Supply Chain Management: Enterprise CDM's Role and Relationship

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Integrated Support Systems, Incorporated

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Introduction

- Who's Ram?
- The world of CDM according to Ram.
- Supply Chain Management, the other SCM.
- Supply Chain data, old & new.
- Supply Chain Data Exchange.
- Real-time, real-world SCM examples.
- The CDM role, now and forever more.

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Why is CDM Important?

CDM Principles Facilitate:

- Doing the Right Thing(s)
- At the Right Time(s)
- For the Right Reason(s)
- By the Right Person(s)

. . . with the right Information.

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CDM is the "right way"

- The Right information
  - to Right people,
  - at the Right time,
  - in the Right place, and
  - for the Right reasons

Get the Right Product,
with the Right Form,
the Right Fit, and
the Right Function

To the Right Customer
at the Right Price
To the right Place and
at the Right Time

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CDM Short Course

- If it is not defined and identified,
  it can not be accounted for;
- if it can't be accounted for,
  it can't be traced through audit;
- if it can't be traced by audit ,
  it can't be controlled;
- if it can't be controlled,
  it can't be managed, therefore;
- either define and identify it,
  or forget it.

What is “IT” - Product Information

(Wisdom)

(Knowledge)

(Intelligence)

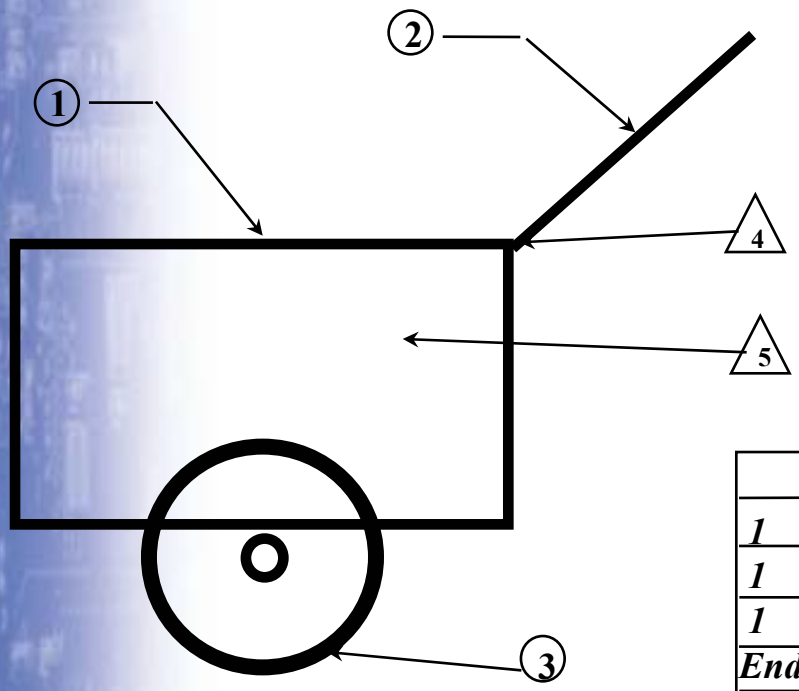
Information

Physical
Drawings
Books
Manuals
Papers
Libraries

The old and the new:

Documentation to Data
Paper to Digital
Manual to Automated

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



QTY	PART/ID NO.	DESCRIPTION/NOMEMCLATURE	MATERIAL SPEC	FN
				4
1	*WA123-1*	*Wheel Assembly*		3
1	*WH123-1*	*Wagon Handle*		2
1	*WB123-1*	*Wagon Box*		1
End	*WW023-1*	*Wagon*		

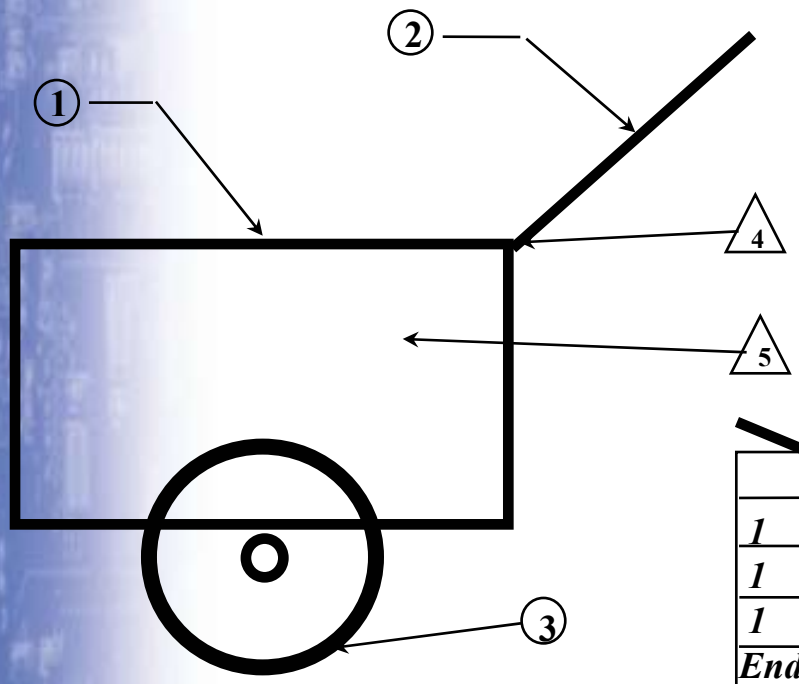
PARTS LIST

NOTES:

1. APPLICABLE STANDARDS:
   ANSI Y14.5-1982, DEM & TOLERANCES
   MS-STD-12, ABBREVIATIONS
2. REMOVE ALL BURRS
3. SAND ALL EDGES
4. BOND PER MS-1234
5. LABEL PER MS-4321

CONTRACT NO.	APPROVALS	COMPANY			
		Wonka Wagons			
	DRAWN	DWG. TITLE			
	CHECKED	*Wagon Assembly*			
DESIGN ACTIVITY	SCALE	SIZE	CAGE	DWG. NO.	REV
		A	*WQ123*	*WW023*	-

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



See Separate/Automated Parts List (S/APL)

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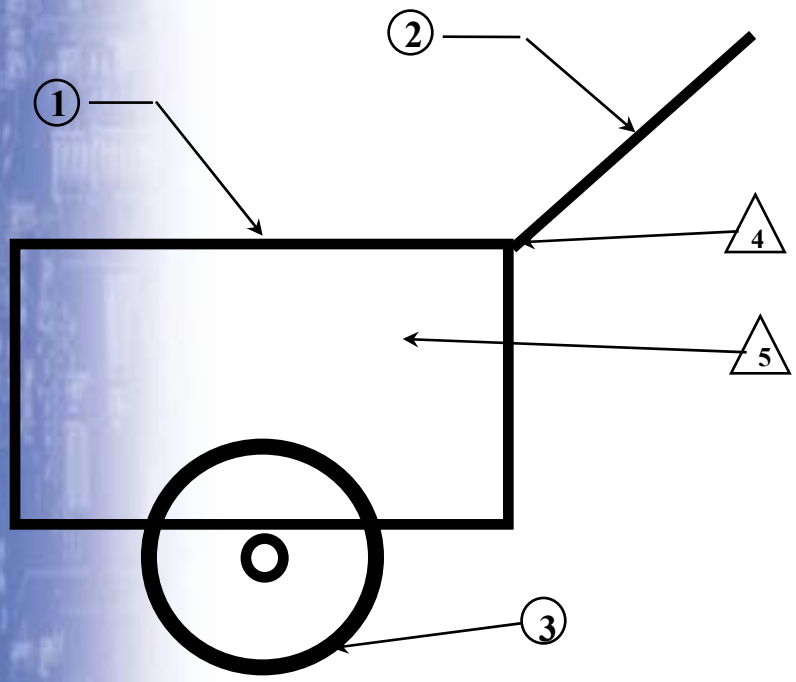
See Separate/Automated Parts List (S/APL)

See Application Data List

CONTRACT NO.	APPROVALS	COMPANY			
		Wonka Wagons			
	DRAWN	DWG. TITLE			
	CHECKED	*Wagon Assembly*			
DESIGN ACTIVITY	SCALE	SIZE	CAGE	DWG. NO.	REV
		A	*WQ123*	*WW023*	-

REVISIONS				
ZONE	REV	DESCRIPTION	DATE	APPROVED



Digital Data Item #1

CONTRACT NO.	APPROVALS	COMPANY *Wonka Wagons*				
	DRAWN	DWG. TITLE				
	CHECKED	*Wagon Assembly*				
DESIGN ACTIVITY	SCALE	SIZE *A*	CAGE *WQ123*	DWG. NO. *WW023*	REV -	

PARTS LIST

DESIGN ACTIVITY	CONTRACT NO.	CAGE	DATE	PL	SHEET
Wonka Wagon	*WQ01*	*WQ123*	*11/11/97*	*WA123-1*	*1* of *1* SHEETS

LIST TITLE	AUTHENTICATION	DRAWING NO.
Wagon Assembly		*WA123*

FIND or LINE #	QTY	UNIT of MEASURE	CAGE CODE	PART or ITEM ID NUMBER	DRAWING/DOCUMENT SIZE	DRAWING/DOCUMENT NUMBER	NOMENCLATURE or DESCRIPTION	SUPL. LISTS	NOTES
001	*1*	*EA*	*WQ123*	*WB123-1*	*A*	*WB123*	*Wagon Box*		
002	*1*	*EA*	*WQ123*	*WH123-1*	*A*	*WH123*	*Wagon Handle*		
003	*1*	*EA*	*WQ123*	*WA123-1*	*A*	*WA123*	*Wheel Assembly*		

Digital Data Item #2

LTR.	DESCRIPTION/AUTH	DATE	APPD.	LTR.	DESCRIPTION/AUTH	DATE	APPD.

NEXT ASSEMBLY	USED ON
APPLICATION	

NOTES LIST

DESIGN ACTIVITY	CONTRACT NO.	CAGE	DATE		SHEET
Wonka Wagon	*WQ01*	*WQ123*	*11/11/97*	NL *WA123*	*1* of *1* SHEETS

LIST TITLE	AUTHENTICATION	DRAWING NO.
Wagon Assembly		*WA123*

NOTE #	NOTE / DESCRIPTION
704	BOND PER MS-1234
705	LABEL PER MS-4321
802	REMOVE ALL BURRS
803	SAND ALL EDGES
901	APPLICABLE STANDARDS: ANSI Y14.5-1982, DEM & TOLERANCES MS-STD-12, ABBREVIATIONS

Digital Data Item #3

LTR.	DESCRIPTION/AUTH	DATE	APPD.	LTR.	DESCRIPTION/AUTH	DATE	APPD.

NEXT ASSEMBLY	USED ON
APPLICATION	

APPLICATION LIST	DESIGN ACTIVITY	CONTRACT NO.	CAGE	DATE	AL	SHEET 1 of 1 SHEETS
	Wonka Wagon	*WQ01*	*WQ123*	*11/11/97*	*WA123*	

LIST TITLE	AUTHENTICATION	DRAWING NO.
Wagon Assembly		*WA123*

Digital Data Item #4

Application / Usage Information

LTR.	DESCRIPTION/AUTH	DATE	APPD.	LTR.	DESCRIPTION/AUTH	DATE	APPD.

NEXT ASSEMBLY	USED ON
APPLICATION	

What is “IT” - Product’s Data

(Wisdom)

(Knowledge)

(Intelligence)

Information [data]

Object

File

Record

Field

Element

Character

Location / Representation
Media (format)
Storage (located)
Application (used by)
Protocols (exchanged)
Operating System
Database (related)
Meta-data (about)
Characteristics,
Attributes, & Features

What is “IT” - Product’s Data

(Wisdom)

(Knowledge)

(Intelligence)

Information [data]

Object

File

Record

Field

Element

Character

One to One
One to Many
Many to One
Many to Many

Location / Representation
Media (format)
Storage (located)
Application (used by)
Protocols (exchanged)
Operating System
Database (related)
Meta-data (about)
Characteristics,
Attributes, & Features

The Top Ten Reasons to Automate Configuration/Data Management

#10 - Size & Volume
#9 - Time & Cycles
#8 - Accessibility
#7 - Quality Conformance
#6 - Changing Changes
#5 - Analysis Capabilities
#4 - Data Exchange
#3 - Collaboration
#2 - Integration
#1 - Complexity

Product Life cycle

As Proposed

Cost Estimating
Capacity Planning
& Assessment
Specifications

As Allocated

Master Schedule
Work Breakdown Structure
Budgets
Sales Orders
Cost Accounts
Effectivity

As Designed

Baseline Release
Document Control
Product Definition
EBOM
Bill of Routings
Engineering Effectivity

As Planned

MBOM
Manufacturing Effectivity
Bill of Routings
Bill of Resources
Master Production Schedule
Rough-cut Capacity Planning
MRP/CRP
Procurement
Work Order Release

As Purchased

Receiving/Inspection
Receiving Instructions
Dock-to-Stock
Inventory (WIP)
Lot Code / Serial Numbering

As Tested

Shop Floor Control
Labor Collection
Work Measurements
Process Instructions
Test Procedures
Test Results

As Built

CM Status Accounting

As Delivered

As-Built Snapshot
CM Reconciliation
CM Status Accounting
Lot Code / Serial Numbering
Deviations / Waivers

As Maintained

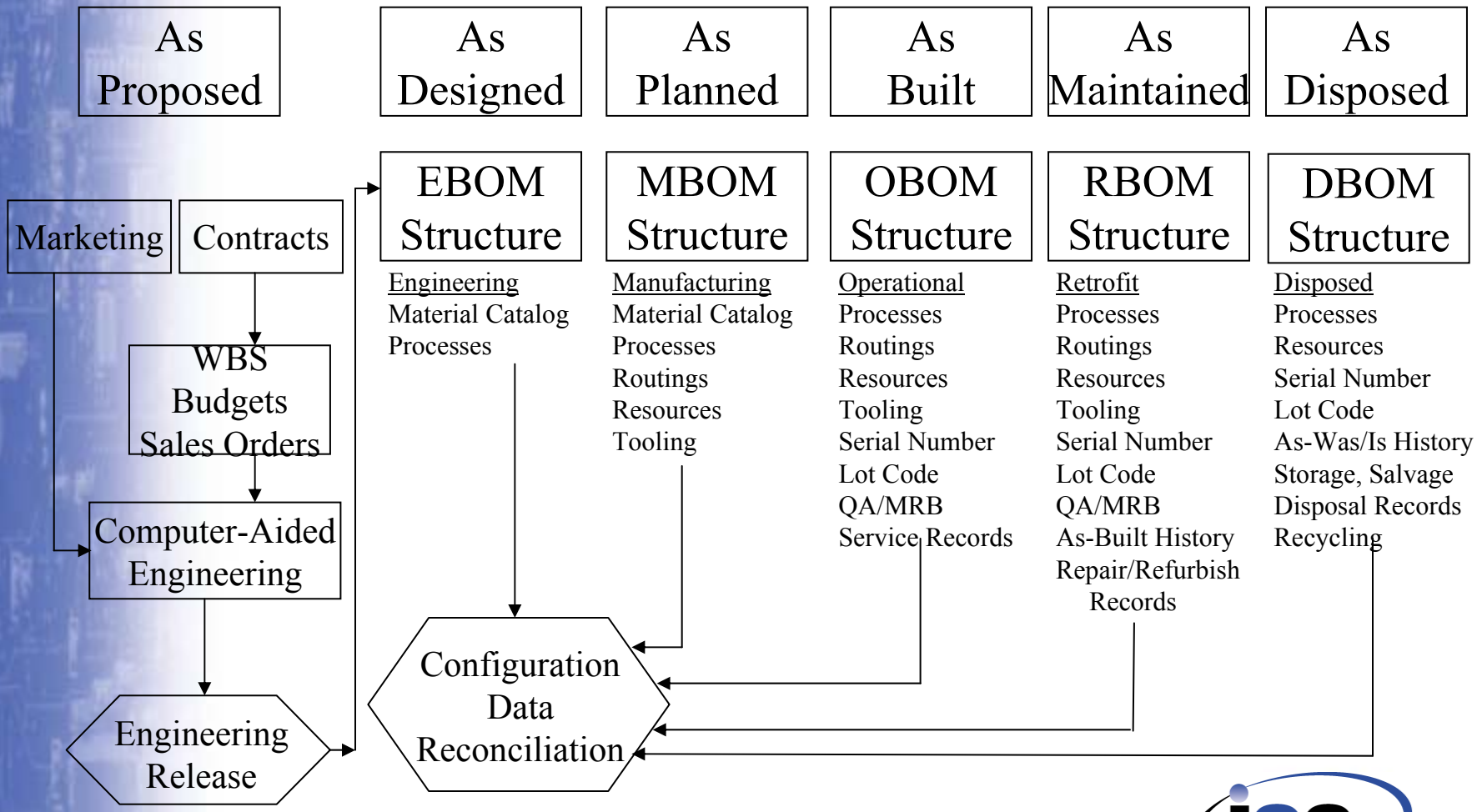
Field Return / Retrofit
Field Service
CM Reconciliation
Lot Code / Serial No.
CM Status Accounting
As-Built History

As Disposed

Storage, Salvage
To-Become (Recycle)
CM Reconciliation
Lot Code / Serial No.
CM Status Accounting
As-Was/Is History

Reference: Stanford Friedman
Midrange ERP, September 1998

Configuration Data Management



Reference: Stanford Friedman
Midrange ERP, September 1998

Definitions (APICS Dictionary)

Supply Chain – 1) The process from the initial raw materials to the ultimate consumption of the finished product linking across supplier-user companies. 2) The functions inside and outside a company that enable the value chain to make products and provide services to the customer.

Supply Chain Management – The planning, organizing, and controlling of supply chain activities.

