

# Standardized Operational Log of Events (SOLE)

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# What is the Problem to be solved?

- Why are there delays?
  - “This report took six hours to deliver. That’s too long. Fix it.”



- What equipment is being over utilized or under utilized?



# What is the Problem to be solved?

- Why are there queues?
- “Having ten people in the waiting room is unacceptable.”
- Why are there queues in one location and not another?





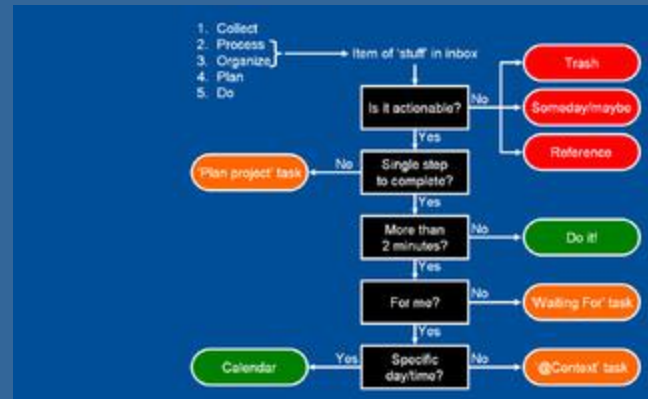
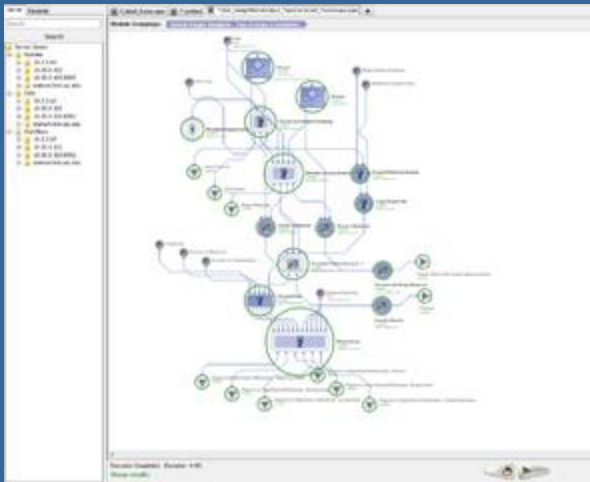
# What is the Problem to be solved?

- The easy obvious improvements are being made. To improve imaging workflow you need analysis.
- Operational improvements to the imaging department need to be based on real measurements, not guesses or gut feel.



# Techniques that are used

- Workflow simulations
- Procedural Analysis
- Trials and revised procedures.



# Data Gathering Constraints

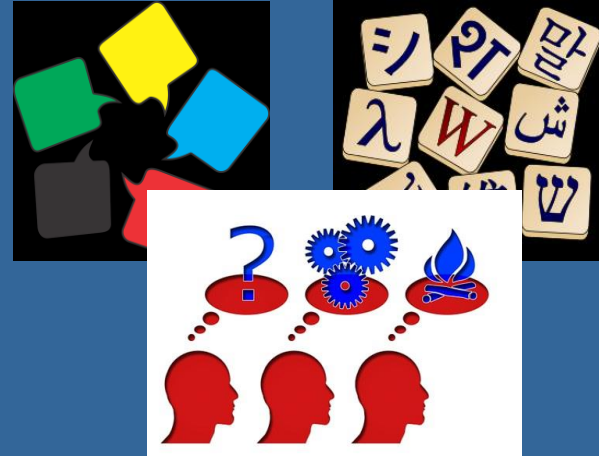
- There must be a reward for incremental improvements.
- Inexpensive
  - Minimal staff impact
  - Minimal equipment impact.
- The data collected must contribute to better workflow understanding





# Data format and meaning

- The data format need to be agreed and non-proprietary. Current tools are proprietary and inconsistent with each other.
- The meanings of events need to be the same and consistent from all equipment.



