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**Process Documentation and Execution: Introducing A Tool to Support Analysis of Alternatives**

US Military Academy West Point, NY

Approved for public release, distribution unlimited

Process Documentation and Execution:

Introducing A Tool to Support Analysis of Alternatives

Thomas A. Dufresne and Robert L. Turner
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Problem Statement

Develop software tools to support analytical data preparation processes:

- Populate authoritative databases
- Prepare data for analysis
- Post-process model output

What features would you like to see in these tools?

- Usability
- Reliability
- Flexibility
- Transparency
- Repeatability

Introducing…
Process Execution Tool

Choose any import location

MS Access
MS Excel
JOPES B8
SQL Server
XML
Oracle

Do Something

Transform, view, modify, add and remove data using tools

Order Of Battle - Unit - Transform - Surrogation – GeoDataViewer - TPFDD

Choose any export location

Models
MS Access
MS Excel
JOPES B8
SQL Server
XML
Oracle
Process Execution Tool (PET)

• PET is analogous to Microsoft Project.
  – A graphical display of the tasks/steps in a data preparation process.

• PET goes a step further than MS Project by supporting the execution of process steps.

• Process steps are assigned tools (Step Tools), which complete or support the completion of the step.
Example Process: Populate Authoritative Database
Step Tools

Step Tools come in three flavors:

- **Generic data manipulation tools**
  - To import data: Data Mapper
  - To filter, merge, modify, and export data: Transform Tool
  - To create translation tables: Surrogation Tool

- **Entity specific data editors**
  - To create and edit units: Unit Tool
  - To create and edit Orders of Battle: OOB Tool
  - To view and edit entity locations: GeoData Viewer
  - To view, edit, and convert TPFDs: TPFD Generator

- **External applications**
  - COTS / GOTS software
  - Your own custom built applications
Process Execution Tool (PET)

PET should be useful for projects or processes with:

- Many complexly sequenced steps (JWARS TFPD)
- Multiple data sources (CFDB)
- Multiple data output formats (JICM)
- Multiple analysts (MCS)
- Extended Duration (Analytical Baseline)
- Changing requirements

Just about everything we do.
PET Functionality

Three Levels of Functionality: Process Administrator, Analyst, Observer

• Administrator Functionality:
  – Create Process - Adding and Sequencing Steps
  – Assign Step Tools
  – Assign Step Validation Rules
  – Designate Automatic Steps
  – Establish Connections to Source Data
  – Define Transformations
  – Assign Analysts to Steps
  – Monitor Execution and Inspect Intermediate Data Products
  – Add / Modify / Delete Steps During Execution

• Analyst Functionality:
  – Inspect Intermediate Data Products and Data Validation Results
  – Work on Assigned Steps
  – Enter Step Execution Comments

• Observer Functionality: Monitor Process
Benefits of Using PET

To Populate Authoritative Databases:

1. Provide visibility into process completion.
2. Automate data consistency checks.
3. Improve process efficiency.
4. Document the process.
Benefits of Using PET

To Post-Process Model Output:

1. Facilitates correlation of output data elements within a run.
2. Facilitates comparison of output data between runs.
3. Provides framework for automating MOE calculation and chart generation.
4. Document the Process
Benefits of Using PET

To Prepare Data for Analysis:

1. Facilitates controlled modifications for analysis of alternatives.

2. Facilitates extending analysis using consistent common data

3. Document the process.
Example Data Preparation Process

Tidal Wave Mitigation (TWM)
A Case Study
using the Process Execution Tool

The Case Study and the sample data is available on the provided CD
The Case Study …

- Demonstrates the overall use of PET from data import to data export.
- Demonstrates the benefits of using PET for managing the development of analysis datasets.
- Is based on an entirely fictional and unclassified scenario and unclassified data.
- Consists of a few…
...simple steps...

- Force structure with rolled up units
- Rolled up units with aggregated equipment
- Equipment down select to only what is played in the TMW-01 Scenario
- Surrogation of Equipment Into Representative Types
...plus a few more...
Initial Data

Force List, Tables of Equipment, Equipment Characteristics
Output Data

Playable units and equipment
Case Study “Results”

• Build the process:
  – 1-2 days to build 34 step process.

• Execute the process – build the base case:
  – Less than 2 hours

• Generate excursion data set:
  – Duration depends on the extent and location of changes
  – Assertion – can be done faster and more reliably with PET
Questions?
Updates and Feedback

• **SourceShare:**  [https://sourceshare.pae.osd.mil](https://sourceshare.pae.osd.mil)

  collaborative software development site (registration required)

• **Send Comments to:**
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