



Information Systems Development Center 9500

Prognostics and Health Management Center Of Excellence Board Meeting

December 6, 2004

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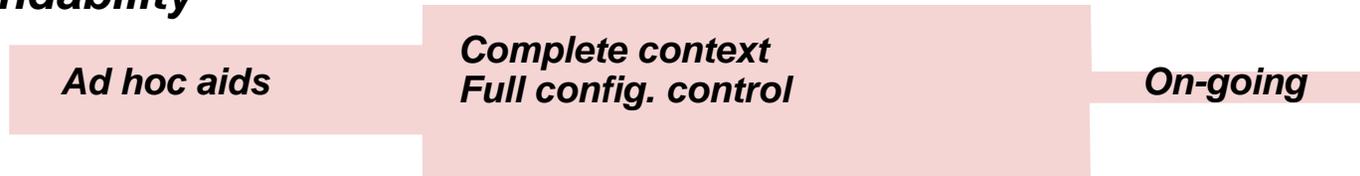


Converting Data to Info. To Enabling Decision Making

Accessibility



Understandability



Analysis





Turning Data into Information

Accessibility



- **Accessibility**
 - Many different data sources
 - Different data structures
- **Integration**
 - Extract the data
 - Transform the data (for integration, uses)
 - Load the data



Turning Data into Information

Accessibility



- **Overlay with application/tools to report/access**
 - Display the data in multiple ways
 - Provide to multiple user groups
 - Extract
 - Report
- **On-going effort to support accessibility**



Using Information to Make Decisions

Understandability

Ad hoc aids

*Complete context
Full config. control*

On-going

- **Understandability/usability to support decisions**
 - **Data Dictionary**
 - **Data cleanup**
 - **Can combine data however needed – Data Marts**
 - **Extract data as needed**
 - **Report data as needed**
- **Control data access**



Using Information to Make Decisions

Analysis



- **Analysis need constantly changing**
 - Use data as needed
 - Add data sources
 - Display/query data in new ways
 - Mine data
 - Add new tools/applications for data analyses

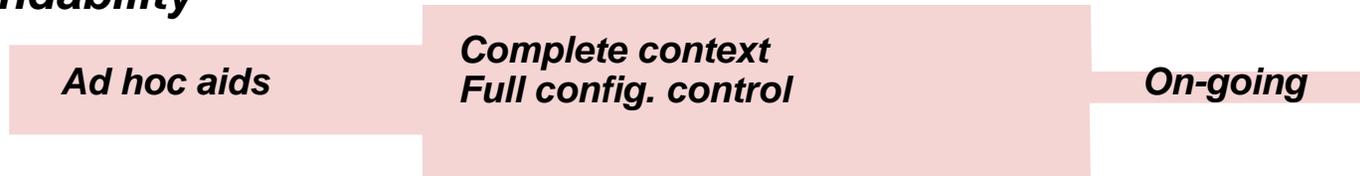


Converting Data to Info. To Enabling Decision Making

Accessibility



Understandability



Analysis





Neutron Generator Analysis Problem

- **Putting data together for analysis took months:**
 - Legacy data in obsolete, off-line systems
 - Operational systems were disparate, not integrated
 - Source systems
 - Unclassified (Oracle Manufacturing)
 - Classified (Produce Tester System, Vanguard, etc.)
 - Each analysis different needing data combined in many different ways
- **Analysis was too slow and difficult to get answers quickly and efficiently**



Neutron Generator Analysis Solution

From Months to Minutes

- **Pull data together in Data Warehouse**
 - **Build information model, common data structure for all sources**
 - **Extract data from sources**
 - **Unclassified (Oracle Manufacturing)**
 - **Classified (Produce Tester System, Vanguard, etc.)**
 - **Transform data**
 - **Do data check to ensure validity**
 - **Load into Enterprise Data Warehouse**
 - **Retrieve into applications and tools for**
 - **Analysis**
 - **Reporting**



What is a data warehouse?

- A collection of the key information used to manage a business
 - Can be integrated from many disparate sources
- Dedicated to **ANALYSIS needs** - Focuses on analysis, decision support and reporting
 - Not an operational/transactional system
- Integrated compilation of data from many data sources
- Often includes summary & historical views of data
- Ranges from gigabytes to terabytes in size



