Using Data Integration and Data Governance to Extend the Life of USMC Logistics Applications During Migration to GCSS-MC
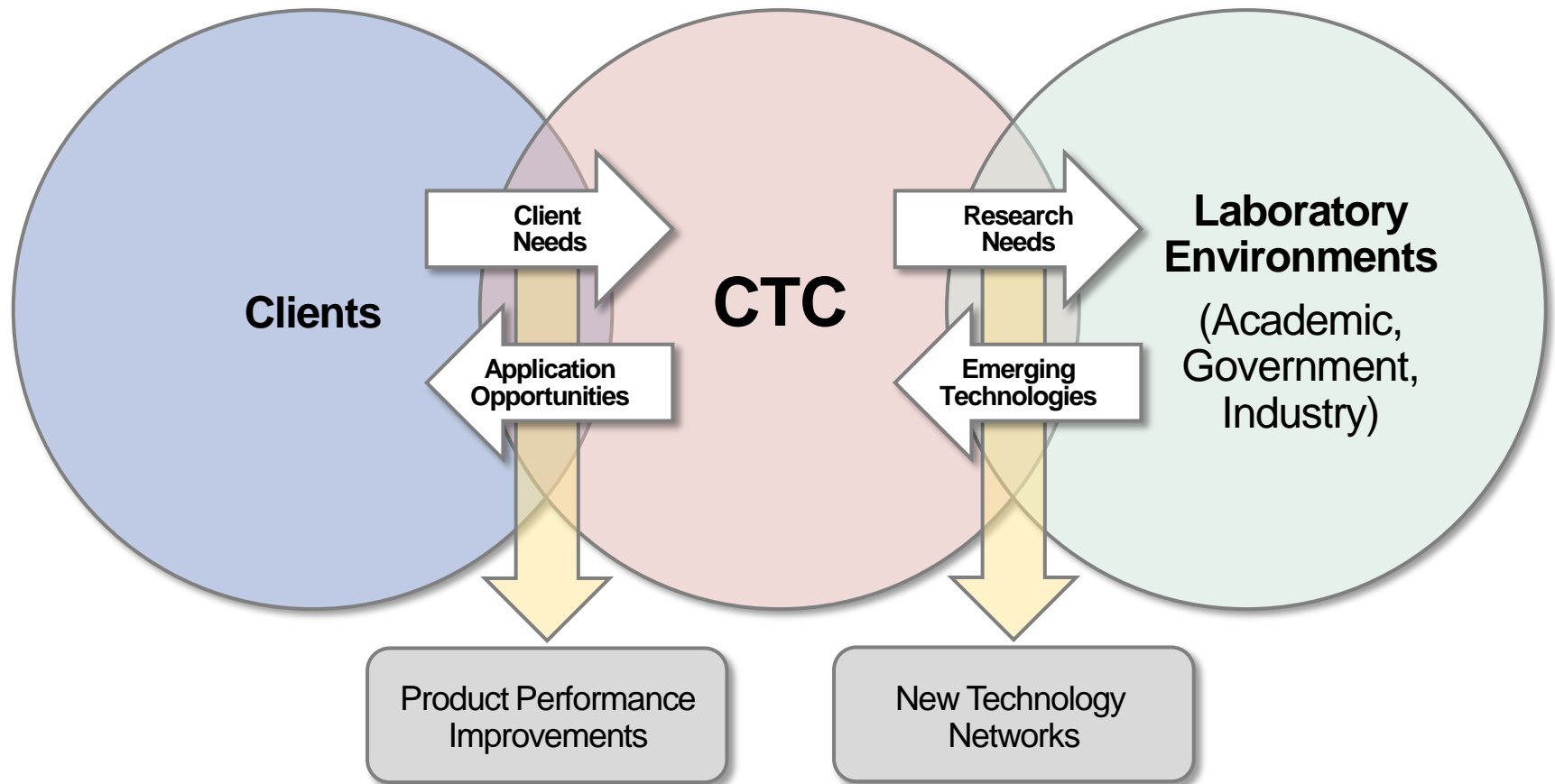## *Keeping Legacy Systems Viable*

Mary D. Hiles
Concurrent Technologies Corporation
Systems Engineering Conference 2012 - Session 14665

Who is CTC?