Definitions (APICS Dictionary)

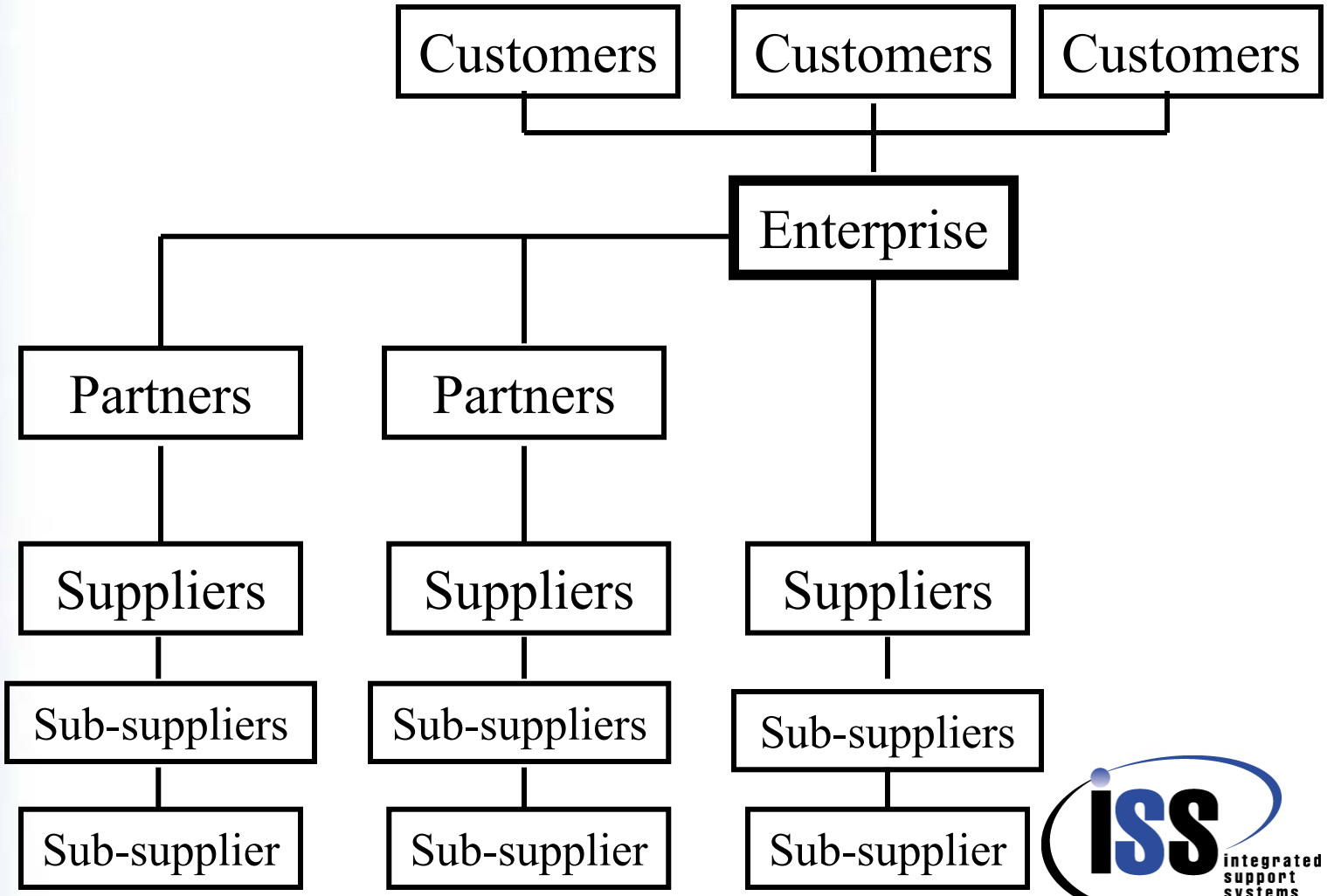
Value Chain –The functions within a company that add value to the goods or services that the organization sells to customers and for which it receives payment.

Value-driven enterprise – An organization that is designed and managed to add utility from the view point of the customer in the transformation of raw materials into a finished good or service.

CDM Role – Assuring the rights are right.

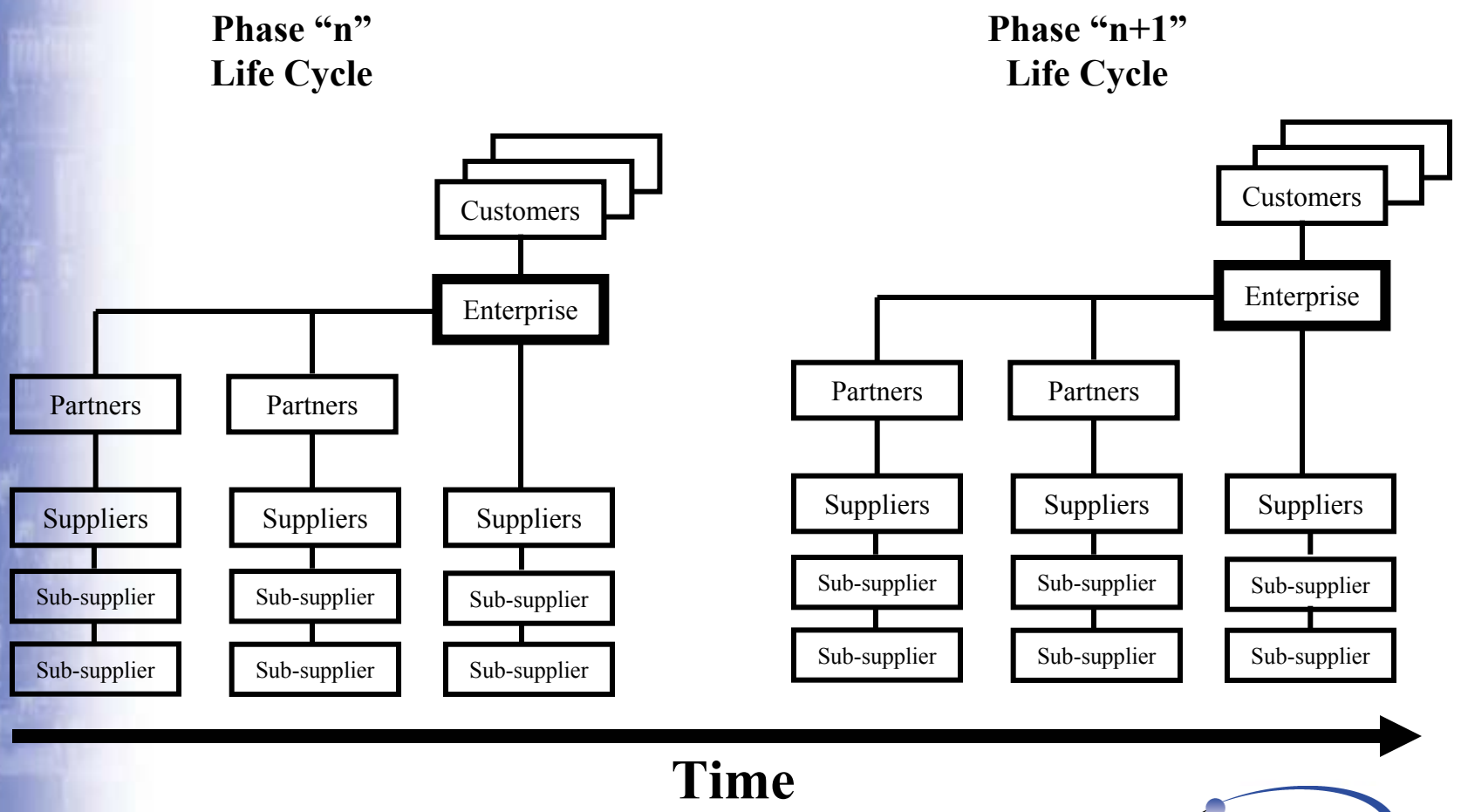
Enterprise Supply Chain Management

Global and Virtual Model



Enterprise Supply Chain Management

Global and Virtual Model



Key Elements of Supply Chain Management

- Order Entry
- Configurator Functions
- Planning
  (Production/Manufacturing)
- Scheduling
- Expediting
- Demands / Pulls
- Capacity
- Constraints
  (Materials / Capacity)

- Inventory
  - Warehousing
  - Picks / Issues
  - Staging
  - Work-in-Process (WIP)
  - Replenishment
- Transportation
  - Stores / Yard
  - Loads
  - Routing
  - Duty
  - Freight
  - Rating

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Customer-integration (sales order) Management and Product Configurators

Customer-integration (sales order) Management

- front-office operations - sales, service, marketing, orders
- procurement from supplier's point of view
- interactive selling
- opportunity management
- customer history, service, call management

Product Configurators

- rules based configuration
- automatic generation of bill of material
- end item definition from order entry
- configurating orders to multiple models or variations

Advanced Planning and Dynamic Scheduling

Advanced Planning

- deals with few days to few weeks
- detailed execution of the production plan
- account for current plant floor conditions
- schedules and sequences to capacity
- addresses expediting

Dynamic Scheduling

- deals with months and years
- constraint models - materials and capacity
- alternative production scenarios
- master scheduling
- material requirements planning
- capacity planning

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Warehousing and Transportation Management 1 of 3

Warehousing Management (system)

- Labor planning
- Slotting
- Inventory control
- Staging
- Put-away path processing
- Picking
- Packing
- Replenishment

Warehousing and Transportation Management 2 of 3

Joint Functionality of Warehousing & Transportation

- Yard management
- Trailer management
- Load diagramming
- Vehicle/door scheduling
- ASN receiving
- Inventory visibility
- Wave planning
- Flow-through
- Cross-docking

Warehousing and Transportation Management 3 of 3

Transportation Management (system) and Logistics

- Load planning
- Routing and scheduling
- Asset management
- Load tendering
- Tracking and tracing
- Rating
- Freight payment

Demand & Distribution Planning

Demand Forecasting

- level of activity predictions (weeks)
- statistical accuracy management
- elimination of excess inventory
- ensure availability of materials

Distribution Management

- determines distribution of optimal quantities
- minimizes costs
- planning of product distribution
- distribution of vendor supplied inventory
- manages the shift from warehousing items to constant distribution

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Component and Procurement Management

Component and Procurement Management

- supplier component information
- supplier's designs and processes reuse
- supply-chain information sharing
- supplier component cataloging
- ordering capabilities
- time-to-market and product costs

Production Environments

MTS - Make-to-stock (before order)
MTO - Make-to-order (after order)
MTP - Make-to-Print
ATO - Assemble-to-order
FTO - Finished-to-order
DTO - Design-to-order
ETO - Engineer-to-order
Mass Customization

Getting Sick on the Acronym Soup

DRP - Distribution Requirements Planning
MRP - Materials Requirements Planning
MRP II - Manufacturing Resource Planning II
ERP - Enterprise Resources Planning
SCM - Supply Chain Management
ISCM - Integrated Supply Chain Management

CM - Configuration Management (Context, Content)
DM - Data Management
PDM - Product Data Management
SCM - Software Configuration Management
PLCM - Product Life Cycle Management
UPLCM - Unified Product Life Cycle Management
PCDM - Product Content and Data Management

PM - Program Management (Project)
CPC - Collaborative Product Commerce
CSM - Component & Supplier Management
CAD - Computer-aided Design
CRM - Customer Relationship Management
EDI - Electronic Data Interchange

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Information feeds the Supply Chain

- What?
- How many?
- When?
- Where?

The supplier's Critical four Pieces of Product data

"Product data is the DNA of the value chain, without it there is nothing."

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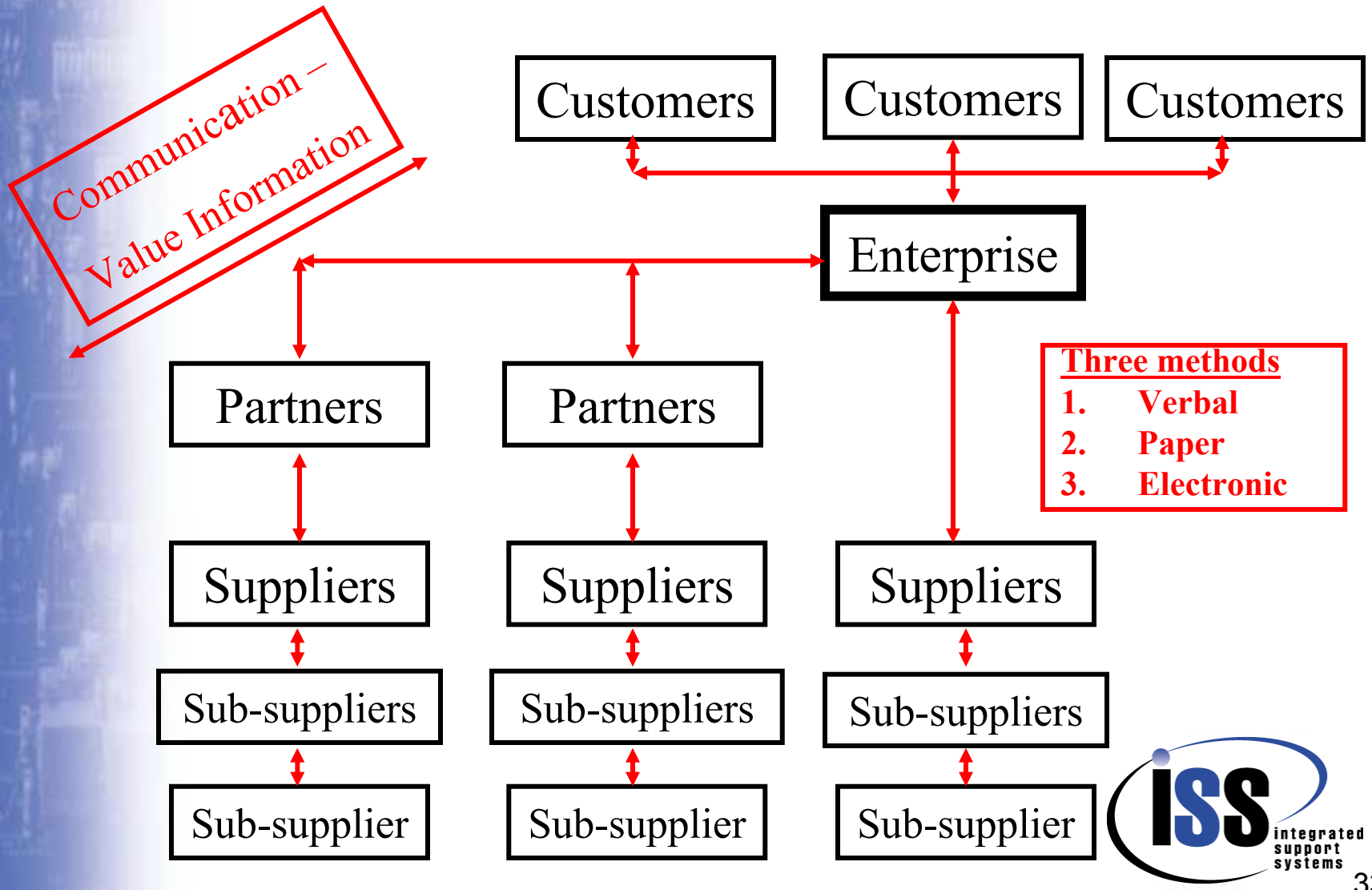
Enterprise Supply Chain Management

Global and Virtual Model



Pains of Paper

Isolation/go it alone
Costs
Resources
Delays
Inaccuracies
Inaccessibility
Redundancy
Reconciliation
Validation/Verification

Key Entry Errors
Distribution
Reproduction(s)
Reporting, data collecting
Monitoring and Tracking
Physical Libraries/Cribs
Intervention Resources
Red-line Management
Physical size, oversize

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Real Life Example of Manual Paper Vault

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Gains of Digital

Time Savings
Accuracy
Access
Shared
Globalization
Collaboration
Commons
Standards
Teaming / Supply Chain
Shared Amortization

ISO Compliance (SPC)
Certification
ROI / Profits
Costs Avoidance
Reduced Keyed Data Entry
Re Used, Reusability
Less Training Required
Liaison activities
Reporting
Metrics