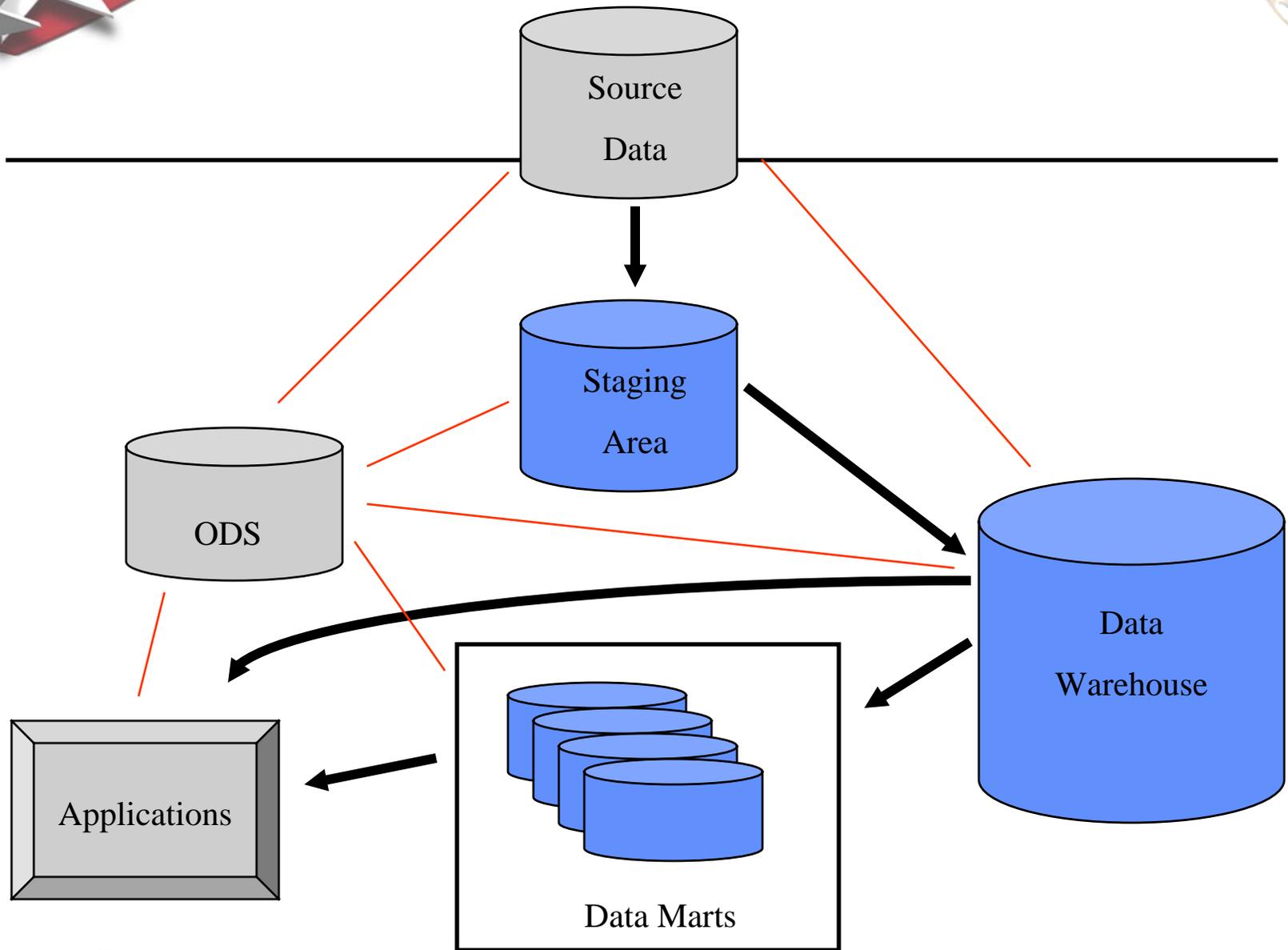
Examples of Data Warehouses

- Walmart – over 10 TB's, gives competitive edge, record of every scan from every Walmart, helps answer questions about where new Walmarts should be built
- Telecom Industry – Used to determine your life events & offer you new services before you know you need them
- Pharmaceutical Industry – Drug studies, patient information
- Geological and meteorological warehouses – examples of successful technical warehouses
- Sandia: Enterprise Data Warehouse