CTC is an independent, nonprofit, applied scientific research and development professional services organization.

Clients → **Client Needs** → CTC → **Research Needs** → Laboratory Environments (Academic, Government, Industry)

CTC → **Application Opportunities** → Clients

Laboratory Environments → **Emerging Technologies** → CTC

Product Performance Improvements

New Technology Networks

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What is the Problem?

- USMC needed to migrate legacy mainframe supply (SASSY) and maintenance (MIMMS) systems to the Oracle based GCSS-MC system in order to modernize and streamline its systems

- The migration period was planned in stages and the cutover would take more than 1 year as units were moved over in groups

- USMC still had the requirement to rollup their Readiness values at the USMC level and report to OSD

- Data Quality problems in the legacy system would further delay the migration

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Requirements

- Need to have consistent, repeatable methods for reporting equipment readiness values during migration

- Need to help identify issues with the data and assist in cleansing the data prior to and during the migration

- Need to ease the transition to new system by managing reporting externally

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GCSS-MC

- GCSS-MC is a multi-block program for Logistics Chain Management (LCM) that will modernize the entire United States Marine Corps (USMC) Logistics Architecture and Management across retail supply, wholesale supply, equipment maintenance, and repair functions.

- GCSS-MC will eliminate antiquated and unsupported hardware and software and retire Supported Activities Supply System (SASSY), Marine Corps Integrated Maintenance Management System (MIMMS), among others.

- Oracle is the Systems Integrator (SI) using the Oracle E-Business Suite 11i as the core software package.

GCSS-MC Migration

- Migration was planned in stages beginning July, 2011 and running through December, 2012 for a majority of units

- There will still be pockets of units that do not cut over fully due to unique requirements, remote locations, etc…

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Approach

- Leverage the existing Data Warehouse to store the "blended" information from the legacy systems and GCSS-MC in the Master Data Model (MDM) during the transition period
  - Master Data Repository (MDR)

- Enhance / Extend Total Life Cycle Management - Operational Support Tool (TLCM-OST) to create a system-independent Decision Support Tool
  - Provide a system-agnostic reporting environment that shields the user from having to know which system provided the data
  - Support Readiness Reporting
  - Support Discrepancy Reporting
    - Incorporate metrics and trends
    - Identify responsible organization and measurable values for deviation

TLCM-OST
TOTAL LIFE CYCLE MANAGEMENT - OPERATIONAL SUPPORT TOOL

- is a Web-based decision support tools that:
  - o Integrates usage, maintenance, and supply data
  - o Provides one system for readiness visibility
  - o Provides cost of maintenance data
  - o Provides reliability, availability, and maintainability data
  - o Facilitates trend analysis and decision formulation
  - o Integrates earlier generations of targeted tools into a single decision support dashboard

Several of these tools won Defense Logistics Technology Implementation of the Year Award

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TLCM-OST Home Page

Out of Many – One Answer

MDR :

