

NIF



NIF Electronic Operations (NEO): Improving Productivity With IPAD Application Development

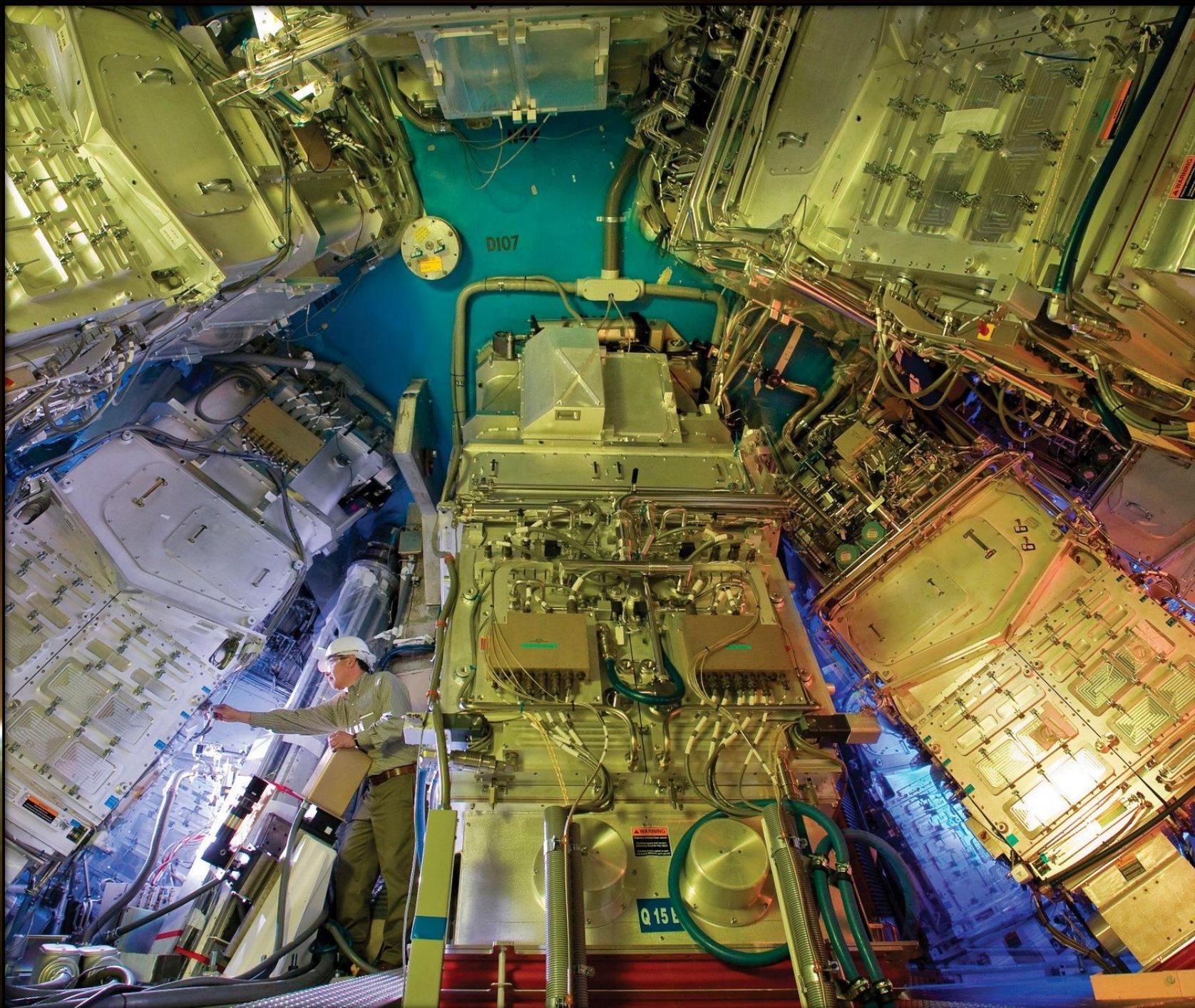
**Presentation to
14th International Conference on Accelerator & Large
Experimental Physics Control Systems (ICALEPCS)
October 6-11, 2013**

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This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344

LLNL-PRES-644466



What are NIF Electronic Operations (NEO)?

NIF has many procedures for the installation of hardware in the target chamber.

Electronic Operations is the conversion of these procedures to a tablet based format.

Why use Electronic checklists?

- Eliminate errors and overhead caused by manual entry.
- Reduce amount of paperwork staff need to carry in the field.
- Integration with other NIF software to automate manual tasks.
- Provide reporting on execution times and archiving of results.



NEO tablet based procedure execution has improved efficiency and the accuracy of results

Procedure Execution and Administration

- **Execute checklists on the iPad or through a web application**
- **Review previously executed checklists through the web application**
- **Application integration**
 - Ability to communicate and complete workflow steps with other systems triggered by completion of a checklist.
 - Eliminates overhead and errors in manually updating these tasks.
- **Configuration management (CM)**
 - NEO plugin architecture integrates with any CM system
 - NEO and CM ensures that only the latest valid checklist is being used in the field.
- **Detailed reporting on executed checklists**
 - See average completion times per step or group of steps over a given date range.
 - Drill down into individual checklist execution times.
 - See number of executed procedures.