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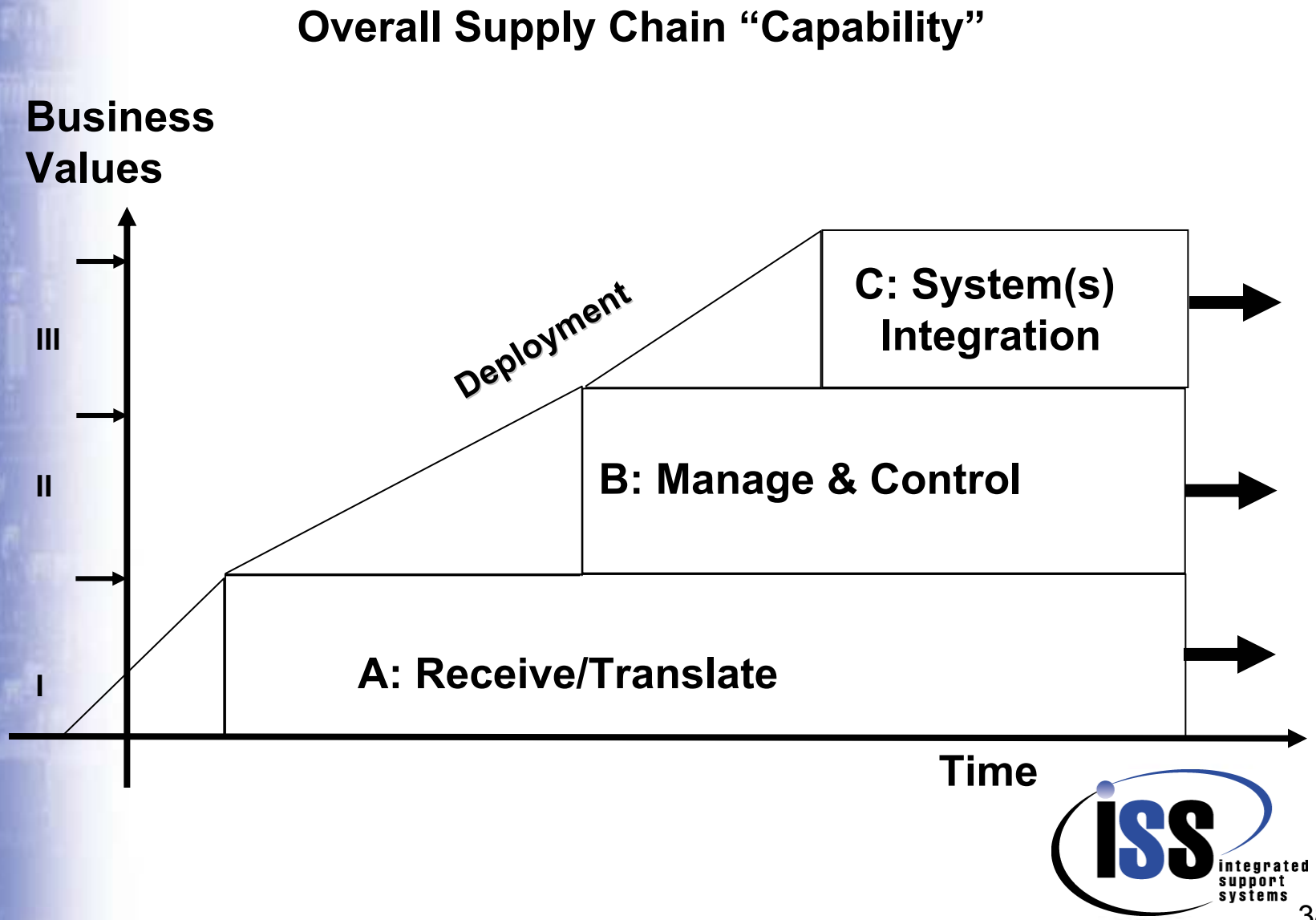
Digital Data Facilitates

- Collaboration
- Group Technology
- Feature Based Design
- Mass Customization or Build-to-Order (common versus unique)
- Logistics - inventory, locations, delivery
- Archiving for Historical Retrieval
- Data Storage
- Data Conversions (Systems upgrades)
- Use of Analysis Tools
- Re-packaging (TDP)
- Agile, Lean, and Supply Chain

Iterative Process to Making Gains



Grouping the Benefits

- **Group 1 Benefits:**
  - reductions in paperwork
  - reductions in sorting/mailing time
  - reductions in input errors
  - improved cycle time
  - faster response times
  - standardized information
- **Group 2 Benefits:**
  - Reductions is inventory
  - reductions in lead times
  - improved customer relations
- **Group 3 Benefits:**
  - reductions in personnel
  - efficient business operations
  - effective use of personnel, assigned new tasks
  - time-based competition enhancements

"Most benefits were due to changes in the transaction process"

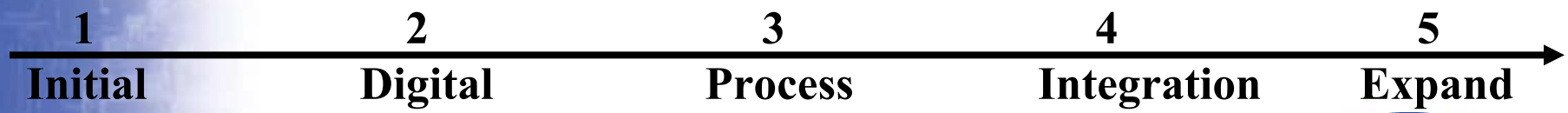
From: APICS, 1995 Conference Proceedings; Rhonda R. Lummus
The Evolution to EDI: Are There Benefits at All Stages of Implementation

APICS "Catching the 2nd Wave"

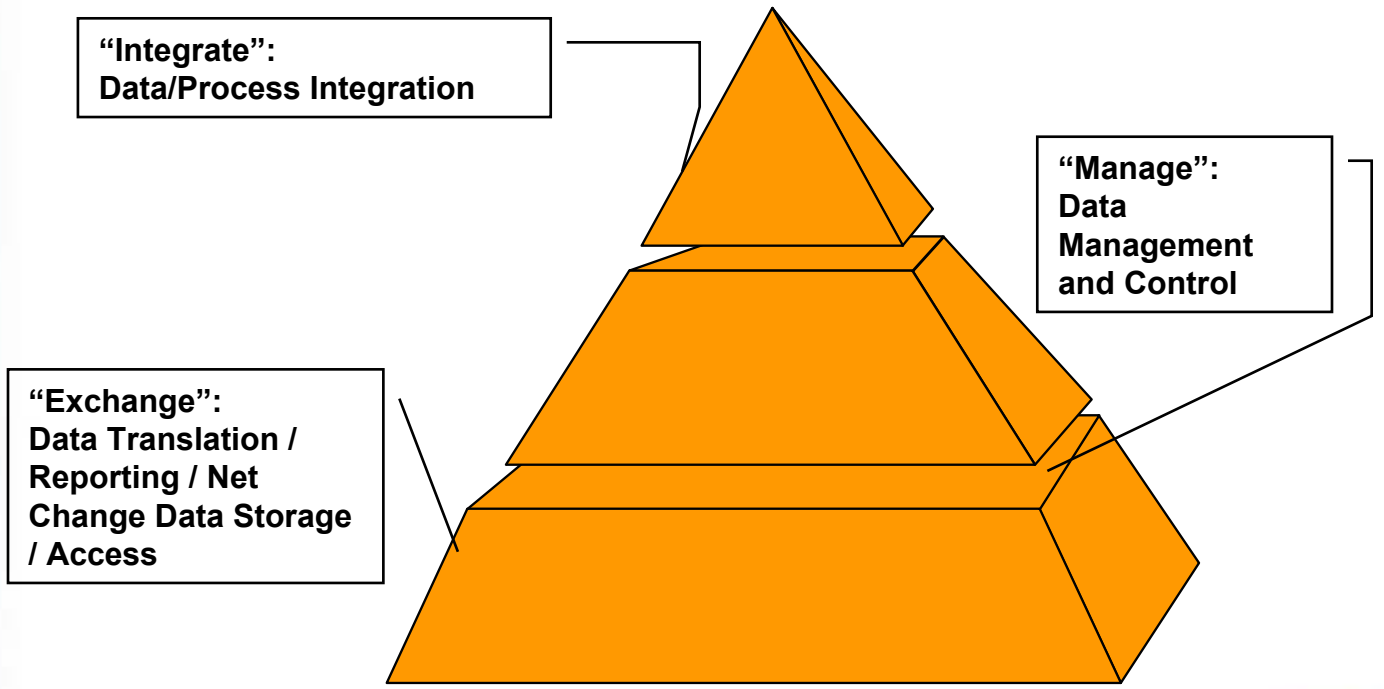
3 - Synergize
Achieve value in use. (Transform)

2 - Synthesize
Build for the future. (Effectiveness)

1 - Stabilize
Secure the base. (Efficiency)



Supply Chain Digital Data Exchange Functional Requirements/ Process Improvement Opportunities



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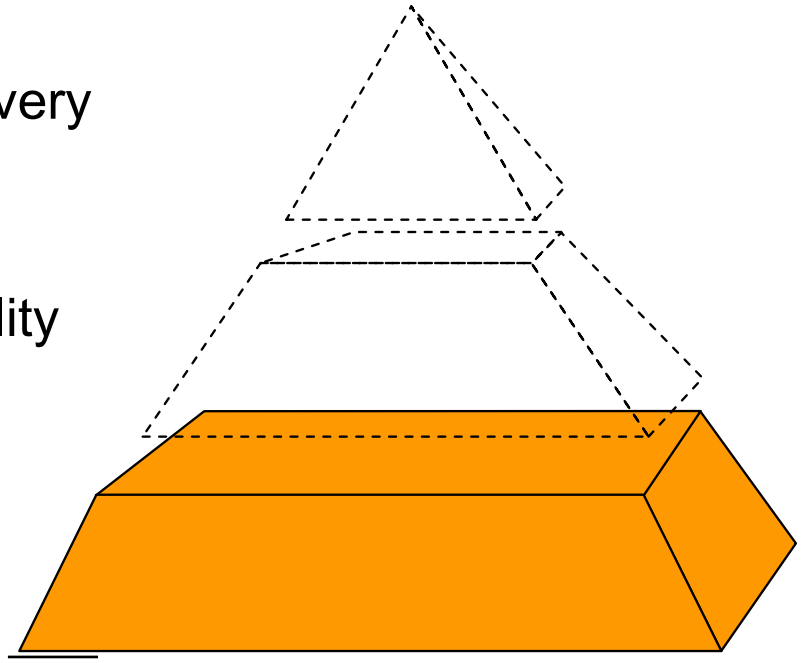
Supply Chain Needs: Exchange

- Retrieve digital data files
- Translate to usable format
- Determine net changes in delivery
- Maintain persistent archive of enterprise design intent data
- Provide search/access capability



Data Translation / Reporting / Net Change / Data Storage / Access

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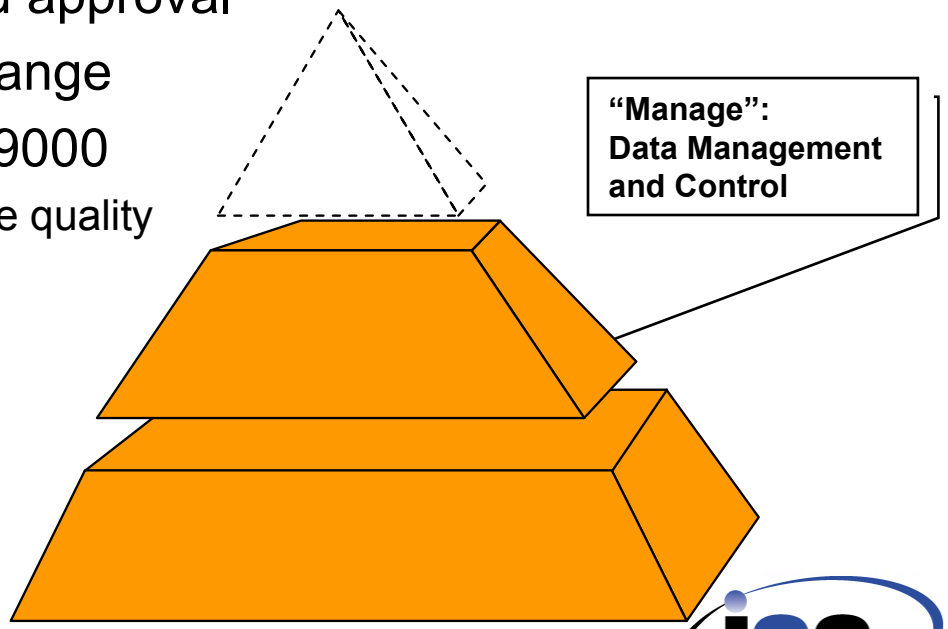
Supply Chain Needs: Manage

- Change disposition, status, distribution and notification
- Review, impact assessment, cost estimation and approval
- Incorporation of change
- Adherence to ISO 9000
  - Enforced /audit-able quality procedures



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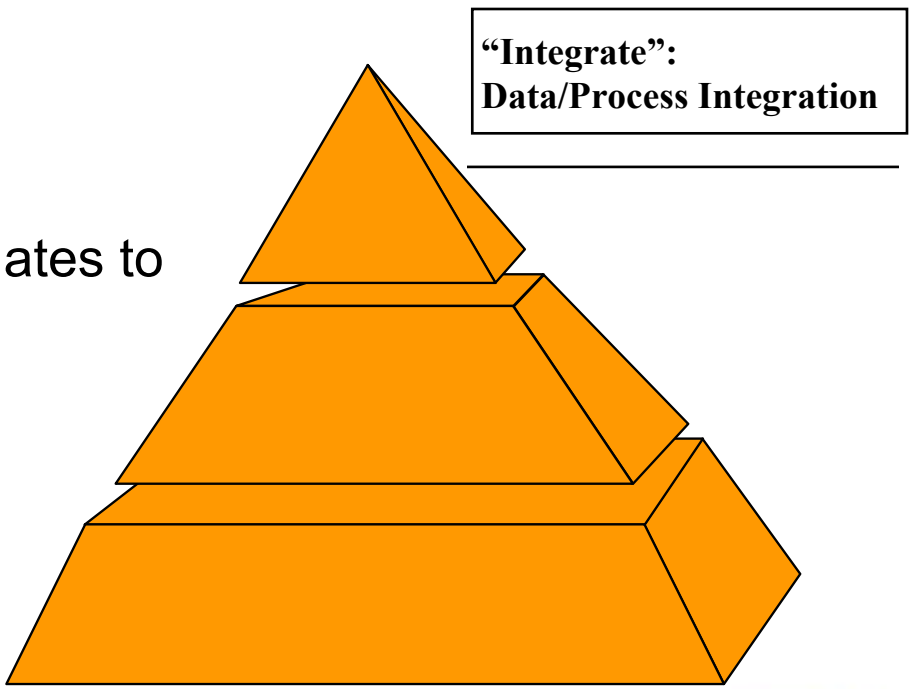
Supply Chain Needs: Integrate

- Product Definition and Change data must be incorporated into other systems
  - ERP
  - CAPP
  - Purchasing
- Manual or digital updates to other systems



Options for Supply Chain Integration

Option 1: Mandate Suppliers Utilize Particular Software Tools (CAD, PDM/CM, ERP, etc.)

- Purchase, implementation, and training costs could be very expensive
- Limits Enterprise supplier choices
- Prevents utilization of “Best of Breed” software
- Difficult to exchange product data between disciplines (Ex. design and support)
- Suppliers must meet the requirements of all customers

Options for Supply Chain Integration

Option 2: All Product Data Resides at Enterprise; Suppliers Access Externally

- Enterprise must implement solution that meets needs for security, performance, reliability, supportability...
- Supplier needs to be trained
- Supplier may need to maintain multiple product data repositories
- Suppliers Must Meet the Requirements of all their Customers

Options for Supply Chain Integration

Option 3: Point-to-Point Integration Between Applicable Product Data Systems

- Costly to implement
- Costly to expand scope
- Costly to maintain
- PTP Integration needs to be updated when any system utilizing product data is upgraded
- Prevents utilization of “Best of Breed” software
- Deployment delayed until PTP solution available
- Suppliers Must Meet the Requirements of all their Customers

Options for Supply Chain Integration

Option 4: Use an Internationally Recognized and Commercially Accepted Neutral Data Definition

- Avoids the inflexibility and cost of a mandate
- Allows suppliers to process applicable product data using best business practices
- Enables cost-effective, COTS solutions to Product Data Exchange
- Supplier can create local "Type Design" database of the enterprise design intent.
- Supplier can support multiple enterprises
- Data may be integrated/interfaced to other supplier data systems (ERP, CAD, PDM, etc.)

STEP, The Accepted Standard

STEP

STandard for the Exchange of Product model data

- ISO 10303 family of standards
- STEP translators available for nearly every major CAD vendor
- STEP Centers
  - U.S., Germany, France, Italy, Japan, Canada, Australia, and China

