COMPONENTS OF NASA’S DATA ACQUISITION SYSTEM

Fall Internship, 2015

Melanie Schmocker
Overview

 Context
  • NDAS

 NOSS
  • Nodes
  • Form Validation

 NCAL
  • Calibration Report

 Other

 Questions
Overview

- **Context**
  - NDAS
- **NOSS**
  - Nodes
  - Form Validation
- **NCAL**
  - Calibration Report
- **Other**
- **Questions**
Context

- Stennis Space Center
Context

- Stennis Space Center
  - Test rocket engines
Context

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  - Test rocket engines
Context

- Stennis Space Center
  - Test rocket engines
- NDAS – NASA’s Data Acquisition System
Context

- Stennis Space Center
  - Test rocket engines
- NDAS – NASA’s Data Acquisition System which can:
  - Calibrate (NCAL)
  - Record (NLOG)
  - Display (NDIS)
  - Export (NGATE)
and otherwise process data from tests
Overview

- Context
  - NDAS
- NOSS
  - Nodes
  - Form Validation
- NCAL
  - Calibration Report
- Other
- Questions
NOSS Database

- NASA’s One-Stop Shop
NOSS Database

- NASA’s One-Stop Shop
Nodes and Measurements

- Each Node represents a piece of hardware on the test stand
Nodes and Measurements

- Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers
Nodes and Measurements

- Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers
- Measurements are collections of Nodes
Nodes and Measurements

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  - Sensors
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- Measurements are collections of Nodes
  - Represent Nodes that are physically connected
Nodes and Measurements

- Each Node represents a piece of hardware on the test stand
  - Sensors
  - Filters
  - Digitizers

- Measurements are collections of Nodes
  - Represent Nodes that are physically connected
  - Enable intuitive interpretation of data
Adding Nodes

- How to handle new types of hardware?
Adding Nodes

- How to handle new types of hardware?
- Typical database method
Adding Nodes

- How to handle new types of hardware?
- Typical database method
  - Redesign database
Adding Nodes

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- NOSS method
Adding Nodes

- How to handle new types of hardware?
- Typical database method
  - Redesign database
- NOSS method
  - Nodes stored as XML in database
Adding Nodes

- How to handle new types of hardware?

- Typical database method
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- NOSS method
  - Nodes stored as XML in database
  - Dynamically creates pages to create/update
Adding Nodes

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Adding Nodes

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  - All Nodes stored in same table
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- Typical database method
  - Redesign database
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  - Nodes stored as XML in database
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  - All XML are text, so no redesign necessary
  - All Nodes stored in same table
Node Form Updates

- XSD format
Node Form Updates

- XSD format
  XML Schema Definition
Node Form Updates

- XSD format
- XML Schema Definition
Node Form Updates

- XSD format
  - Before me: minimal validations
Node Form Updates

- **XSD format**
  - Before me: minimal validations
  - My tasks
    - Update XPath references
Node Form Updates

- XSD format
  - Before me: minimal validation done
  - My tasks
    - Update XPath references
    - Enforce all XSD validations in browser form
Node Form Updates

- XSD format
  - Restrictions
  - Extensions
Node Form Updates

- XSD format
  - Restrictions
    - Limit values stored
  - Extensions
Node Form Updates

- XSD format
  - Restrictions
    - Limit values stored
  - Extensions
    - Add attributes to XML
Node Form Updates

- **XSD format**
  - Restrictions
    - Limit values stored
  - Extensions
    - Add attributes to XML

- **Validations**
Validations

- No input

- Invalid input

- Valid input

REGEX_PATTERN is invalid. It should match the regex `^[a-zA-Z]*[0-9]*[a-zA-Z]*$`
Validations

- No input

- Invalid input

```
REGEX_PATTERN
wrong input
Value should be words followed by a number
```

- Valid input

```
REGEX_PATTERN
good input 1
```
Overview

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- Questions
NCAL

- Calibrates Measurements
  - May also compare against a trusted prior calibration
NCAL

- Calibrates Measurements
  - May also compare against a trusted prior calibration
- Produces a Calibration Report
NCAL

- Calibrates Measurements
  - May also compare against a trusted prior calibration
- Produces a Calibration Report
  - Sensors calibrated at different points throughout the range of expected values
NCAL

- Calibrates Measurements
  - May also compare against a trusted prior calibration
- Produces a Calibration Report
  - Sensors calibrated at different points throughout the range of expected values
  - Report is HTML but must also be printable
Calibration Report Updates

- Prior format

NDAS Daily Cal Report

This page was created on Thu Nov 12 2015 at 16:10:59

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Calibration Report Updates

- Prior format
- Refactor HTML
Calibration Report Updates

- Prior format
- Refactor HTML
- Add interactive data
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