Data Warehouse vs Operational System

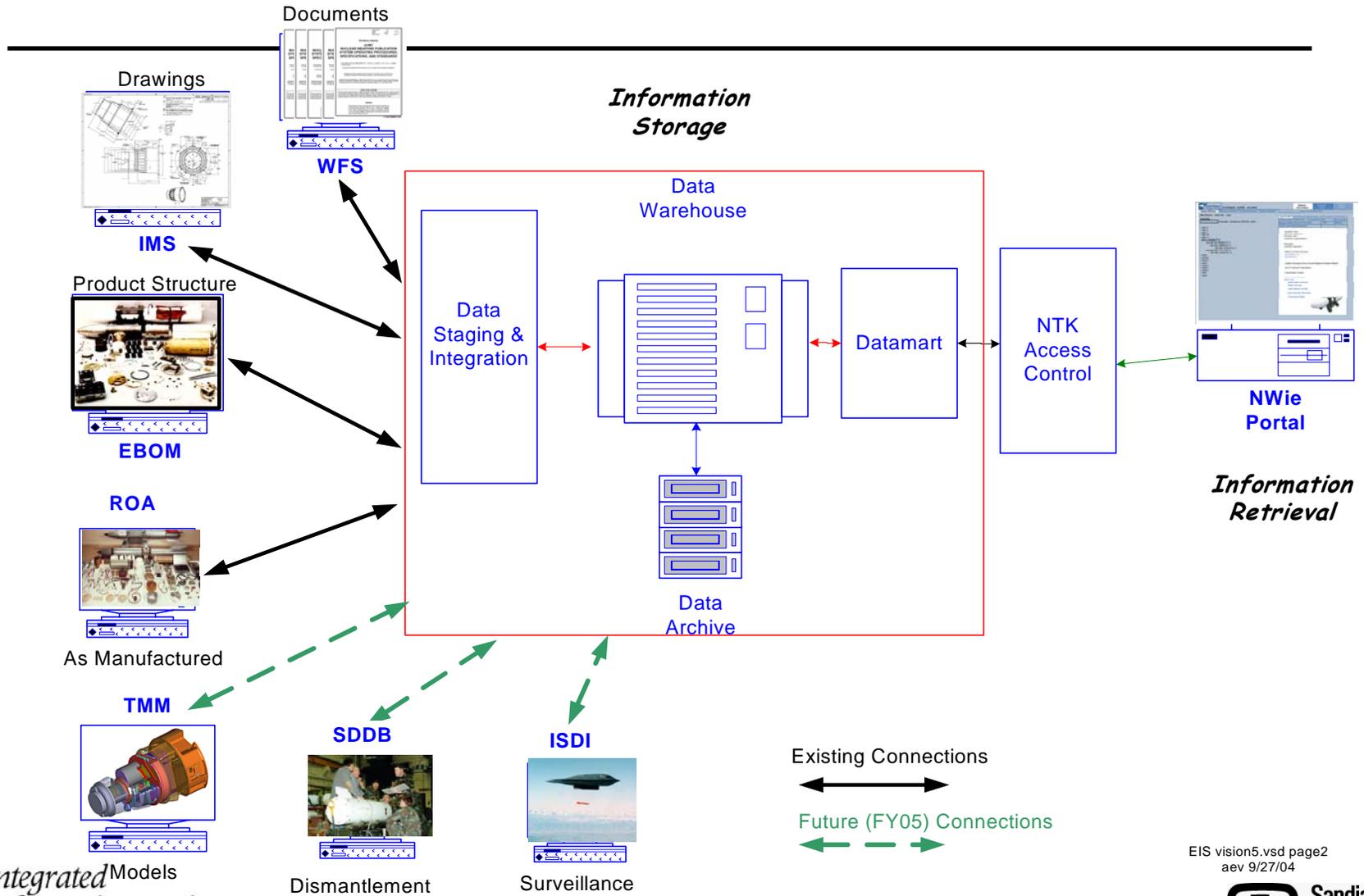
- Integrated data from many sources
 - Weapons data, historical info, manufacturing info, Unsatisfactory Reports all in one area
 - Aggregated data
 - What trends exist? Strategic questions
 - Rich variety of architectures
 - Large amounts of data over infrequent, complex queries
- Transactional data from one system
 - Separate and often isolated systems. designed for performance.
 - Atomic data
 - Tactical questions
 - Relational, normalized
 - Tuned for quick retrievals and updates