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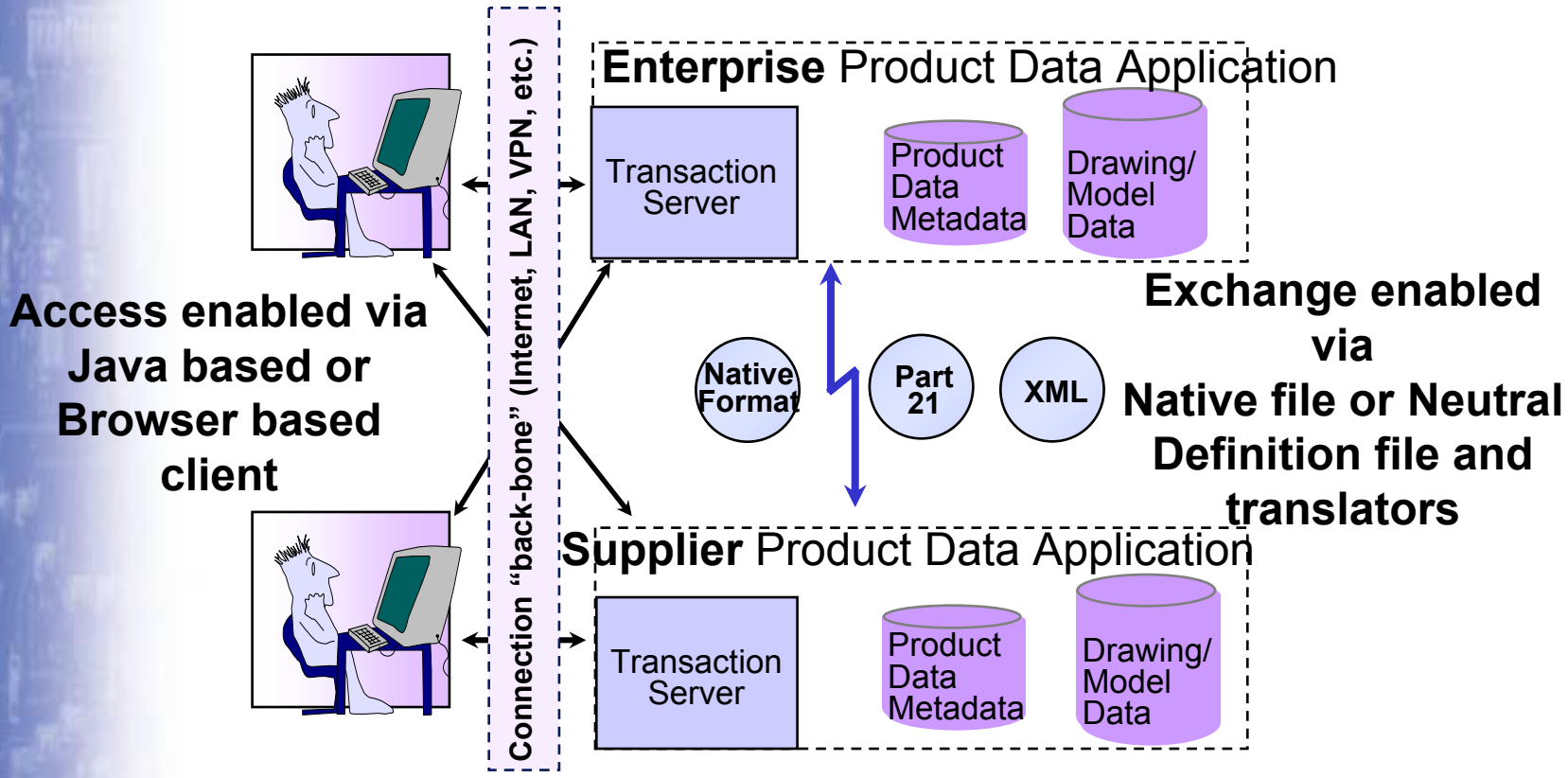
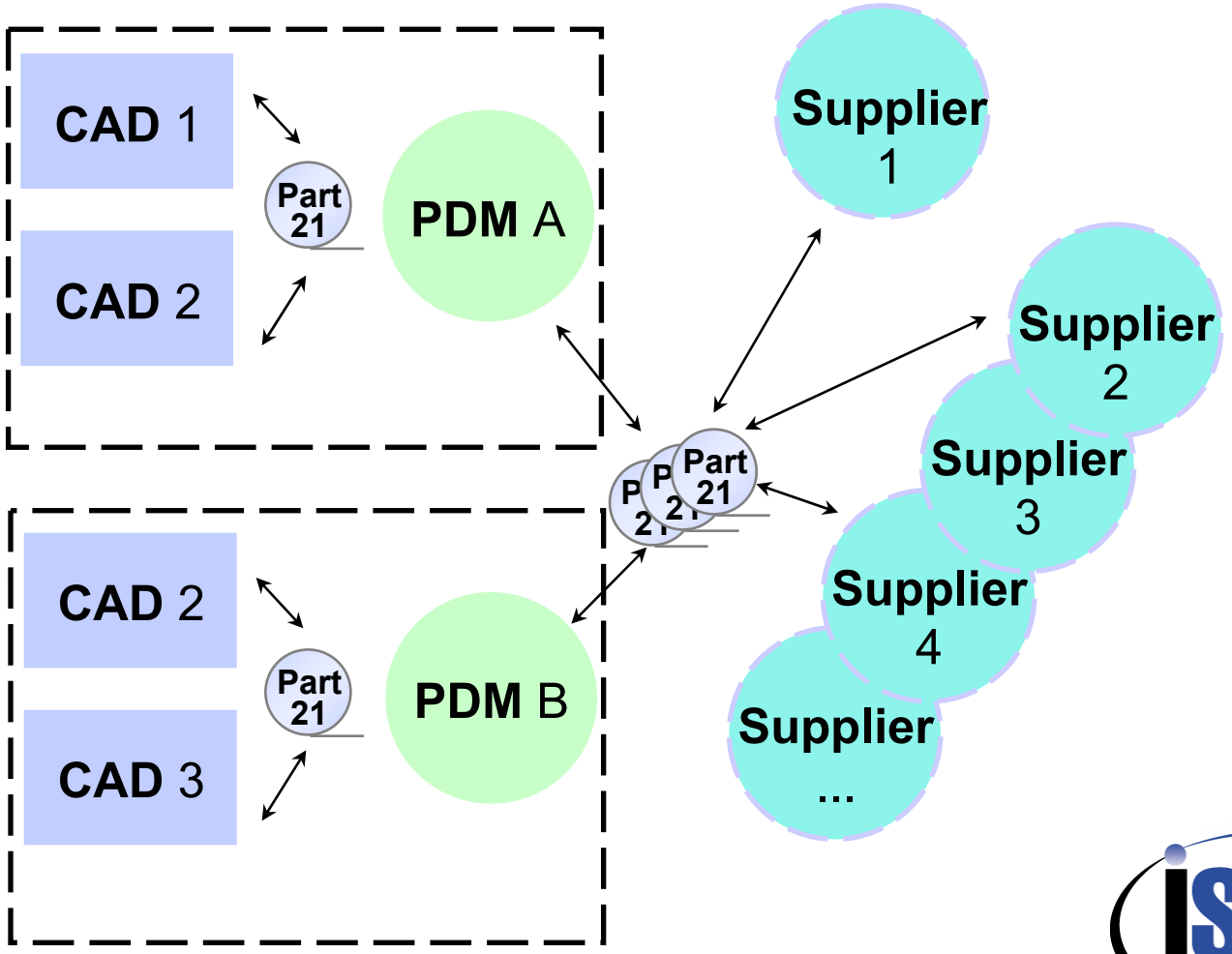
Product Data Exchange / Access In Distributed Supply Chains



CM/PDM Data Exchange

Neutral File Exchange Model



STEP Part 21 File

1-SCML_BTST5BW1.STP - Notepad

File Edit Format Help

```
ISO-10303-21;
HEADER;
/* Generated by software containing S
 * from STEP Tools, Inc. (www.steptoo
 */

FILE_DESCRIPTION(
/* description */ ('Supplier Custom Mo
/* implementation_level */ '2;1');

FILE_NAME(
/* name */ 'SNETDDAT0926200318414
/* time_stamp */ '2003-09-26T18:41:54-(
/* author */ ('NULL'),
/* organization */ ('The Boeing Compa
'Seattle, WA 98124'),
/* preprocessor_version */ 'ST-DEVEL
/* originating_system */
'PDM.c Version action - A2.4P4 (A2.4P
/* authorisation */ 'PDM');

FILE_SCHEMA (('TECHNICAL_DATA
ENDSEC;

DATA;
#10=APCLAS(#12,#11,(#23));
#11=CLSRL('type of notation',$);
#12=CLS1('STANDARD NOTES',$);
#13=DESCRIPTION_ATTRIBUTE('app
#14=(
CNFEFF(#32)
EFFCTV(")
PRDFEF(#15)
SRNMEF('930','930')
);
#15=PRDFUS(",",",#100,#101);
#16=PDCA(#101,#105,#17);
#17=PDCR(",");
#18=APDCRF(#95,",(#15));
```

1-SCML_BTST5BW1.STP - Notepad

File Edit Format Help

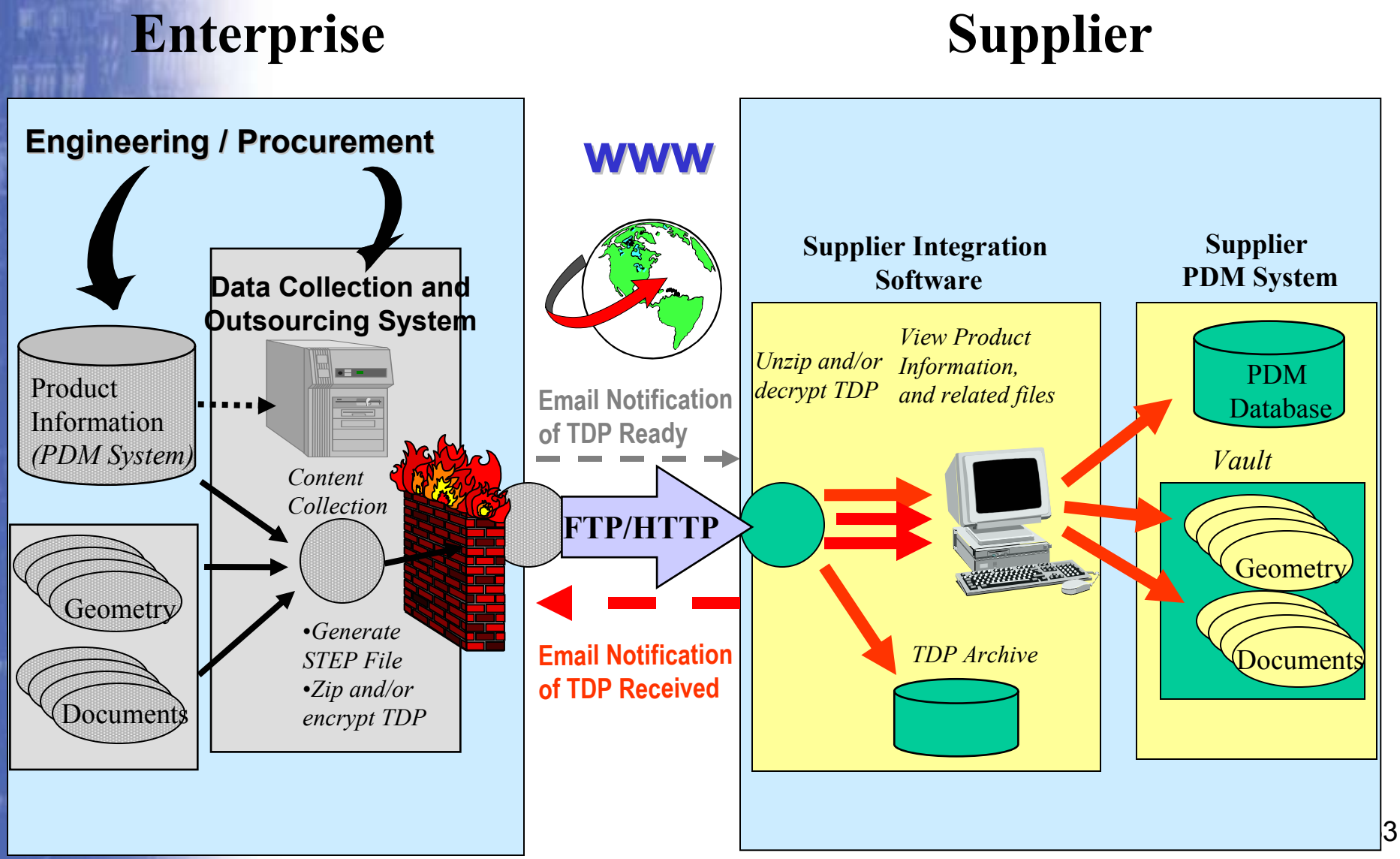
```
#24=PRDFRP(#39,#27);
#25=PRDFRP(#40,#28);
#26=PRDFRP(#41,#29);
#27=RPRSNT('notation',(#20),#30);
#28=RPRSNT('notation',(#21,#23),#31);
#29=RPRSNT('indentured level tag',(#22),#3
#30=RPRCNT(",");
#31=RPRCNT(",'document parameters');
#32=CNFDSG(#33,#107);
#33=CNFITM('VV302',",",#34,");
#34=PRDCNC('767',",",#35);
#35=PRCNCN('BCAG',#131,'airplane');
#36=PRDFRL(",'fulfills',",#99,#100);
#37=ASCA(#42,(#38));
#38=PRPDFN(",'indentured data list header'
#39=PRPDFN('descriptive properties',$,#10(
#40=PRPDFN(",'indentured data list body p
#41=PRPDFN(",'indentured data list entry p
#42=SCRCLS(",'item security classification',
#43=SCCLLV('BOEING PROPRIETARY');
#44=APDTTM(#45,#52);
#45=DTANTM(#48,#46);
#46=LCLTM(18,41,49.,#47);
#47=CUTO(8,0,.BEHIND.);
#48=CLNDT(2003,26,9);
#49=APPROR(#91,#52,#50);
#50=APPRL('release authentication');
#51=APAPAS(#52,(#38,#14));
#52=APPRVL(#53,'release authentication');
#53=APPSTT('PDM');
#54=RLASS(#61,#65);
#55=RLASS(#62,#44);
#56=RLASS(#62,#51);
#57=RLASS(#63,#18);
#58=RLASS(#61,#66);
#59=RLASS(#64,#19);
#60=RLASS(#61,#67);
#61=OBJRL('change identification',$);
#62=OBJRL('release authentication',$);
```

1-SCML_BTST5BW1.STP - Notepad

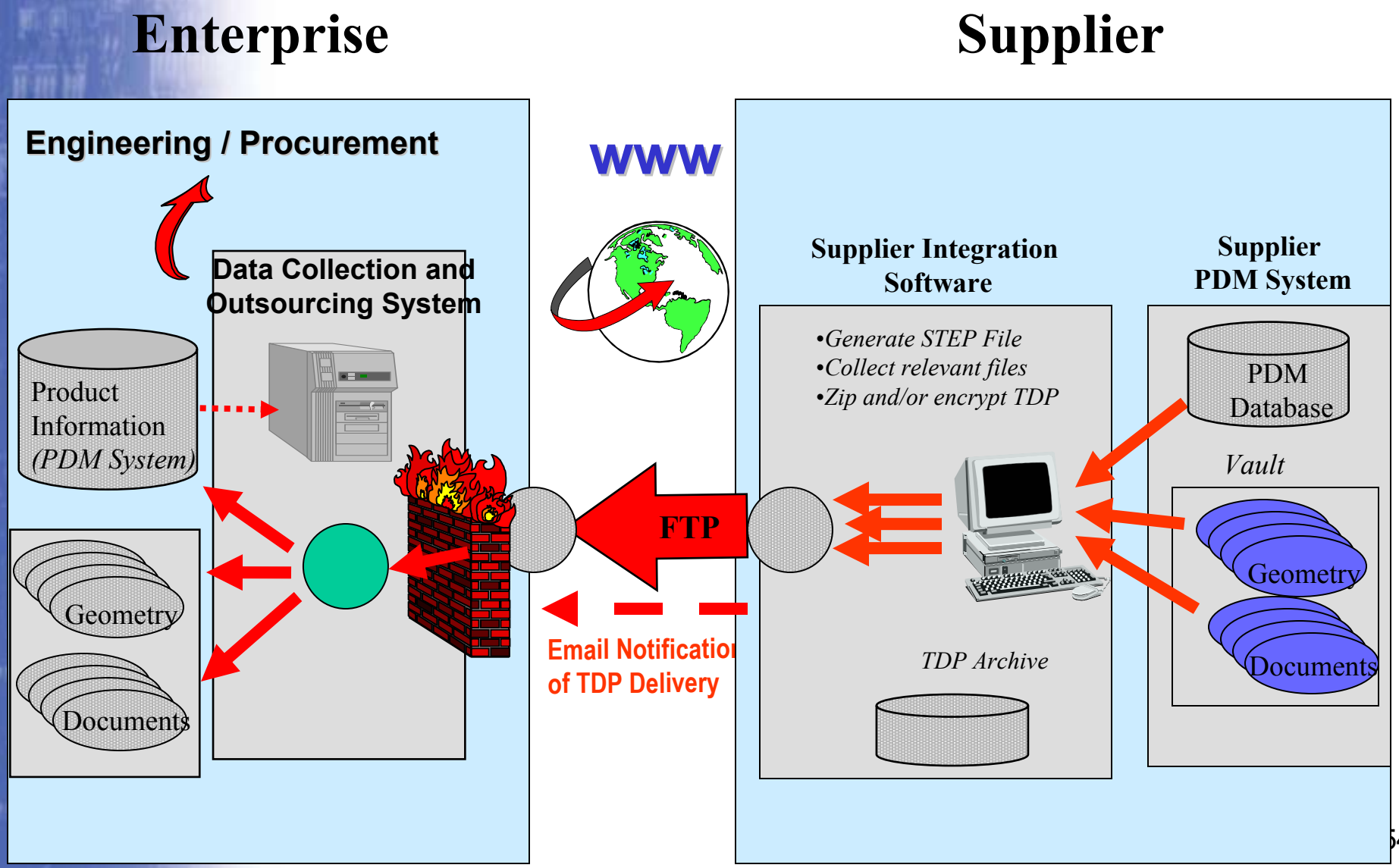
File Edit Format Help

```
#96=DCMNT(",",$,#98);
#97=DCMTYP('configuration controlled document definition');
#98=DCMTYP('configuration controlled document version');
#99=PRDDFN('M','indentured data list content',#107,#102);
#100=PRDDFN('M','item',#109,#103);
#101=PRDDFN('M','item',#110,#104);
#102=PRDFCN('document version',#131,");
#103=PRDFCN('supplier custom part definition',#131,'manufacturing');
#104=PRDFCN('module definition',#131,'manufacturing');
#105=PRDFCN('indentured data list entry',#131,");
#106=PDFR(",'alternate element identification',$,#107,#108);
#107=PRDFFR('K',$,#123);
#108=PRDFFR('/NULL',$,#124);
#109=PRDFFR(",$,#125);
#110=PRDFFR('A',",#126);
#111=PRDFFR('B',$,#127);
#112=PRCTRL(",$,#116,#117);
#113=PRCTRL(",$,#117,#118);
#114=PRCTRL(",$,#116,#119);
#115=PRCTRL(",$,#120,#121);
#116=PRPC('document',$,(#123,#124,#127));
#117=PRPC('indentured data list',$,(#123));
#118=PRPC('Supplier Custom Module List','Distribution Product',(#123));
#119=PRPC('SCML IDENTIFIER',$,(#124));
#120=PRPC('supplier custom part',",(#125));
#121=PRPC('kit',",(#125));
#122=PRPC('module',",(#126));
#123=PRDCT('170T0100-907,930,VV302','VERT STAB ASSY',$,(#128));
#124=PRDCT('170T0100-907#930K',",$,(#128));
#125=PRDCT('170T0100-907',",",(#128));
#126=PRDCT('170T0100-26','VERT STAB ASSY',",(#129));
#127=PRDCT('BDS-1057_SCML',",$,(#130));
#128=PRDCNT(",#131,");
#129=PRDCNT('Production',#131,");
#130=PRDCNT('reference document',#131,");
#131=APPCNT('PDM Distribution');
#132=APPRDF('international standard','technical_data_packaging',2001,#131);
ENDSEC;
END-ISO-10303-21;
```