The Web based administration application handles procedure maintenance and metrics. The iPad handles execution only.

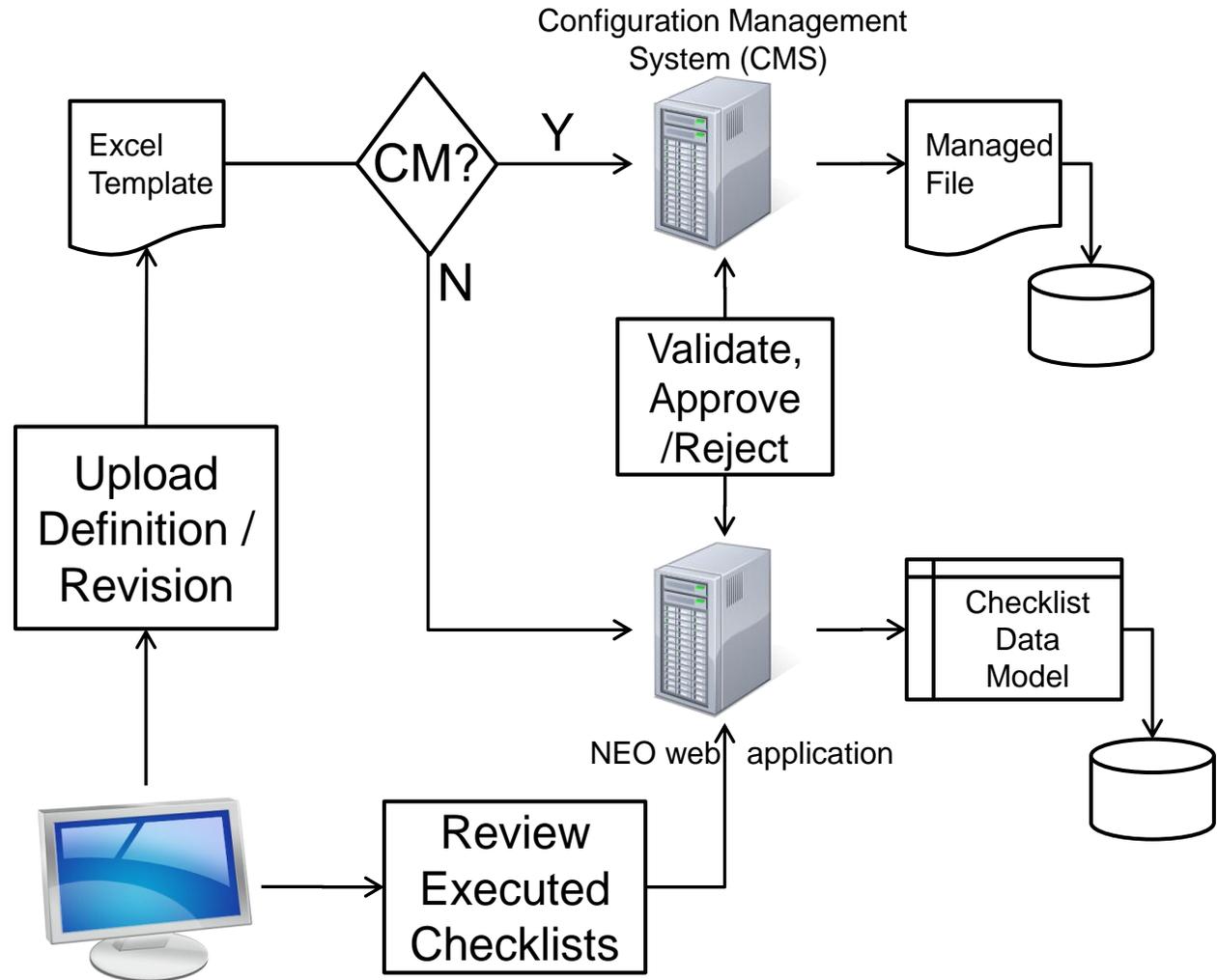
Checklist Features

- **Works without a network connection.**
 - Needed in the facility where wireless is spotty.
- **Checklist author can:**
 - Define step inputs / input type (checkbox, text, image, serial # ref, etc.)
 - Reference other step inputs for equations.
 - Define images displayed in a step.
 - Make a step jump to another sub-checklist.
 - Require comments if a step is skipped.
 - Group steps into categories for reporting purposes.
- **Checklist users can:**
 - Execute steps out of order.
 - Add optional comments to a step.
 - Take images with iPad camera and attach to a step as a comment.
 - Transfer checklists between devices (workstation or iPad).
 - Only one device may have the same checklist instance.