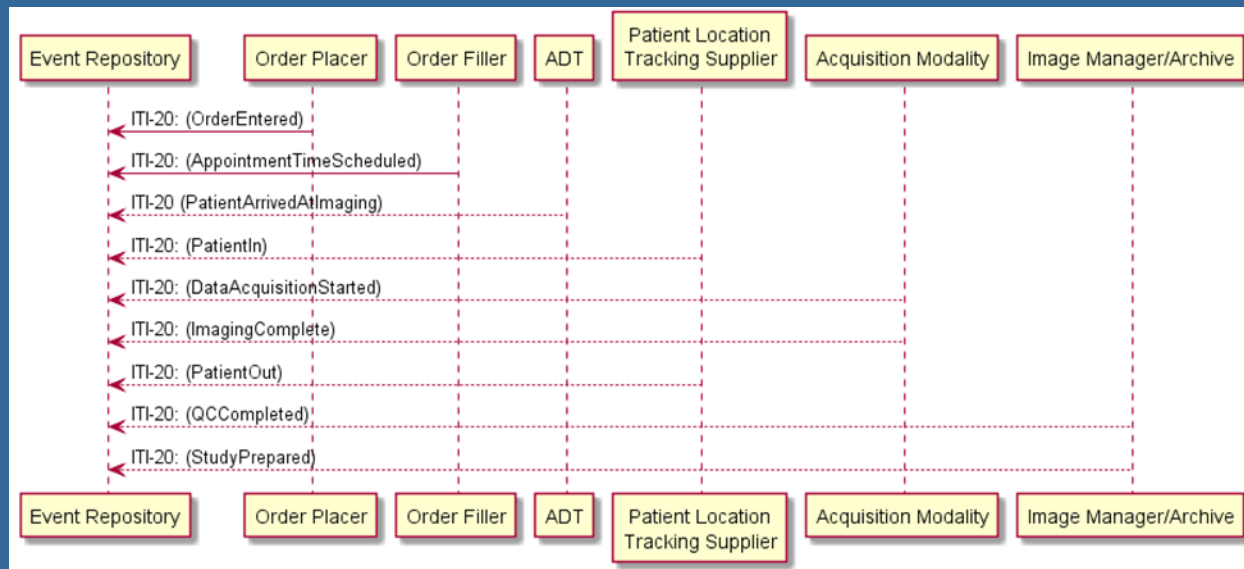
# Based on SWIM

- **SIIM Workflow Initiative in Medicine (SWIM™)**
- **Society for Imaging Informatics in Medicine initiative**
- **Initial goals of developing:**
  - A common definition of workflow steps in medical imaging departments;
  - Key performance indicators defined using these workflow steps;
  - Data elements defined to capture information about the workflow steps with these key performance indicators; and
  - A prioritized plan for implementation.
- **Background information: [/siim.org/page/swim](http://siim.org/page/swim)**