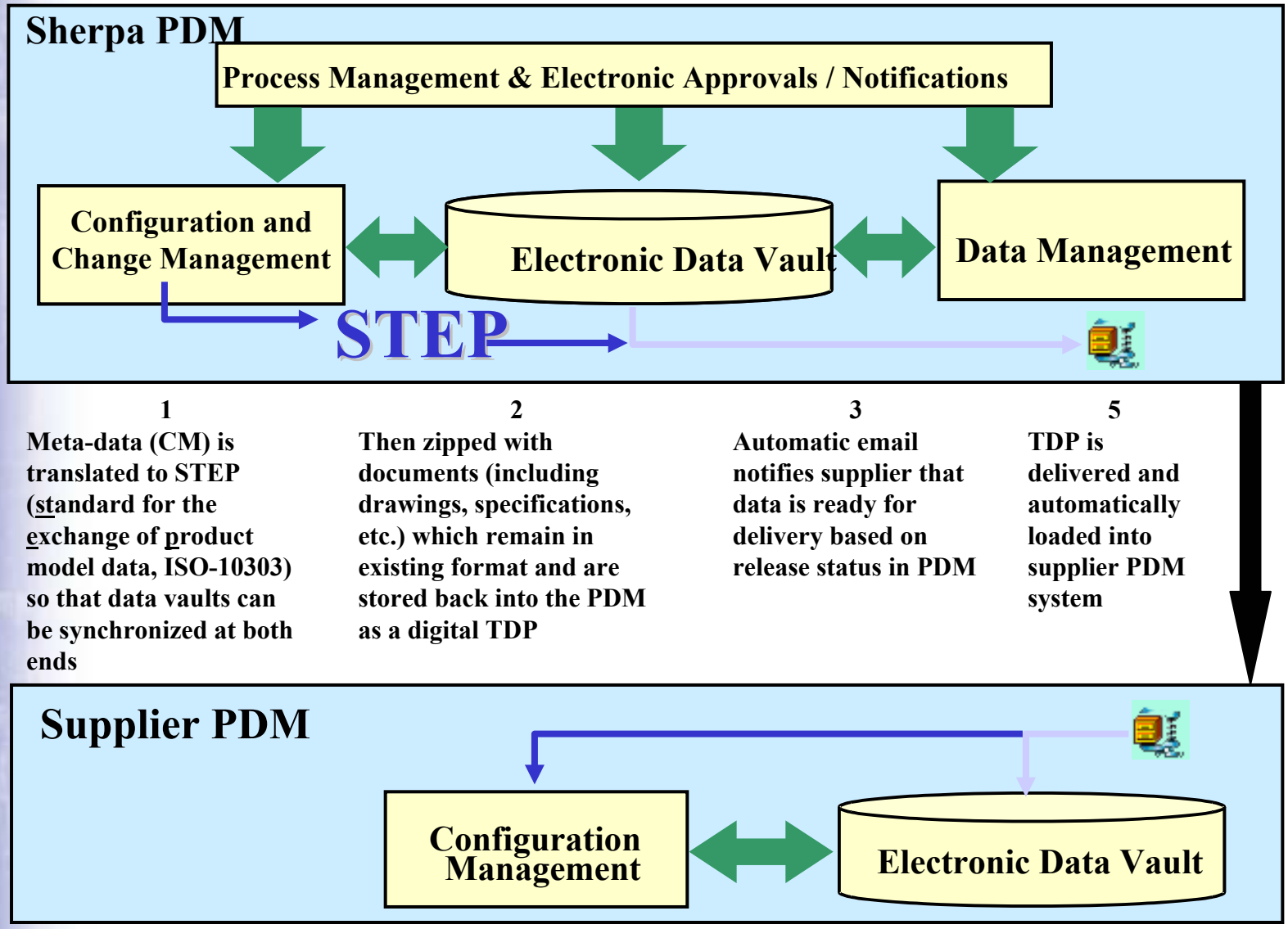
Enterprise Supply Chain Data Exchange Implementation



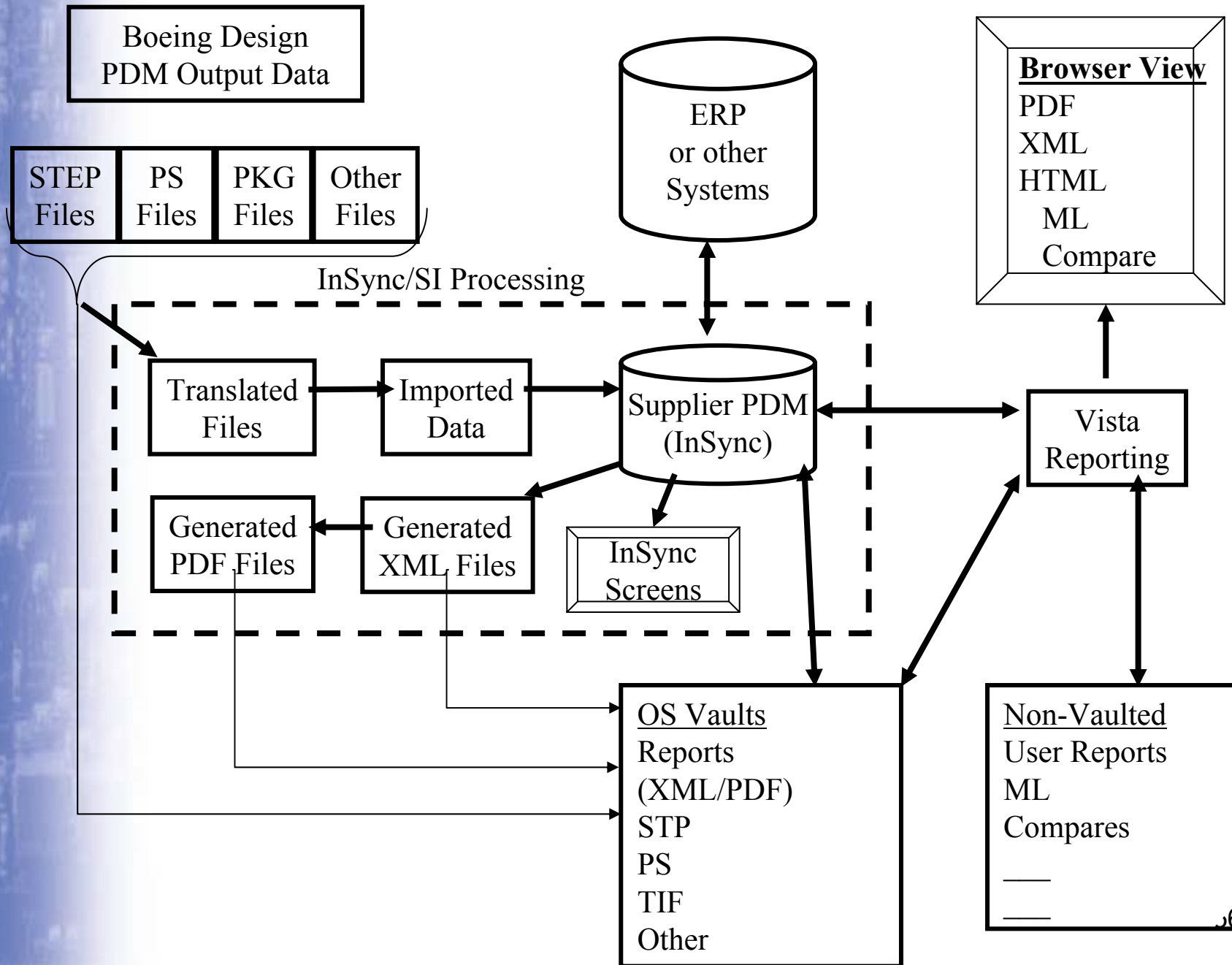
Enterprise Supply Chain Data Exchange Implementation



Raytheon Supply Chain Data Exchange

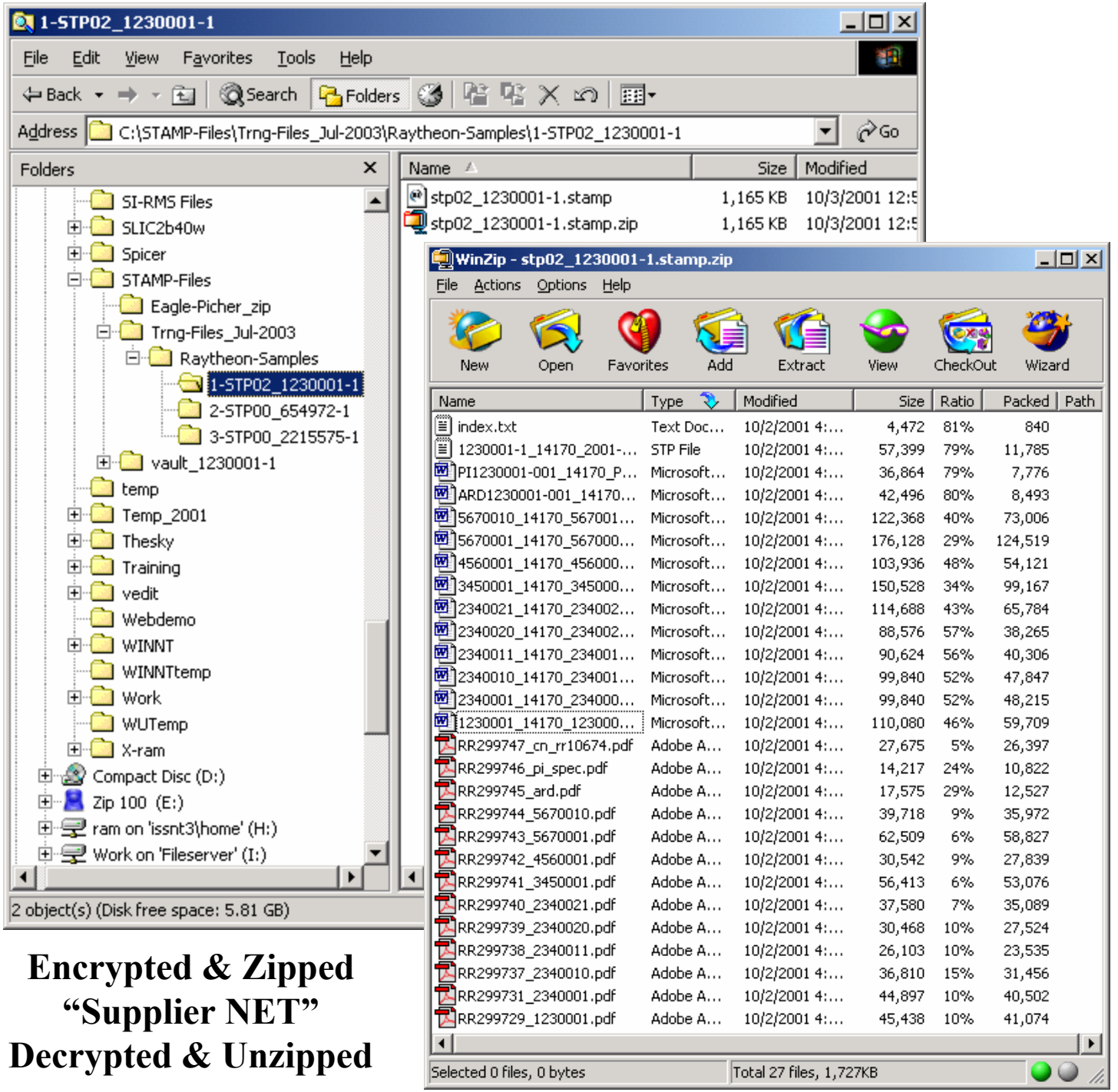


Boeing (BCA) Supply Chain Data Exchange



Technical Data Package Documentation Requirements
(Supported by the STEP AP 232 & PDM Schema)

- Conceptual design drawings
- Developmental drawings and associated lists
- Product drawings and associated lists
- Commercial drawings and associated lists
- Special inspection equipment (SIE) drawings and associated lists
- Special tooling drawings and associated lists
- Specifications
- Packaging/Handling documents and data
- Software documentation
- Quality Inspection Criteria
- Critical Manufacturing Processes



Encrypted & Zipped
"Supplier NET"
Decrypted & Unzipped

index_030701095526.txt - Notepad

File Edit Format Help

```
1230001-1_14170_2001-10-02T16-26-05.idx

STAMP Product Data Index
Data Exchange Manager (DEM)
Raytheon West

Product Structure

=================================================================
File_Indicator  Object_Type\Object_Id_With_Cage\Rev     (Relation)
-----------------------------------------------------------------
N  PART\1230001-1&14170\0001
Y    DOCUMENT\1230001&14170\-  (desc_by)
N      MODEL\1230001&14170\0001  (derived_from)
Y    DOCUMENT\ARD1230001-001&14170\-  (desc_by)
Y    DOCUMENT\PI1230001-001&14170\-  (desc_by)
N      DOCUMENT\MIL-STD-882&96906\C  (calls_out)
N      DOCUMENT\MIL-STD-1686&96906\C  (calls_out)
N      DOCUMENT\MIL-STD-130&96906\J  (calls_out)
N      DOCUMENT\MIL-M-8856&81349\-  (calls_out)
N      DOCUMENT\MIL-HDBK-263&81349\B  (calls_out)
N      DOCUMENT\MIL-E-6051&81349\D  (calls_out)
N    PART\2340001-1&14170\0001  (uses)
Y      DOCUMENT\2340001&14170\-  (desc_by)
N        MODEL\2340001&14170\0001  (derived_from)
N      PART\2340010-1&14170\0001  (uses)
Y        DOCUMENT\2340010&14170\-  (desc_by)
N          MODEL\2340010&14170\0001  (derived_from)
N        PART\2340011-1&14170\0001  (uses)
Y          DOCUMENT\2340011&14170\-  (desc_by)
N            MODEL\2340011&14170\0001  (derived_from)
N          PART\MIL-F-48616&81349\0001  (uses)
N            DOCUMENT\MIL-F-48616&81349\-  (desc_by)
N          PART\MIL-G-174&81349\0001  (uses)
N            DOCUMENT\MIL-G-174&81349\B  (desc_by)
N          PROCESS\MIL-O-16898&81349\0001  (uses)
N            DOCUMENT\MIL-O-16898&81349\B  (desc_by)
N          PROCESS\MIL-STD-1189&96906\0001  (uses)
N            DOCUMENT\MIL-STD-1189&96906\B  (desc_by)
N        PROCESS\MIL-STD-130&96906\0002  (uses)
N          DOCUMENT\MIL-STD-130&96906\J  (desc_by)
N      PART\2340020-1&14170\0001  (uses)
Y        DOCUMENT\2340020&14170\-  (desc_by)
```