- Loads data from 31 source systems
- Supports 23 applications
- Has 8 exports to other systems
- 1.2 Terabytes of data
- Imports 164 datasets / ~53 million records daily.
- Stores data in "layers", from raw source system data to functional layout to data marts
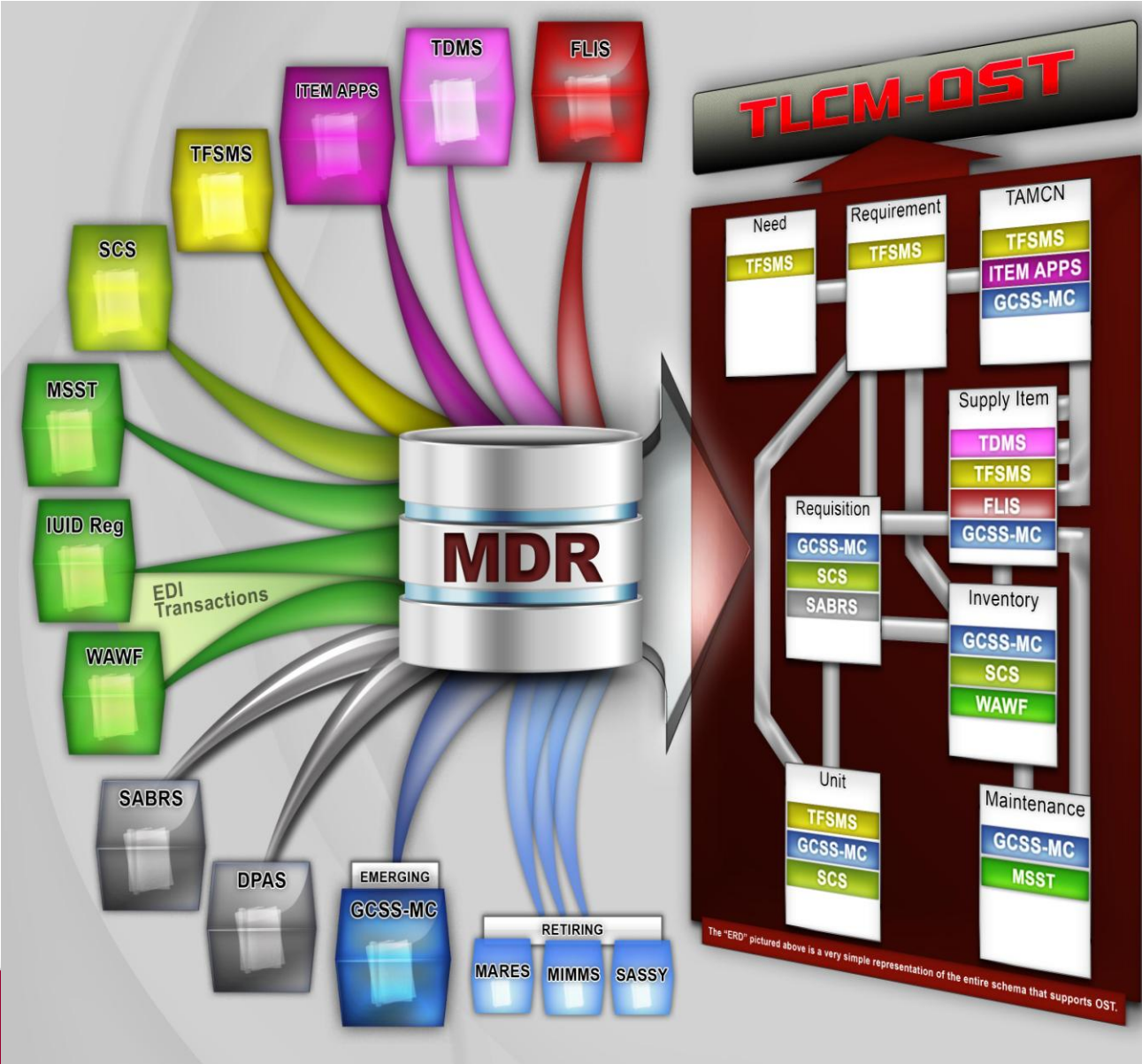
The Need for a Systems Engineering Approach
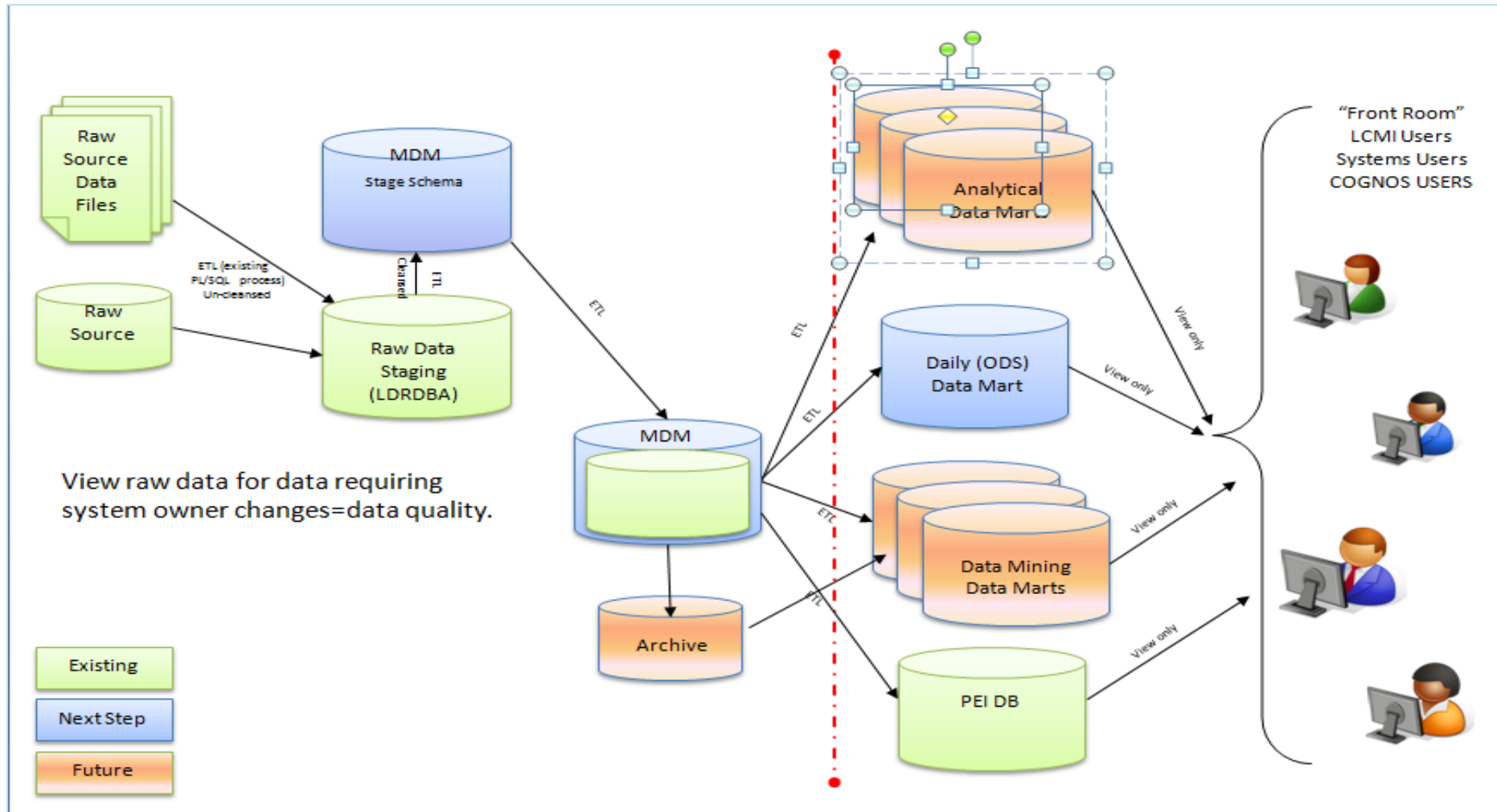
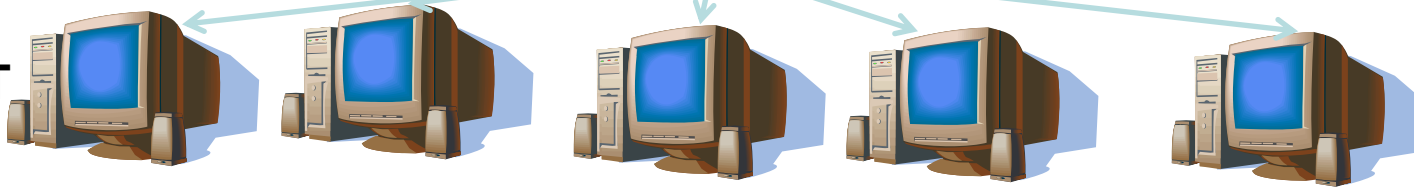# Blended Warehouse

