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
• 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
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.

Event Repository -> Image Display Report Creator

ITI-20: (user login)

ITI-20: (ExamOpenedForReporting)

ITI-20: (query images)

ITI-20: (retrieve images)

ITI-20: (retrieve images)

ITI-20: (ReportDictated)

ITI-20: (ReportApproved)

ITI-20: (ReportAvailable)

ITI-20: (ExamTransferToBilling)

select next patient

request images

images sent

view images and dictate report

Send finished report
Allow analyst to obtain a large history of events
Use Case: Mobile devices

Mobile devices accumulate event reports while being used.

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