Transaction Systems

Engineering Information Architecture



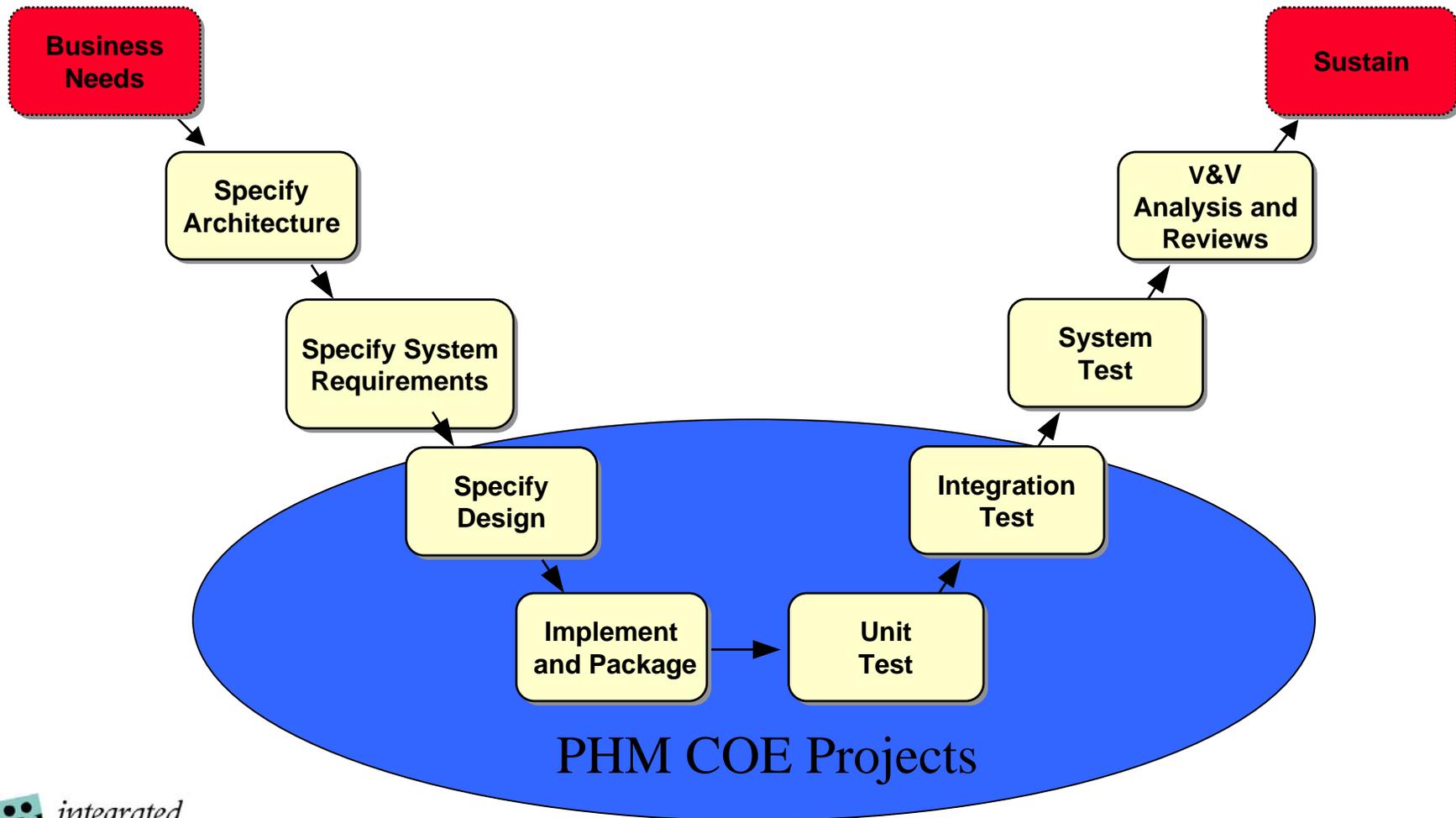


Integrated Information Systems Capabilities

- **Enterprise Architecture (EA)**
- **Infrastructure including networks/hardware**
- **Software Architecture**
- **Data Warehouse**
- **Systems Analysis**
- **Data Mining**
- **Application Development**
- **Quality Processes**
 - **Capability Maturity Model**
 - **Technology Infusion Process**
 - **Software and Information Life Cycle (SILC)**



Provide Solutions Through the Software Engineering Process





Integrated Information Systems Examples

- **Experience with Applications Development**
 - **Currently developing new systems:**
 - **Nuclear Weapons (NW) Stockpile Surveillance**
 - **NW Waveform Analysis**
 - **Homeland Security BioNet Modeling and Simulation software**
 - **Releasing new versions**
 - **NW Record Of Assembly**
 - **Materials Properties Analyses Software**
 - **Product Tester Software**



Integrated Information Systems Examples

- **Experience with integrating and implementing Commercial Off The Shelf (COTS) software applications**
 - **eMatrix Bill Of Materials**
 - **Oracle Manufacturing**
 - **Oracle Financials**
 - **Serena Workflow**
 - **Stellent Content Management system (Web FileShare)**
 - **PeopleSoft Human Resources**



Integrated Information Systems Security

- **Sandia Restricted Network**
 - Protect restricted information
- **Sandia Classified Network**
 - Protect Secret Information
- **Protect Need To Know**
 - Partition data and deliver subsets to identified groups with appropriate Need to Know



Information System Roadmapping Goal for this Meeting

- **Technical Roadmap Elements:**

- Information Architecture Description

- **Current view, future view, & transition**
- **Data elements**
- **Application elements**
- **Infrastructure elements**
- **Development strategy (may be series of iterations)**

- Milestone Chart

- **Scaled vision – more detail for short-term than long-term**

- **High Level Timeline**

- **Identify interdependencies**