Early Stage Migration

Late Stage Migration

MIMMS / SASSY

MIMMS/ SASSY

MIMMS SASSY

GCSS-MC

GCSS-MC

MIIMS SASSY

Data Warehouse

Supply / Maintenance Data

TLCM-OST

No change to apps during migration

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Approach

- Implement full complement of data quality reports and discrepancy reports prior to and during migration

- Apply Data Governance to Data Sources during migration
  - Define standard terminology and business rules
  - Communication of Business Rules / Calculations
  - Assign responsibility for Discrepancies
  - Provide Measurable metrics monthly – loop back to data owners

- Provide full disclosure of Data Pedigree throughout
  - Transparency of Source
  - Where did this piece of data come from?

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Data Quality

Enterprise Logistics Reporting Dashboard

Enterprise Asset Trending / PEI Iron Triangle
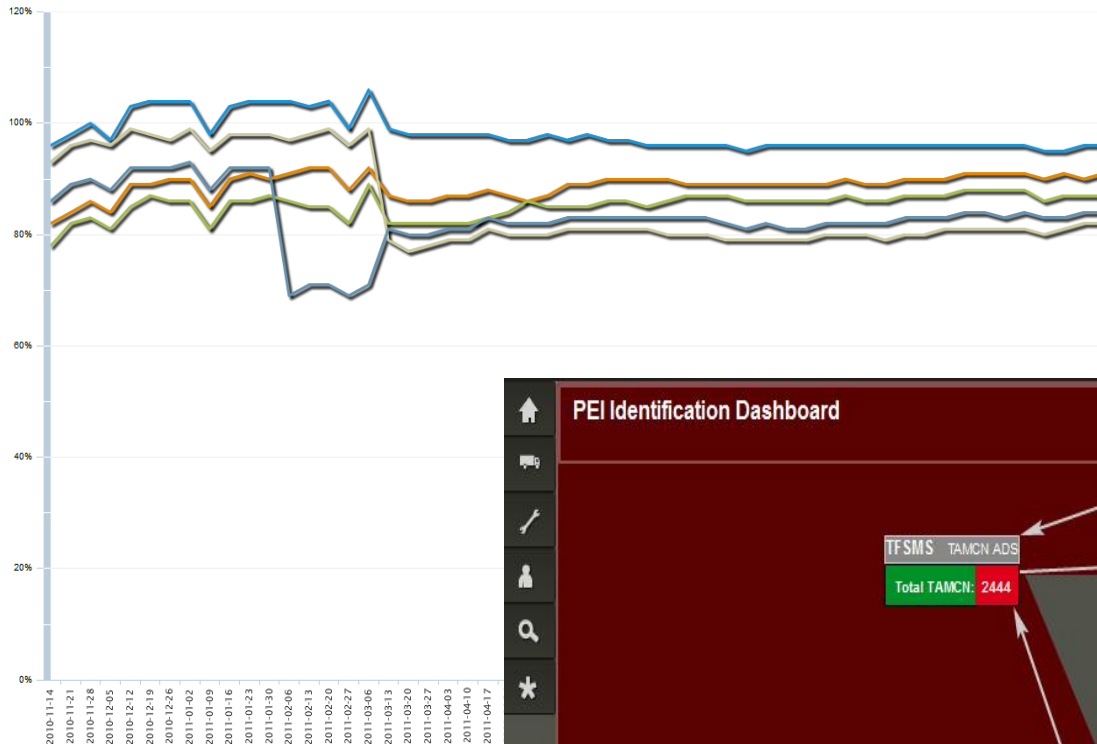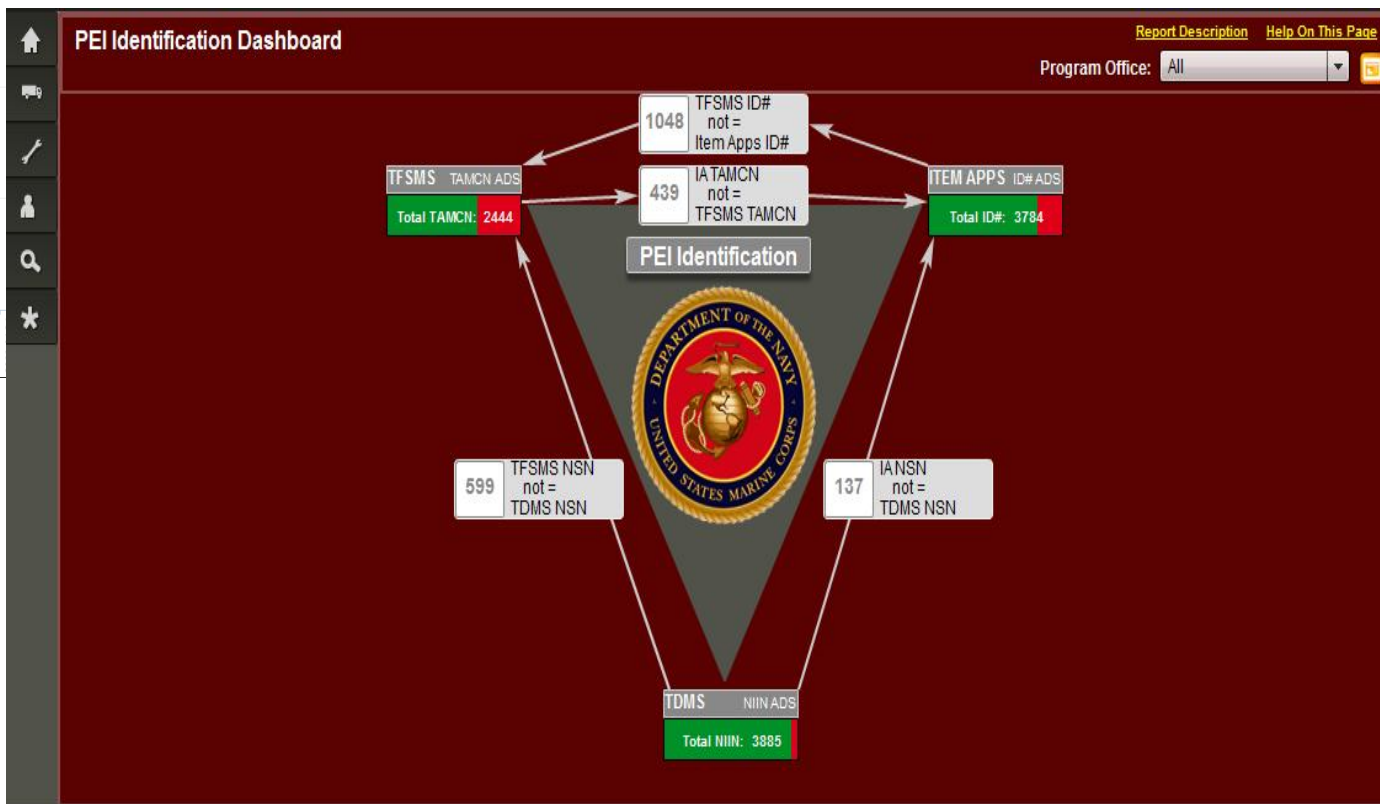
Data Pedigree