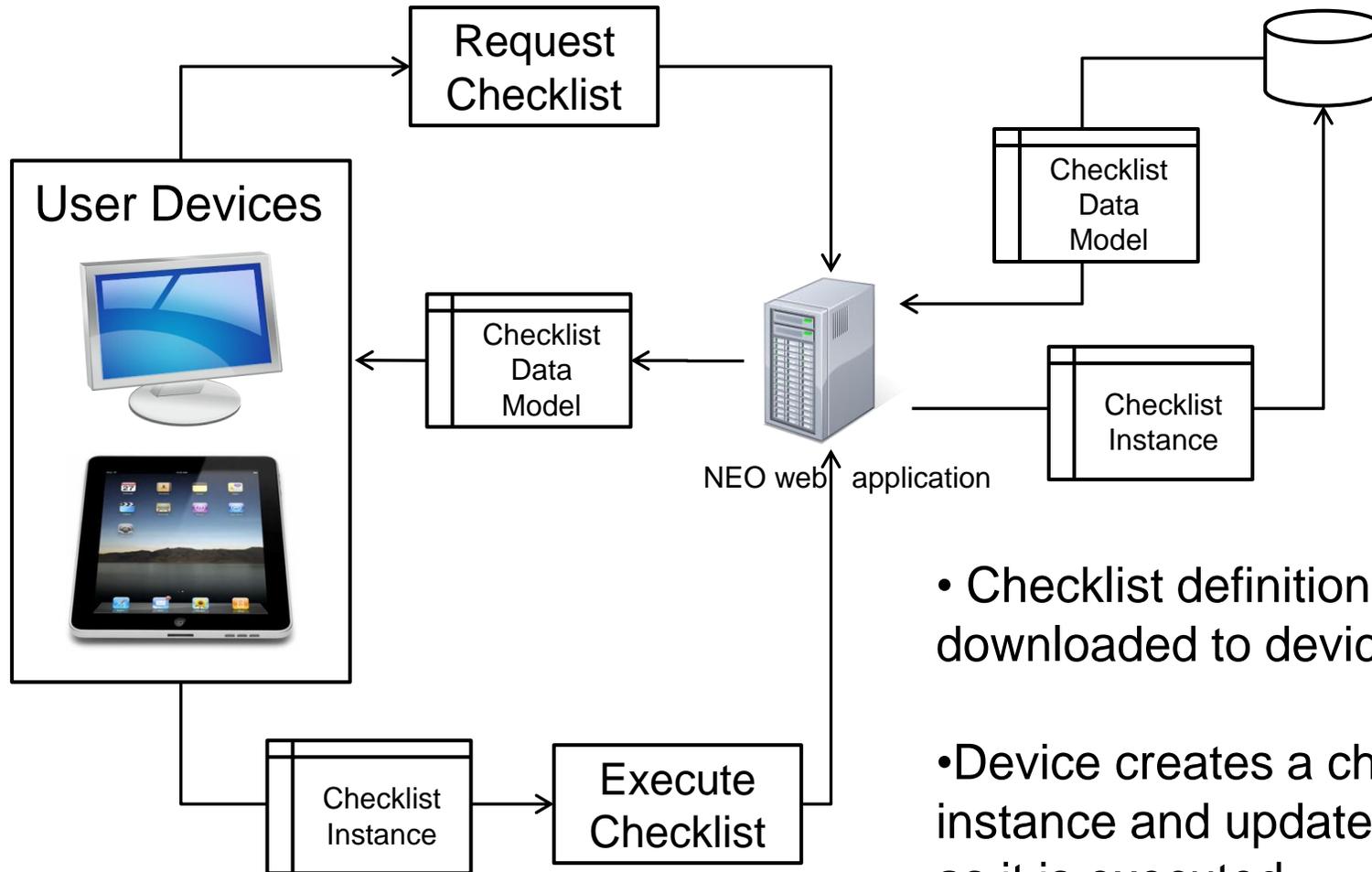
Checklist have a rich set of features and meet the business needs of a variety of groups.

NEO Checklist Management

- New checklist revision is uploaded to NEO or CMS.
- Once a checklist is managed by CM it cannot be modified through NEO.
- Old version is retained for reporting purposes.
- Checklist instances and reporting is done through NEO web application.



NEO Checklist Execution



- Checklist definitions are downloaded to device.
- Device creates a checklist instance and updates the server as it is executed.
- iPad operates in disconnected mode for when network connection is spotty.

Application Architecture

- iPad
 - Native application written in Objective C.
 - Alternative frameworks were jQuery mobile, Cordova.
 - Went with Native app for camera access and best user experience.
 - Local data model defined in Core Data.
 - Communicates with RESTful services.
- Web
 - jQuery client backed by Jersey RESTful services.
 - Service endpoint for iPad operations.
 - Spring/JDBC used to store checklist model in Oracle database.

The use Objective C and jQuery provided the best user experience on the iPad and in the Web application

Future Work

- Add support for redlines
 - Allow expert users to mark aspects of a checklist as outdated if conditions have changed in the field.
- Modify NEO so that it can be used for other projects, internal and external to NIF and perhaps even LLNL.
 - Remove integration with NIF specific systems.
 - Make integration with external software more pluggable and generic.
- Questions or interest in NEO?
 - Contact Scott Reisdorf - reisdorf1@llnl.gov
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 - Or Beth Palma - palma5@llnl.gov

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