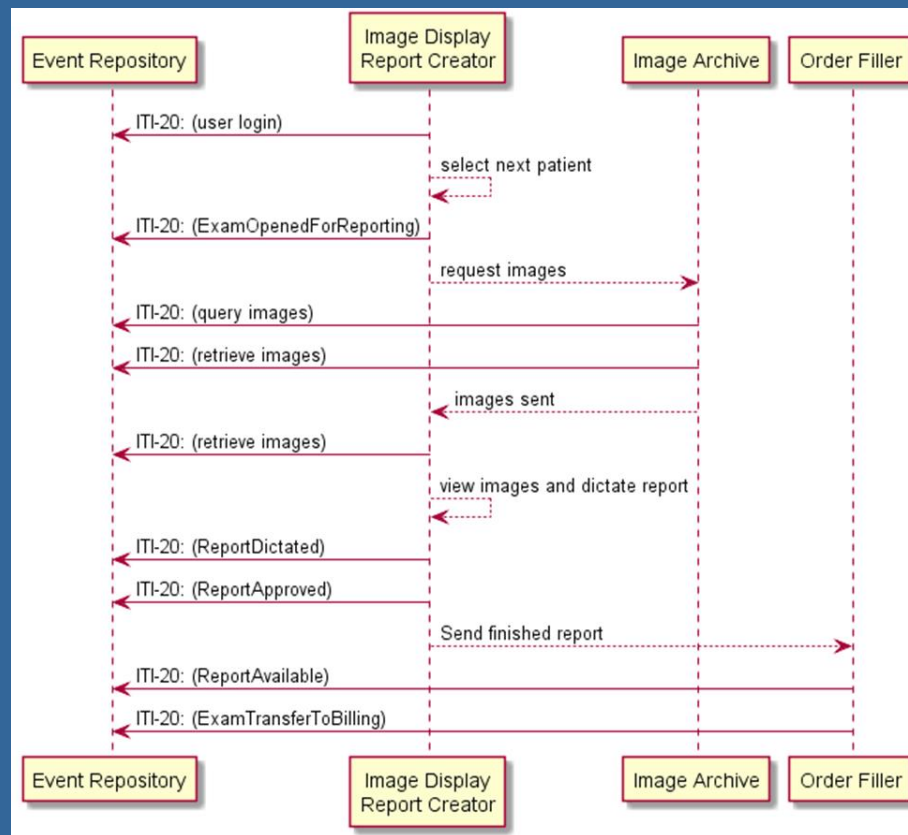
# Use Case: Track Reading #1

Track activity from order to time until Study ready to read.



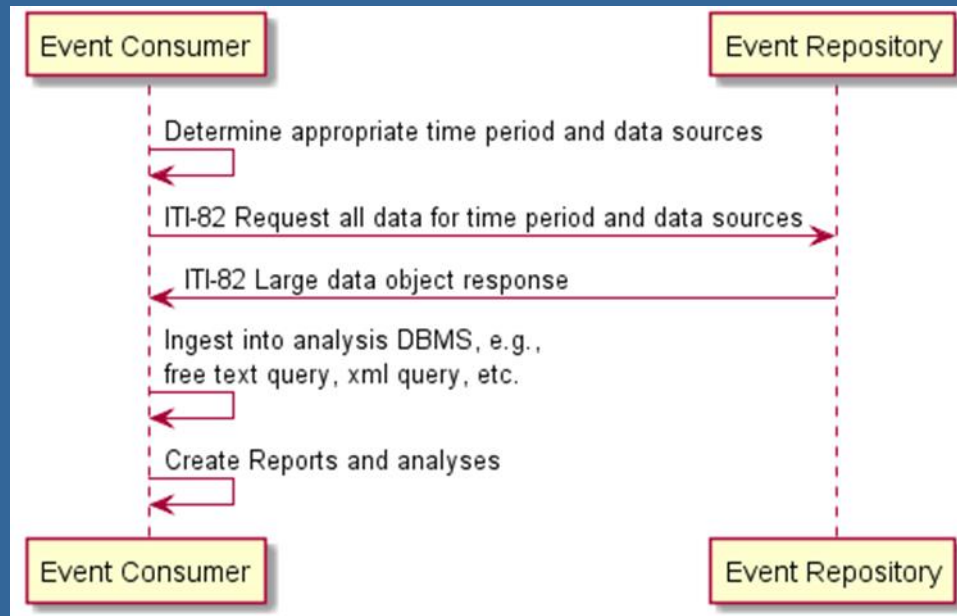
# Use Case: Track Reading #2

Track activity from Ready-to-read until Report available.



# Use Case: Offline Analysis

Allow analyst to obtain a large history of events





# Use Case: Mobile devices

Mobile devices accumulate event reports while being used.