Data Pedigree for TLCMOST.EAE Operation Status Details

Basic View | Detailed Tree View

Data Element Title	Definition	Business Rules	USMC Data Source	MDR Table	MDR Column
UIC-Org (DODAAC)	Combination of UIC, Unit Name, and DODAAC	The DODAAC will be shown if TFSMS has the UIC/DODAAC association	TFSMS	TFSMS_UNIT	UNIT_NAME
TAMCN	Table of Authorized Material Control Number	A seven position alphanumeric control number assigned to an end	TFSMS	TFSMS_EQUIP	TAMCN
Nomenclature	The combination of approved item name and military type designation as	Refer to MIL-HDBK-1812	TFSMS	TFSMS_EQUIP	ITEM_NAME
Service Req/ERO	Count of Service Requests or Equipment Repair Orders (EROs) for the Maintenance Type shown	Maintenance type is determined by the category code (N, P, X or M) or in the case of Supply-Service the Job Status code (40 or 25)	MIMMS, GCSS-MC	GCSS_IB_ASSET_MAINT	EQUIP_REPAIR_ORDER_NUM
				LDR_MIMMS_HIST_EROS	DATE_CLOSED
				LDR_MIMMS_HIST_EROS	EQUIP_REPAIR_ORDER_NUM
EOM	Tells what Echelon of Maintenance is associated with the given Service Request/ERO	This will always reflect the highest EOM that is active for a given Serial Number.	MIMMS, GCSS-MC	GCSS_IB_ASSET_MAINT	ECHELON_OF_MAINT
				LDR_MIMMS_HIST_EROS	ECHELON_OF_MAINT
BDI 2nd EOM	Battle Damage Indicator on the 2nd EOM Servive Request/ERO per MCO	Per MCO, the BDI flag on the 2nd EOM is the flag that reflects the BDI status.	MIMMS	LDR_MIMMS_HIST_EROS	TYPE_LAST_PREV_MAINT
DCD	Deadline Control Date		MIMMS, GCSS-MC	GCSS_IB_ASSET_MAINT	LM2_DATE
				LDR_MIMMS_HIST_EROS	DEADLINE_CONTROL_DATE
RDD	Requested Delivery Date		MIMMS	LDR_MIMMS_HIST_EROS	REQ_DELIVERY_DATE
Days Deadlined	Days Deadlined	Calculated as the number of days from Today minus Deadline Control Date (if still open) or Date Closed	MIMMS	LDR_MIMMS_HIST_EROS	DATE_CLOSED
				LDR_MIMMS_HIST_EROS	DEADLINE_CONTROL_DATE

- Integrated an innovative Data Pedigree solution into its Software Development Lifecycle (SDLC) process at every data transformation step to capture the migration meta data

- The data was then chained together in both a basic and detailed tree view to allow the user to view field definition, source systems, and business rules at each step

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Data Pedigree – Detailed Tree View