TDP Index File

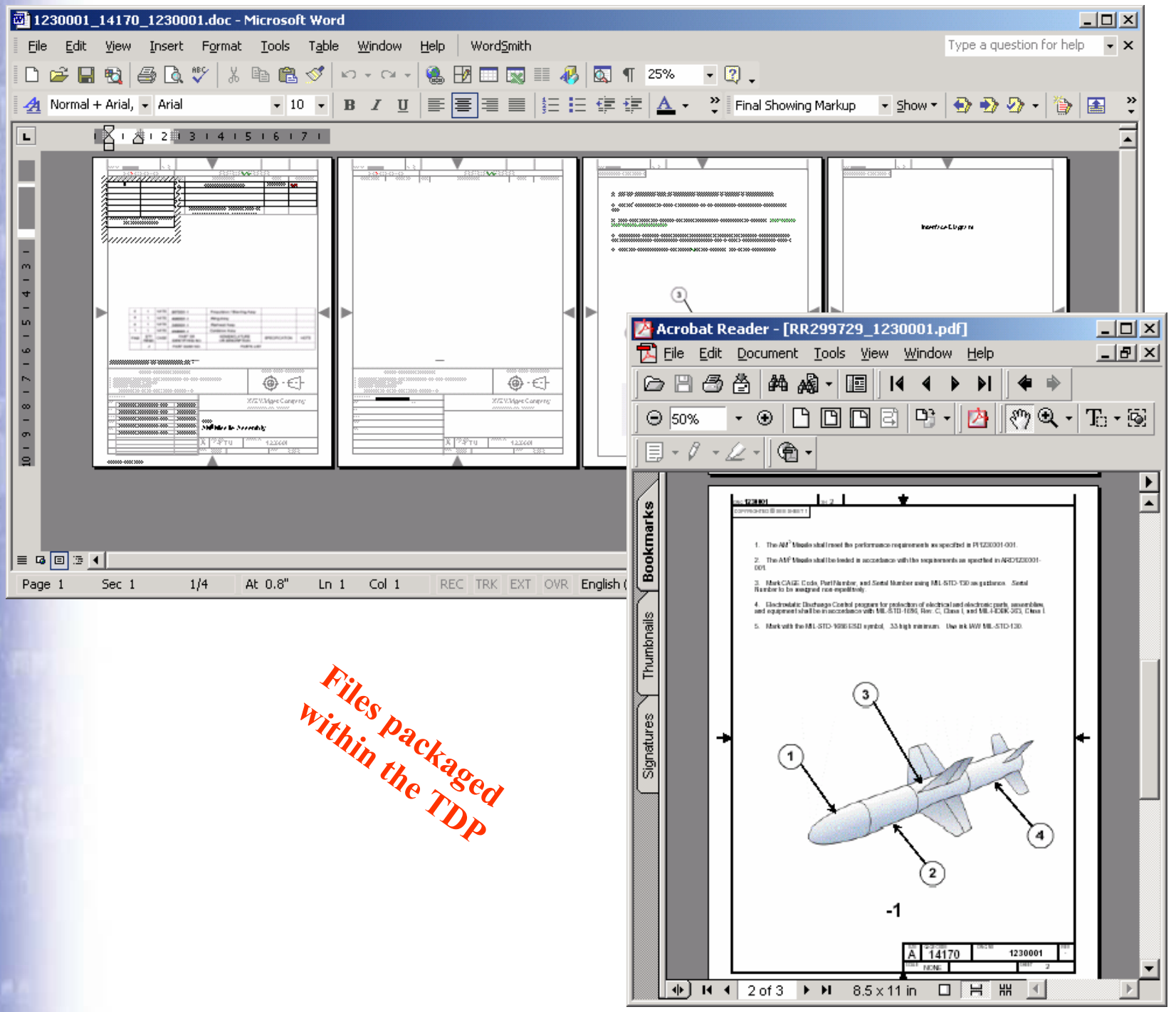
index_030701095526.txt - Notepad

File Edit Format Help

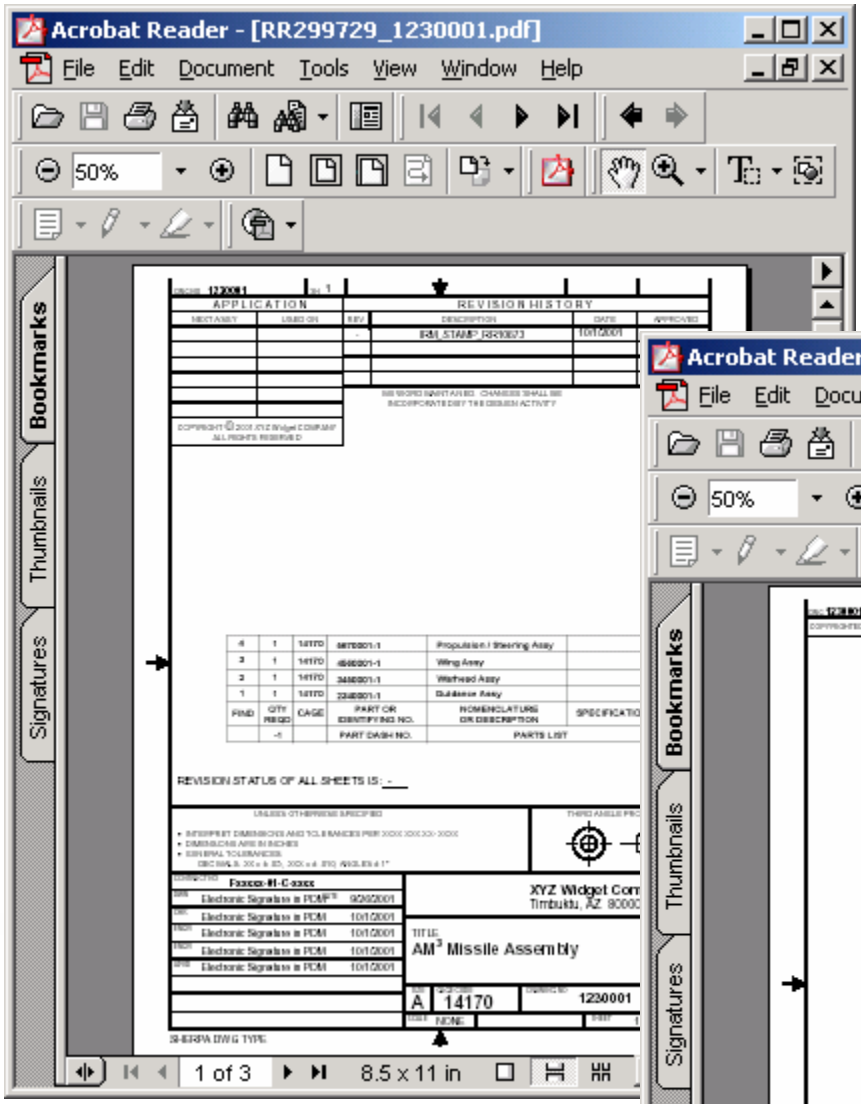
```
N      PROCESS\MIL-STD-130&96906\0002  (uses)
N      PROCESS\MIL-STD-709&96906\0001  (uses)
N        DOCUMENT\MIL-STD-709&96906\C  (desc_by)
N    PART\4560001-1&14170\0001  (uses)
Y      DOCUMENT\4560001&14170\-  (desc_by)
N        MODEL\4560001&14170\0001  (derived_from)
N      PROCESS\MIL-STD-130&96906\0002  (uses)
N    PART\5670001-1&14170\0002  (uses)
Y      DOCUMENT\5670001&14170\-  (desc_by)
N        MODEL\5670001&14170\0001  (derived_from)
N      PROCESS\MIL-STD-1686-CL1&96906\0001  (uses)
N      PROCESS\MIL-STD-130&96906\0002  (uses)
N      PROCESS\MIL-HDBK-263-CL1&81349\0001  (uses)
N      PART\5670040-1&14170\0001  (uses)
N      PART\5670030-1&14170\0001  (uses)
N      PART\5670020-1&14170\0001  (uses)
N      PART\5670010-1&14170\0001  (uses)
Y        DOCUMENT\5670010&14170\-  (desc_by)
N        PROCESS\MIL-STD-130&96906\0002  (uses)
N    PROCESS\MIL-HDBK-263-CL1&81349\0001  (uses)
N    PROCESS\MIL-STD-130&96906\0002  (uses)
N    PROCESS\MIL-STD-1686-CL1&96906\0001  (uses)

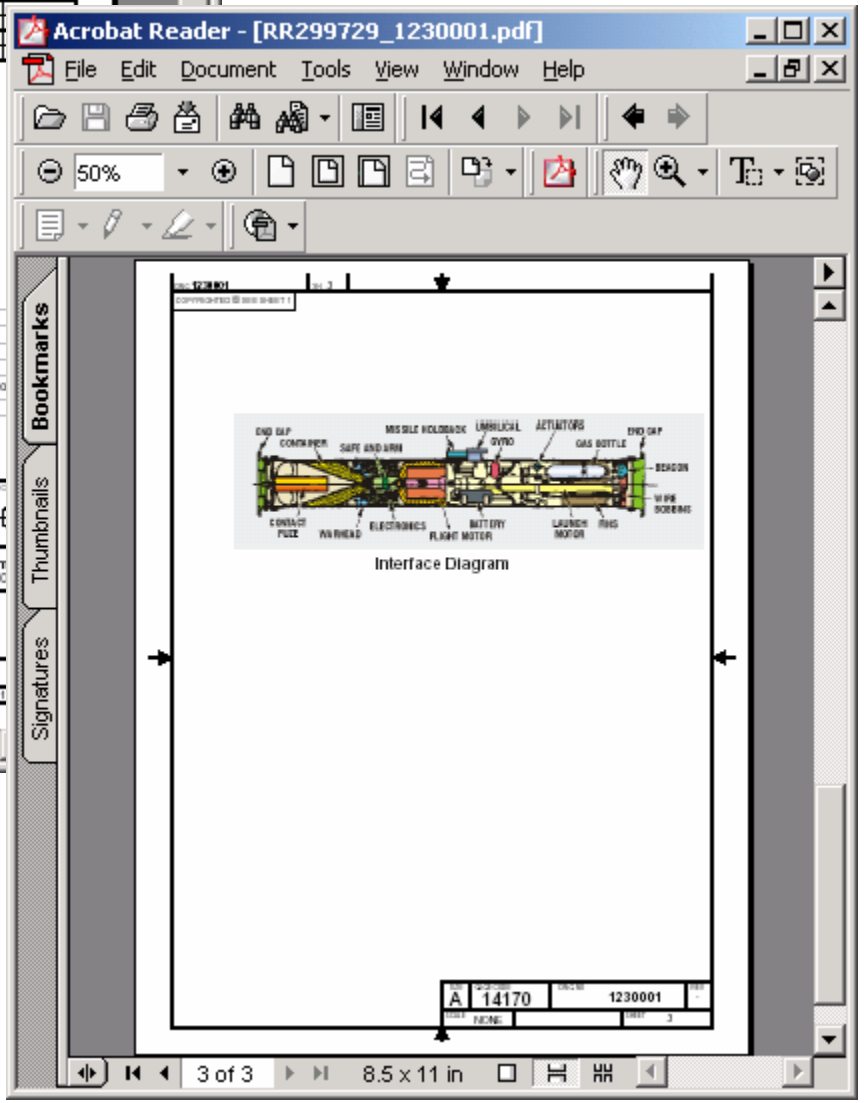
Document Section
-----------------------------------------------------------------
Y  DOCUMENT\1230001&14170\-
Y  DOCUMENT\ARD1230001-001&14170\-
Y  DOCUMENT\PI1230001-001&14170\-
Y  DOCUMENT\2340001&14170\-
Y  DOCUMENT\2340010&14170\-
Y  DOCUMENT\2340011&14170\-
Y  DOCUMENT\2340020&14170\-
Y  DOCUMENT\2340021&14170\-
Y  DOCUMENT\3450001&14170\-
Y  DOCUMENT\4560001&14170\-
Y  DOCUMENT\5670001&14170\-
Y    WORKAUTH\CN_RR10674\0001
Y  DOCUMENT\5670010&14170\-

Supplier Instruction
-----------------------------------------------------------------
(Special instructions go here if required)
```