Ward



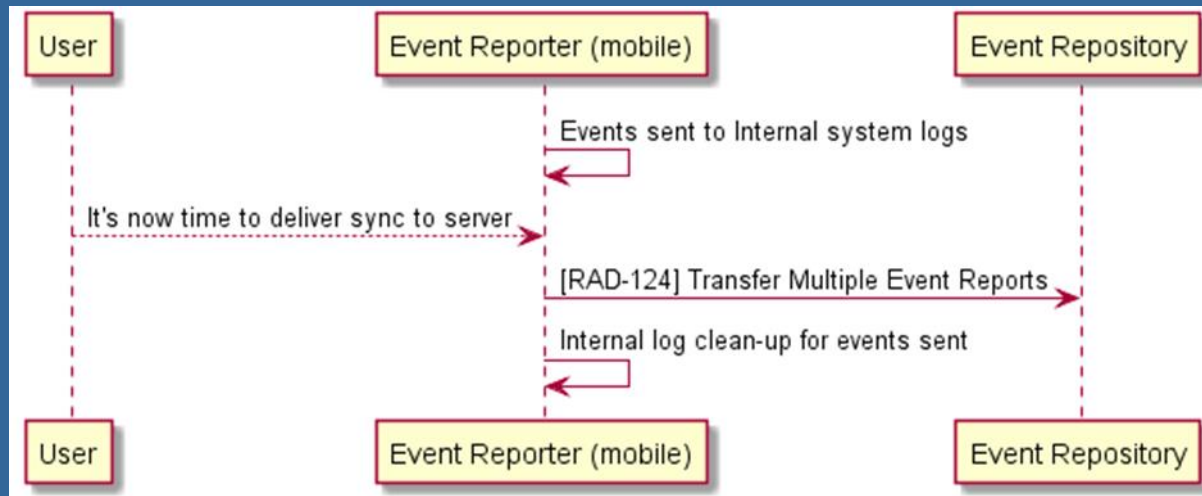
And transmit to a repository later (when power, network, etc. are suitable).



Office

# Use Case: Mobile devices

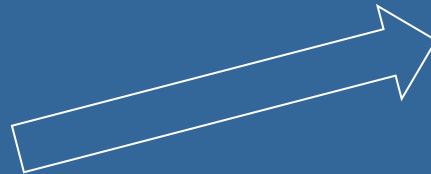
Mobile devices accumulate event reports then transmit to a repository later (when power, network, etc. are suitable).



# Use Case: Dashboard

The dynamic display of  
imaging department status  
at all times.