Data Pedigree Comment Blocks in PL/SQL

```
/*<DP_COMMENTS>
--------------------------------------------------------------------------------
<DPH> SCHEMA NAME:     TLCMCOP
<DPH> SCHEMA TYPE:     APP
<DPH> ENT NAME:        Sum Tam Summary Row
<DPH> Ent Package:
<DPH> Ent Desc Short:
<DPH> Ent Desc Abbrev:
<DPH> Ent Desc Long:

      8                          9      10   11             12        13                14        15
                                 RELATED REL  RELATED        Related   RELATED           
      ELEMENT                    SCHEMA  SCH  ENTITY         Package   ELEMENT           Relation  Relation
      NAME                       NAME    TYP  NAME           Name      NAME              Action    Desc
--------------------------------------------------------------------------------
<DPR> TAMCN ID                   |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |TAMCN_ID          |         |
<DPR> TAMCN                      |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |TAMCN             |         |
<DPR> TAMCN Image                |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |FILE_NM           |         |
<DPR> Nomenclature               |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |NOMEN             |         |
<DPR> AAO                        |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |AAO_QY            |Calc     |
<DPR> Shipped Qy                 |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |SHIP_QY           |Calc     |
<DPR> Planned Qy                 |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |PLAN_QY           |Calc     |
<DPR> Unfunded Qy                |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |UNFUND_QY         |Calc     |
<DPR> Total Value                |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |TOTAL_VALUE       |Calc     |
<DPR> Net Asset Posture          |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |NET_ASSET_POS     |Calc     |
<DPR> Accountable Assets         |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |NAP_ACCNTBLE_ASSETS |Calc   |
<DPR> In Transit                 |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |NAP_IN_TRANS      |Calc     |
<DPR> Maintenance Qy             |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |MAINT_QY          |Calc     |
<DPR> Depot Maintenance Count    |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |MAINT_DEP_QY      |Calc     |
<DPR> Deadlined Count            |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |MAINT_DEAD_QY     |Calc     |
<DPR> Other Maintenance Count    |COP    |DB  |GET_TAM_DSHBRD_LIST    |EAM_PKG  |MAINT_OTH_QY      |Calc     |
```

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Comment Block - continued

```
Optional Element Info
<DPE> TAMCN ID              | Desc Short: Unique internal identifier assigned to this TAMCN
<DPE> TAMCN                 | Desc Short: Table of Authorized Material Control Number - unique identifier for this equipment
<DPE> TAMCN Image          | Desc Short: Picture of this TAMCN (if available).
<DPE> TAMCN Image          | Desc Long:  If no image exists, feel free to submit one for system wide use by clicking on icon on TAMCN Summary
<DPE> Nomenclature         | Desc Short:  Description of the equipment
<DPE> AAO                  | Desc Short:  Total AAO for this TAMCN
<DPE> AAO                  | Desc Long:  Sum of Unit's T/E for this TAMCN rolled up to USMC level
<DPE> Shipped Qy           | Desc Short: Total Shipped AAO Quantity for this TAMCN
<DPE> Shipped Qy           | Desc Long:  Sum of Unit's Shipped Quantity for this TAMCN rolled up to USMC level
<DPE> Planned Qy           | Desc Short: Total Planned AAO Quantity for this TAMCN
<DPE> Planned Qy           | Desc Long:  Sum of Unit's Planned Quantity for this TAMCN rolled up to USMC level
<DPE> Unfunded Qy          | Desc Short:  Total Unfunded AAO Quantity for this TAMCN
<DPE> Unfunded Qy          | Desc Long:  Sum of Unit's Unfunded Quantity for this TAMCN rolled up to USMC level
<DPE> Total Value          | Desc Short: Total Dollar Value of this TAMCN
<DPE> Total Value          | Desc Long: Net Asset Posture X Unit Price for this TAMCN
<DPE> Net Asset Posture    | Desc Short: Total Asset Quantities for this TAMCN
<DPE> Net Asset Posture    | Desc Long:  Includes the Accountable Assets Qy + In Transit Qy + Depot Maintenance Count as reported for this item
<DPE> Accountable Assets Qy | Desc Short:  On Hand Quantities for this TAMCN Wholesale + Retail + GFP
```

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Data Governance

Data Pedigree

Exposes the lineage of a piece of data from it's initial source through to end application

Is the value shown in this particular field correct?

Data Quality

Does the number that is being shown for this field in relation to the other fields make sense?

Data Validation

Lessons Learned / Next Steps

- Creating external reports/dashboard away from systems via data warehouse is a very affordable way to provide this capability and shield end users from migrations
- Need to treat Data Warehouse projects as Complex Systems Engineering problems
- Data Governance helps provide structure/responsibility
- Data Pedigree
  - "Ghost" Tables to track lineage of each data instance
  - Very time intensive to document Pedigree but valuable
- Historical data is kept forever so have to "get it right"
  - Have to maintain history and historical calculations as new orders are adopted to historical and current using same rules

Questions?

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