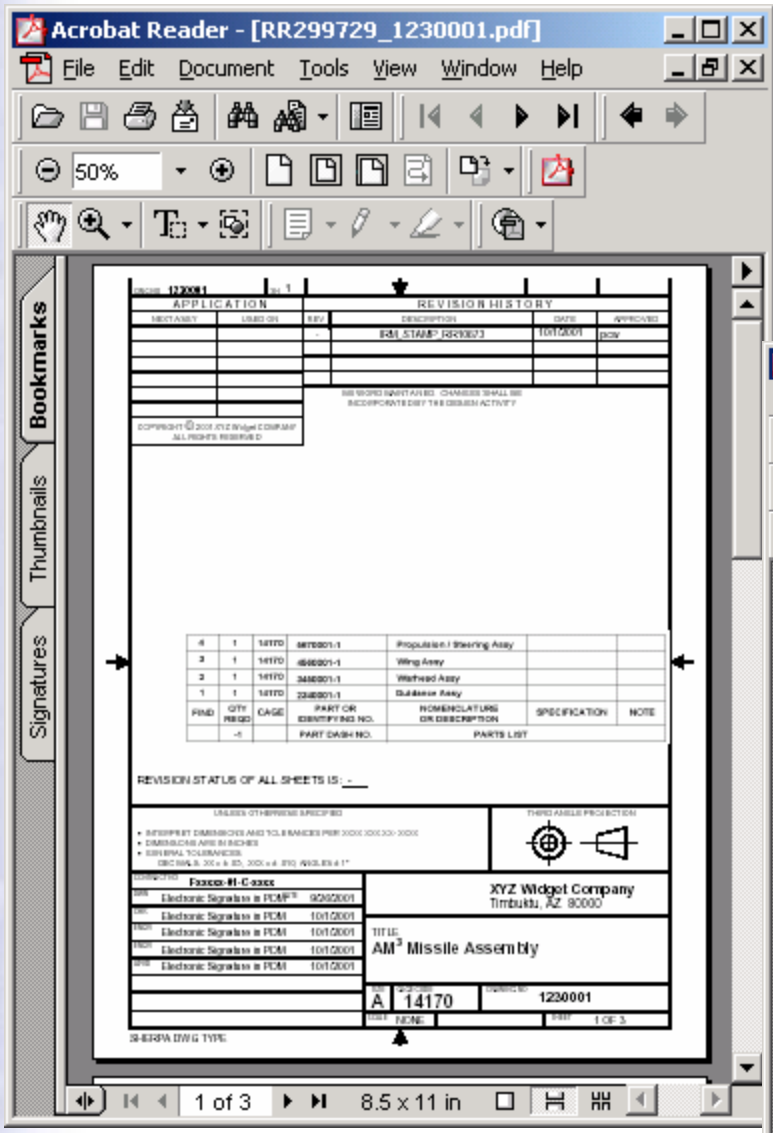
Files packaged within the TDP

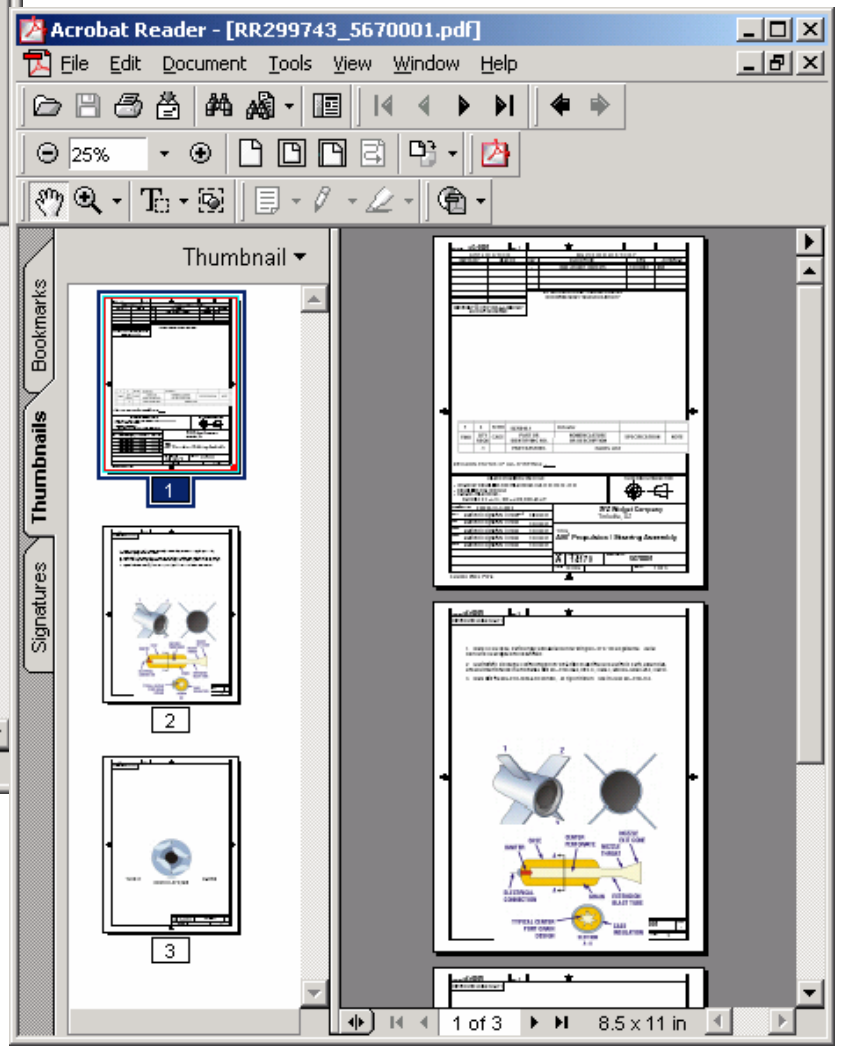




Files packaged within the TDP

Files packaged within the TDP





1230001-1_14170_2001-10-02T16-35-56.stp - Notepad

File Edit Format Help

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ISO-10303-21;
HEADER;
FILE_DESCRIPTION(('Full PART structure tree translation from Sherpa'),'2;1');
FILE_NAME('1230001-1_14170_2001-10-02T16-35-56.stp','2001-10-02T16:35:56',('Sherpa STEP translator'),('ITI'),'Version 0.1','STEP translator','UNSPECIFIED');
FILE_SCHEMA(('PDM_SCHEMA {1.1}'));
ENDSEC;
DATA;
#2=APPLICATION_CONTEXT('mechanical design');
#3=APPLICATION_PROTOCOL_DEFINITION('version 1.1','pdm schema',1999,#2);
#4=PRODUCT_CONTEXT('',#2,'mechanical');
#5=PERSON_AND_ORGANIZATION_ROLE('creator');
#6=PERSON_AND_ORGANIZATION_ROLE('id owner');
#10=PERSON_AND_ORGANIZATION_ROLE('requestor');
#13=DATE_TIME_ROLE('request date');
#15=DATE_TIME_ROLE('creation date');
#18=DOCUMENT_TYPE('configuration controlled document version');
#19=DOCUMENT_TYPE('unspecified type');
#20=PRODUCT_DEFINITION_CONTEXT_ROLE('primary',$);
#21=PRODUCT_DEFINITION_CONTEXT('part definition',#2,'design');
#22=PRODUCT_DEFINITION_CONTEXT('digital document definition',#2,'design');
#23=DIMENSIONAL_EXPONENTS(0.0,0.0,0.0,0.0,0.0,0.0,1.0,0.0);
#24=CONTEXT_DEPENDENT_UNIT(#23,'each');
#25=COORDINATED_UNIVERSAL_TIME_OFFSET(7,$,.BEHIND.);
#26=OBJECT_ROLE('mandatory',$);
#27=REPRESENTATION_CONTEXT('','document parameters');
#28=PRODUCT('1230001-1','','',(#4));
#29=PERSON('TEACHER','Unknown','Unknown',$,$,$);
#30=ORGANIZATION('14170','14170',$);
#31=PERSON_AND_ORGANIZATION(#29,#30);
#32=APPLIED_PERSON_AND_ORGANIZATION_ASSIGNMENT(#31,#6,(#28,#56,#71,#86,#138,#153,#168,#241,#276,#321,#341,#371,#395,#520,#539,#558,#630,#652,#671,#718,#737,#756,#776,#794,#810,#824,#840,#856,#870,#886));
#33=APPLIED_PERSON_AND_ORGANIZATION_ASSIGNMENT(#31,#5,(#28,#37,#38,#56,#57,#58,#71,#72,#73,#86,#89,#90,#138,#139,#140,#153,#154,#155,#168,#169,#170,#241,#242,#243,#276,#277,#278,#321,#322,#323,#347,#357,#374,#381,#396,#403,#521,#528,#540,#547,#561,#568,#631,#638,#653,#660,#672,#679,#719,#726,#738,#745,#757,#764,#779,#780,#795,#796,#811,#812,#825,#826,#841,#842,#857,#858,#871,#872,#887,#888));
#34=PRODUCT_RELATED_PRODUCT_CATEGORY('part',$,(#28,#56,#71,#86,#103,#124,#138,#153,#168,#183,#207,#227,#241,#256,#276,#291,#306,#321));
#35=PRODUCT_RELATED_PRODUCT_CATEGORY('assembly',$,(#28,#56,#71,#124,#138,#153,#241,#256));
#36=PRODUCT_CATEGORY_RELATIONSHIP('',$,#34,#35);
#37=PRODUCT_DEFINITION_FORMATION('0001',$,#28);
#38=PRODUCT_DEFINITION('design',$,#37,#21);
#39=PRODUCT_DEFINITION_CONTEXT_ASSOCIATION(#38,#21,#20);
#40=CALENDAR_DATE(2001,26,9);
#41=LOCAL_TIME(15,1,23.0,#25);
#42=DATE_AND_TIME(#40,#41);
#43=APPLIED_DATE_AND_TIME_ASSIGNMENT(#42,#15,(#38));
#44=SECURITY_CLASSIFICATION_LEVEL('unclassified');
#45=SECURITY_CLASSIFICATION('',#44);
#46=APPLIED_SECURITY_CLASSIFICATION_ASSIGNMENT(#45,(#37));
#47=APPROVAL_STATUS('approved');
#48=APPROVAL(#47,'RELEASED');
#49=APPROVAL_ROLE('approver');
#50=APPROVAL_PERSON_ORGANIZATION(#31,#48,#49);
#51=CALENDAR_DATE(2001,1,10);
#52=LOCAL_TIME(9,32,52.0,#25);
#53=DATE_AND_TIME(#51,#52);
#54=APPROVAL_DATE_TIME(#53,#48);
#55=APPLIED_APPROVAL_ASSIGNMENT(#48,(#37,#38));
#56=PRODUCT('2340001-1','','',(#4));
#57=PRODUCT_DEFINITION_FORMATION('0001',$,#56);
#58=PRODUCT_DEFINITION('design',$,#57,#21);
#59=PRODUCT_DEFINITION_CONTEXT_ASSOCIATION(#58,#21,#20);
#60=LOCAL_TIME(15,3,13.0,#25);
#61=DATE_AND_TIME(#40,#60);
#62=APPLIED_DATE_AND_TIME_ASSIGNMENT(#61,#15,(#58,#528));
#63=SECURITY_CLASSIFICATION('',#44);
#64=APPLIED_SECURITY_CLASSIFICATION_ASSIGNMENT(#63,(#57));
#65=APPROVAL(#47,'RELEASED');
```

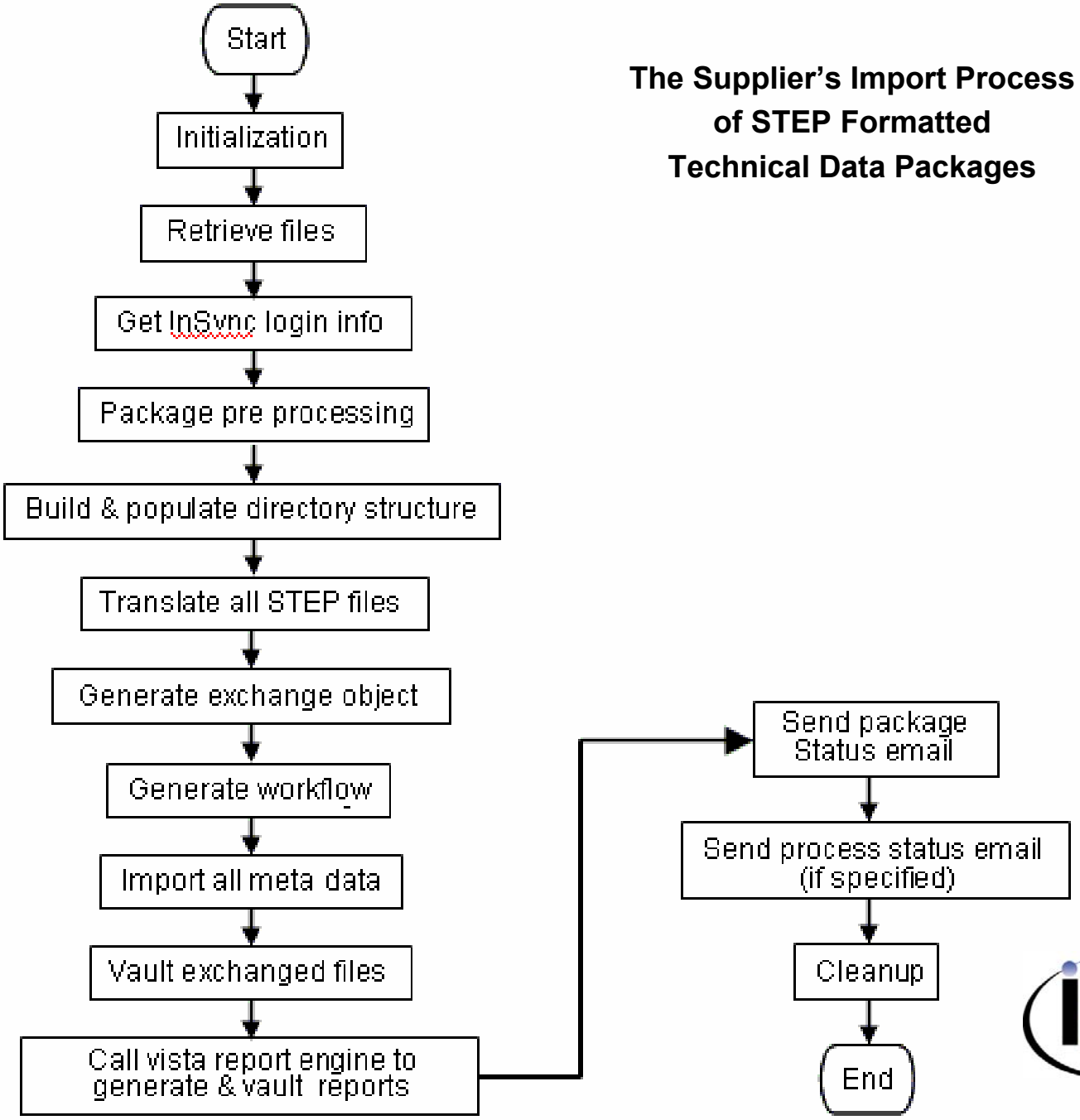
STEP AP232
Part 21 File

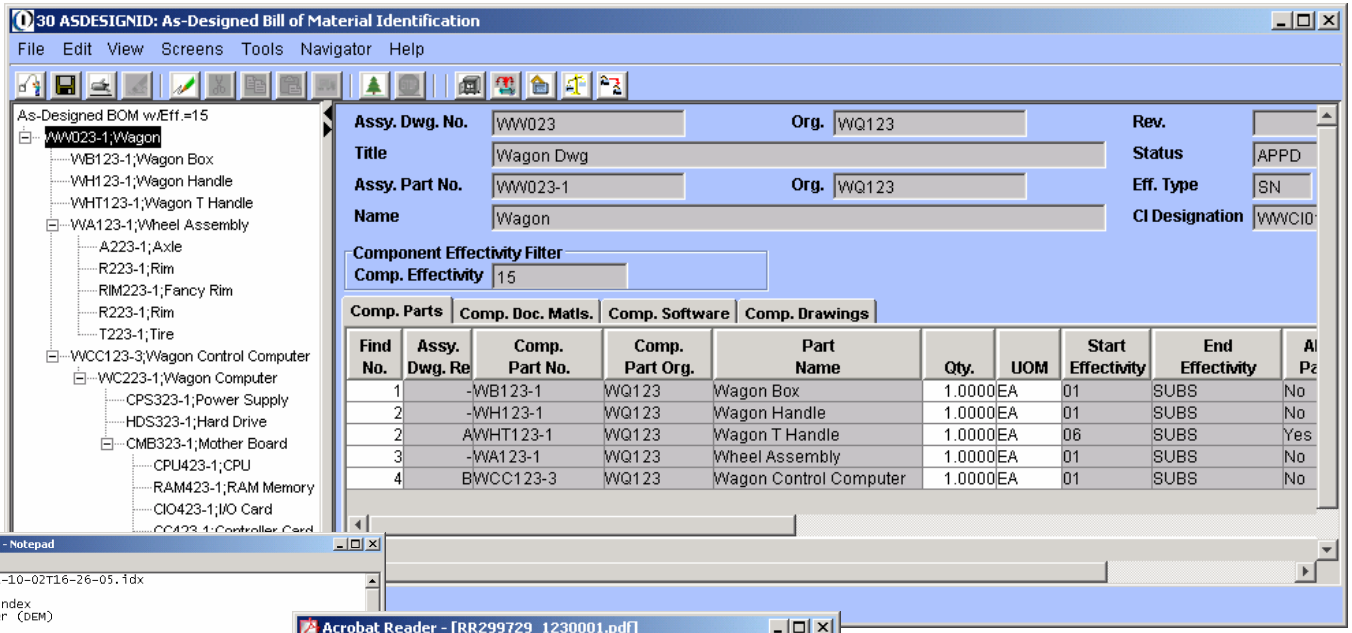
```
IVE('CN_RR10674','(1)
d Parts. (2) On Sheet 3 fix
170, P/N 5670020-1, AM3
'Y 1, CAGE 14170, P/N
nbers 3 and 4. (2) Correct
CTED_ACTION('work
Assemblies and Parts. (2)