The dream



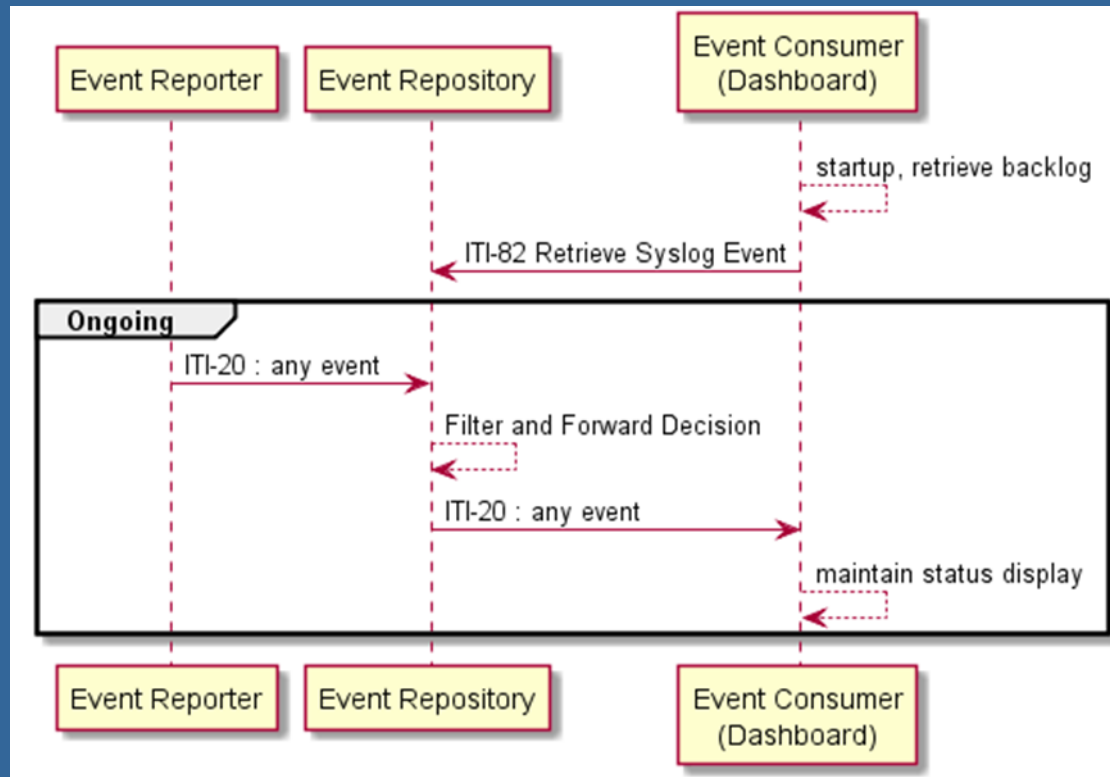
Where you start





# Use Case: Dashboard

## Real-time view into current facility operations



# Scoping

The potential for taking measurements is huge.

The activity scope of SOLE is initially limited to:

- Imaging departments that use orders and schedules.
- Activities between Order and Report.

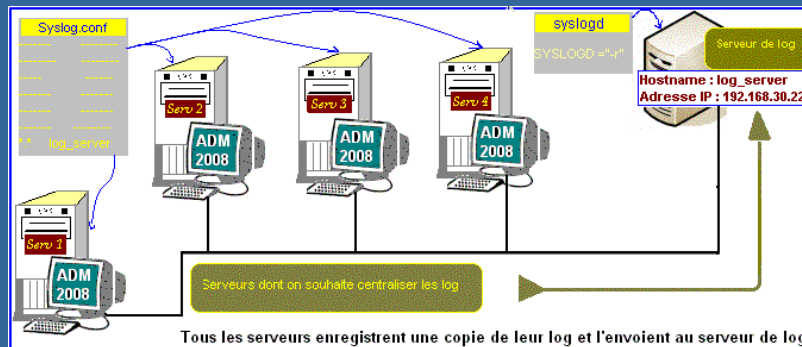
Trimmed the (large) SWIM list to measurements that were:

- Reasonable to implement and define
- Sufficiently informative to be useful for analysis

Suggested a few additions to SWIM.

# Technology

- Use Syslog: it's widespread and used for ATNA.
- Use DICOM schema: it's used for ATNA so tooling and infrastructure exist.



- Defined new events for SOLE
- Defined a bulk transfer transaction for offline analysis and mobile device log transfers.



# New Events for SOLE

- Order Filled
- Order Entered
- Appointment Time Scheduled
- Patient Arrived at Imaging
- Patient Arrived
- Room Assigned
- Resource Assigned
- Patient In
- Data Acquisition Started
- Base Imaging Complete
- Imaging Complete
- Patient Out
- Post Processing Started
- Post Processing Complete
- Study Prepared
- QC Completed
- QC Reject
- QC Repeat Ordered
- Crit 1 Notification Closed
- Crit 2 Notification Closed
- Crit 3 Notification Delegated
- Report Dictated
- Report Approved
- Report Available
- Report Sent
- Exam Archive Commit
- Exam Transfer To Billing
- Patient Merged
- Patient Study Merged
- Study Merged
- Exam Reassigned
- Exam Removed
- Exam Opened For Reporting
- Exam Cancelled
- Exam Pre-fetch Completed
- Exam requested, e.g., priors
- Exam transferred, e.g., priors



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