All functions are traditionally old fashion requestors

- The other two LAB applications must wait for the code changes for Operator missing info
  - Test implementations in October 2012
  - Approx. 20 functions in each application targeted for logging
  - 40+ Pathmaker services, wrapped into 25 servers
  - The NSL application is a C/S app, with a thick client using CSL
  - The NSML application is traditional requester/server application.

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Summary /questions:

- The project is running according with plan
  - One exception, delivery of necessary application changes from application vendor, due to price discussions and summer vacation.

  - Production of one application in October 2012
    - One log instance for every application for each hospital

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