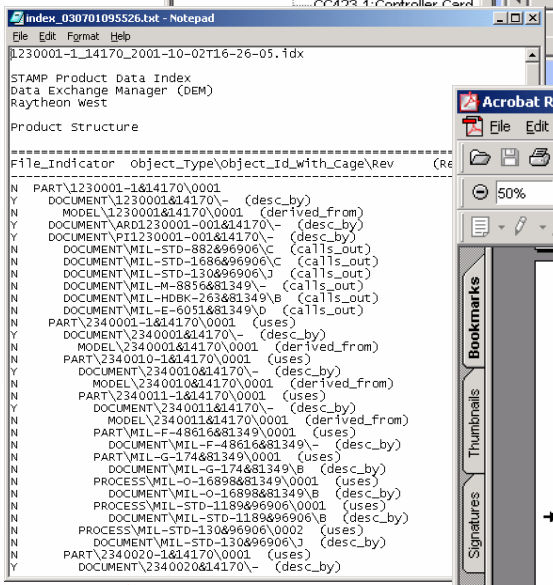
ON('document

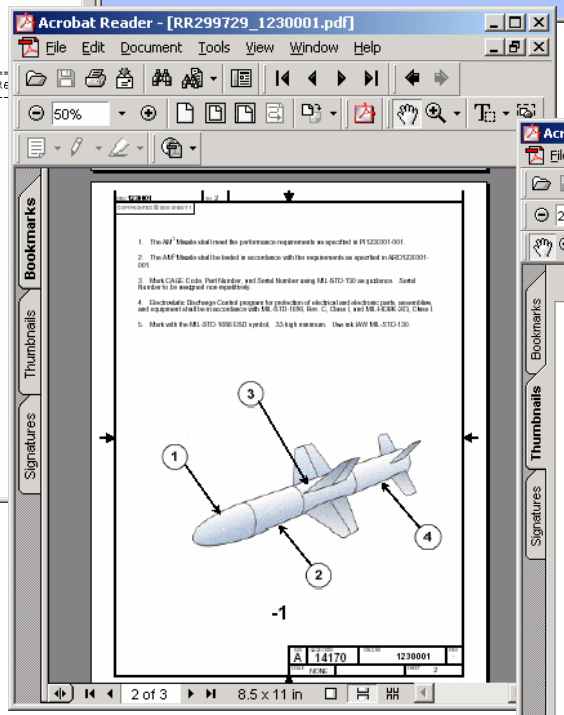
#1166=APPLIED_DOCUMENT_REFERENCE(#1162,'',(#1161));
#1167=ACTION_STATUS('unincorporated',#1161);
#1168=APPLIED_ACTION_ASSIGNMENT(#1161,(#757));
#1169=OBJECT_ROLE('output',$);
#1170=ROLE_ASSOCIATION(#1169,#1168);
#1171=LOCAL_TIME(12,5,35.0,#25);
#1172=DATE_AND_TIME(#51,#1171);
#1173=APPLIED_DATE_AND_TIME_ASSIGNMENT(#1172,#13,(#1161));
#1174=ORGANIZATION('Raytheon','Raytheon',$);
#1175=PERSON_AND_ORGANIZATION(#29,#1174);
#1176=APPLIED_PERSON_AND_ORGANIZATION_ASSIGNMENT(#1175,#10,(#1161));
ENDSEC;
END-ISO-10303-21;
```

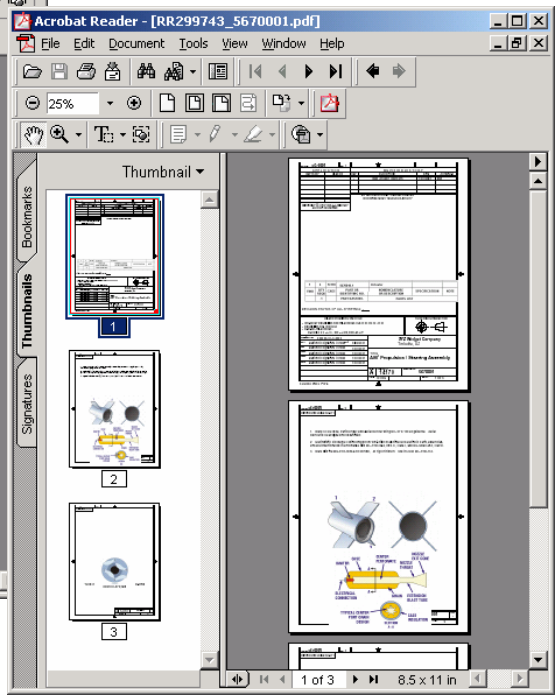
The Supplier's Import Process of STEP Formatted Technical Data Packages



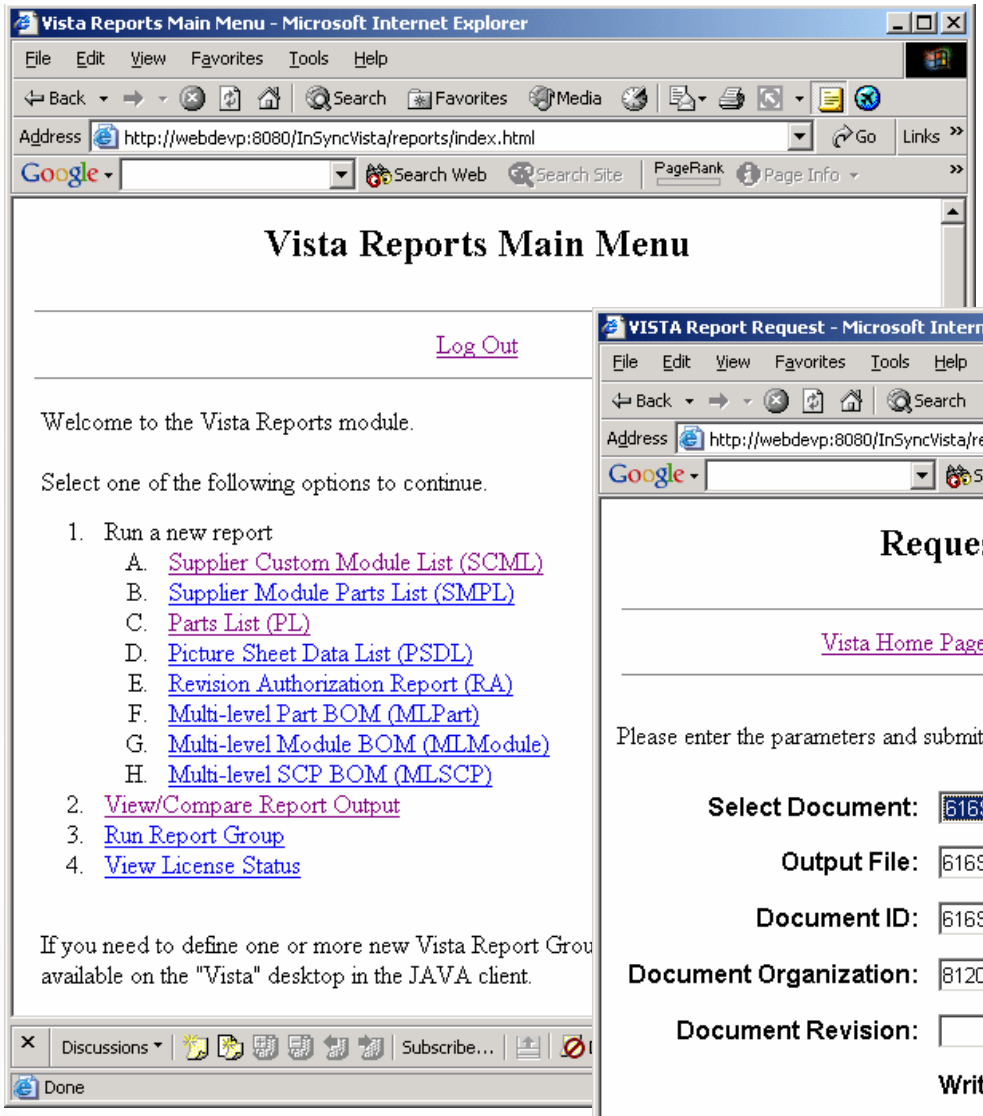


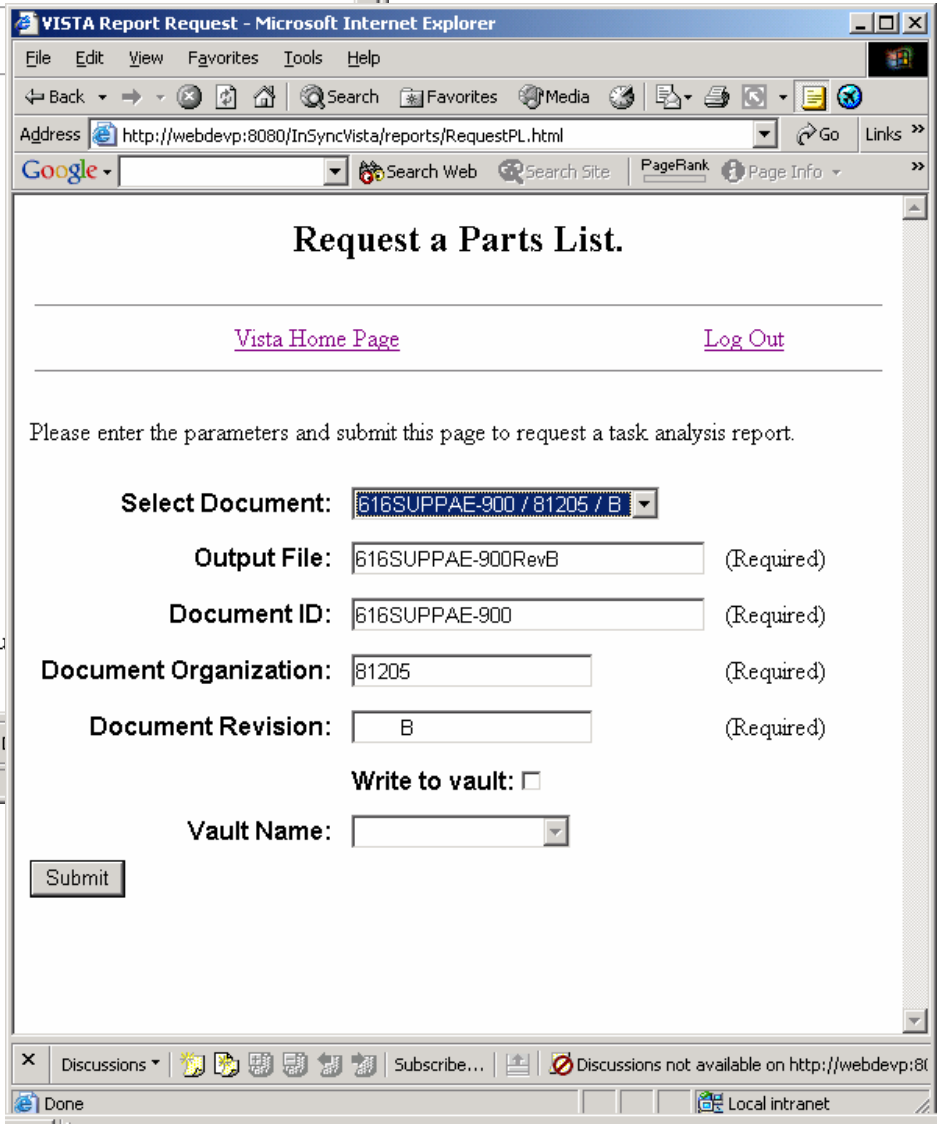






TDP Access via Supplier's Software Applications/Tools





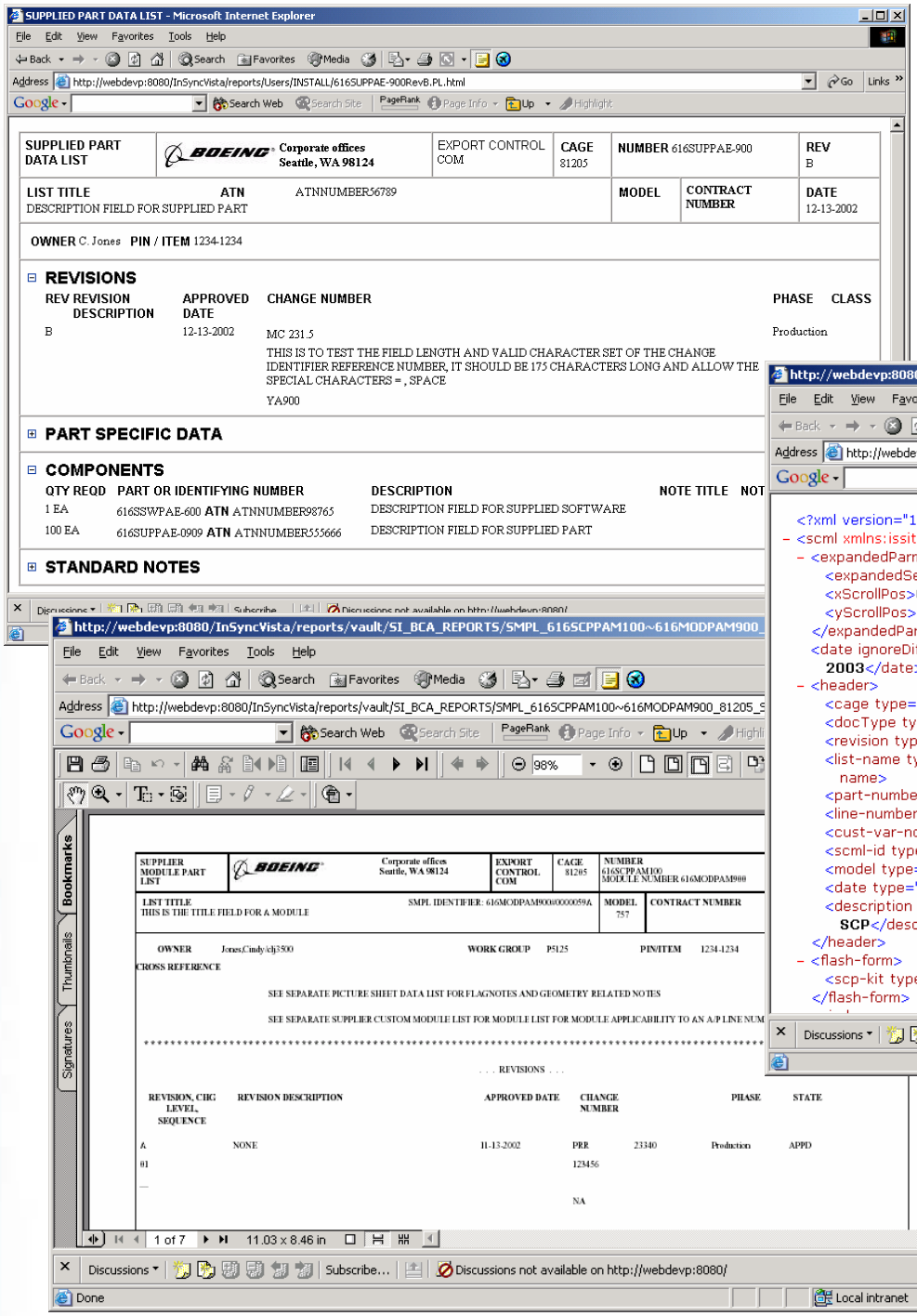
TDP Access via Supplier's Web Browser

Web Browser access:

Anyone

Anywhere

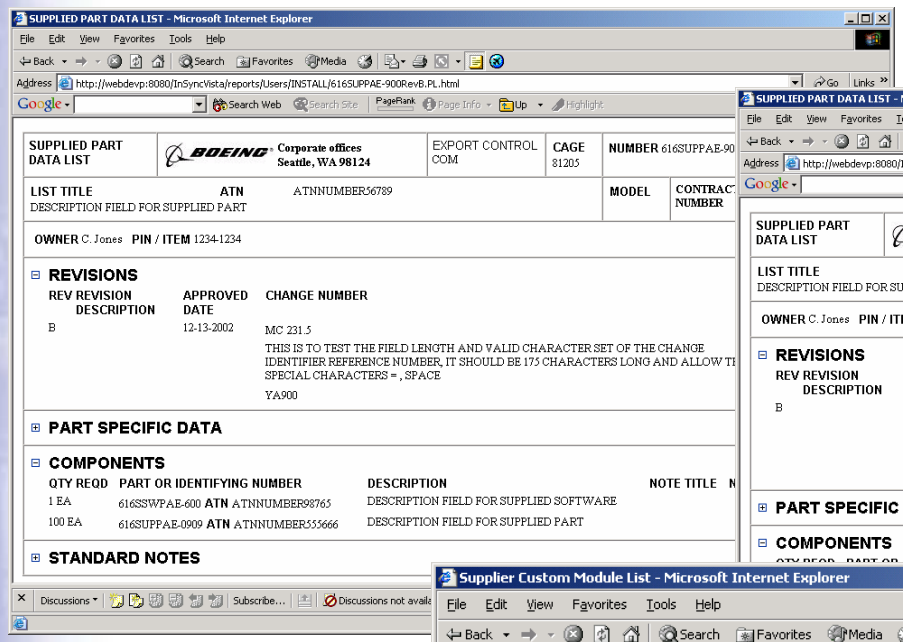
Anytime

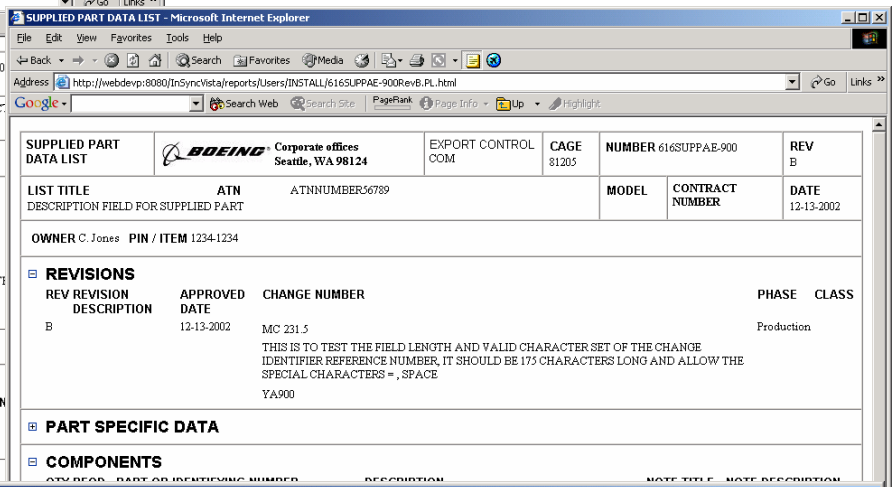


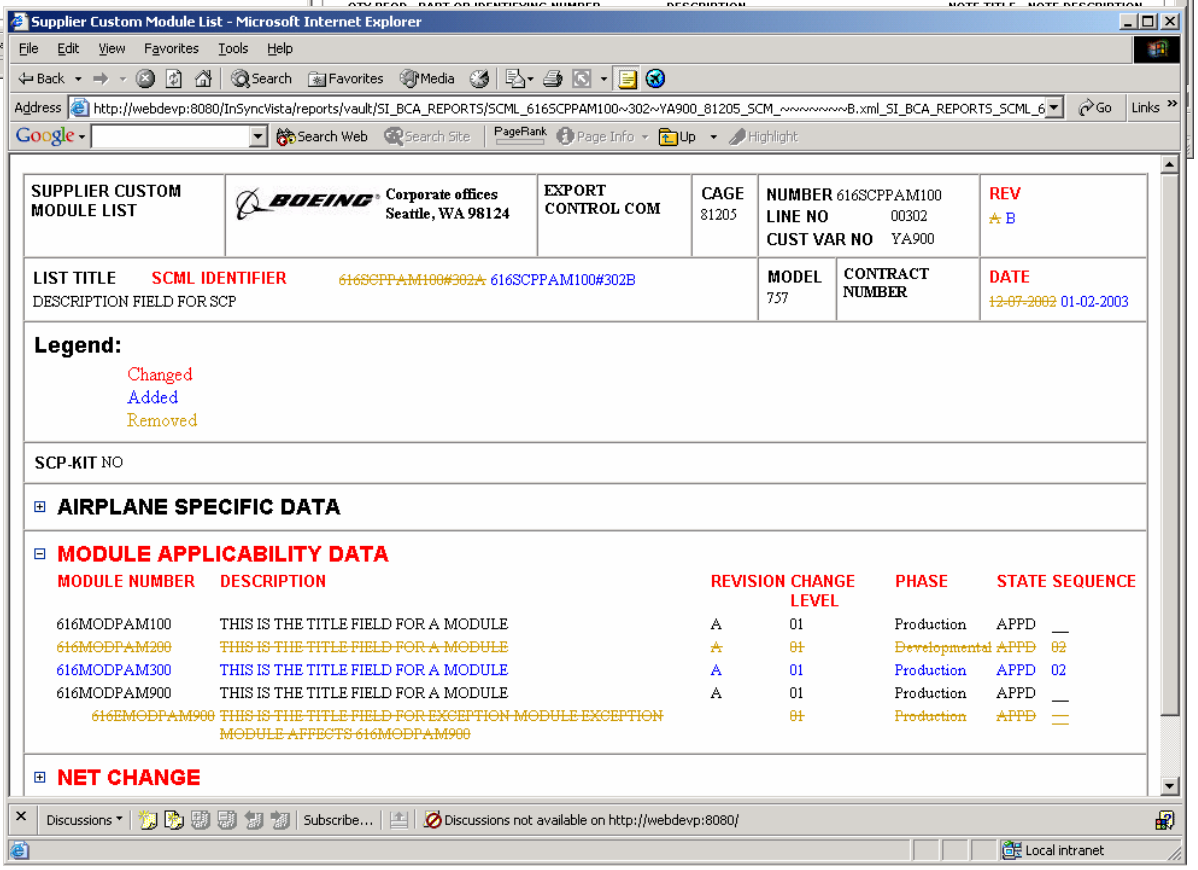
TDP Access via Supplier's Web Browser HTML, XML, PDF

integrated support systems

TDP documentation



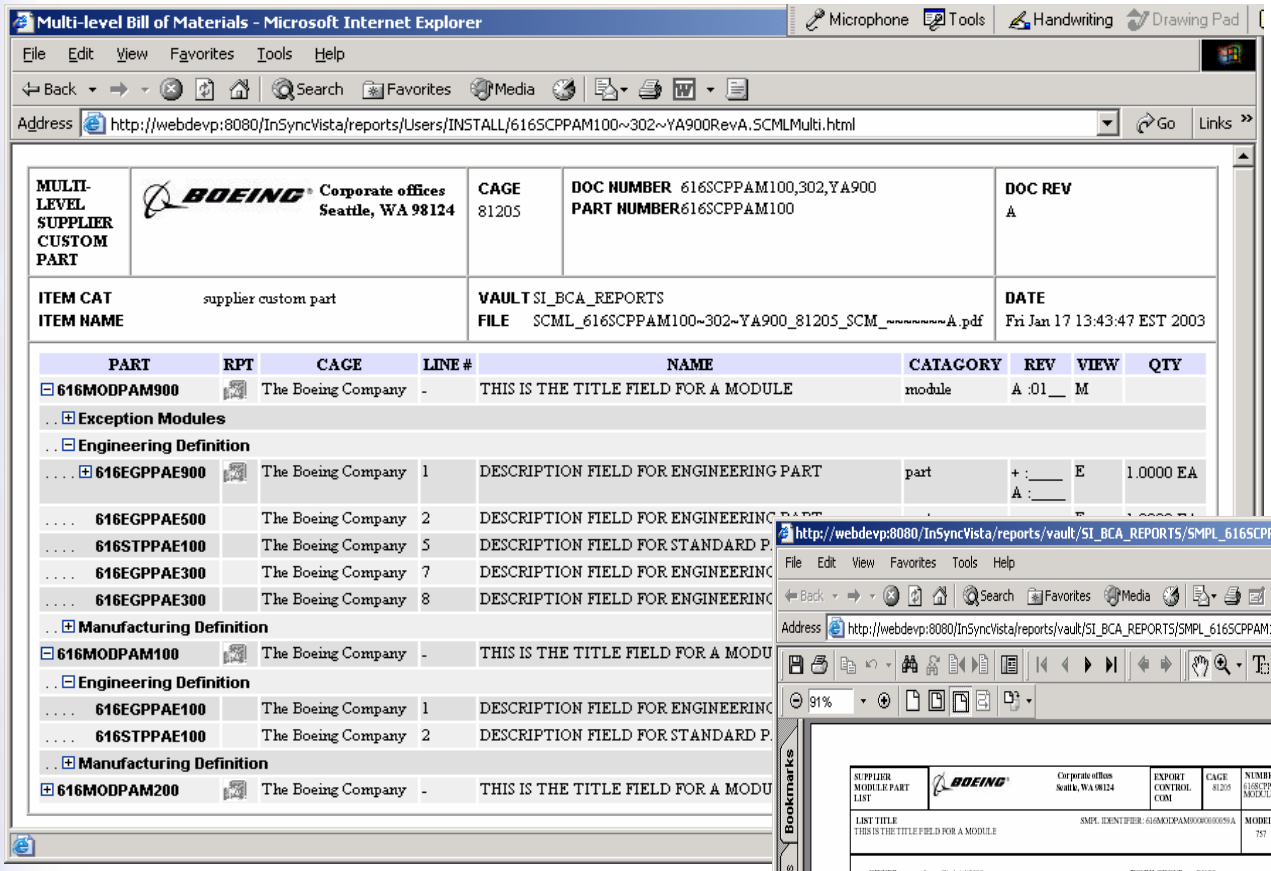


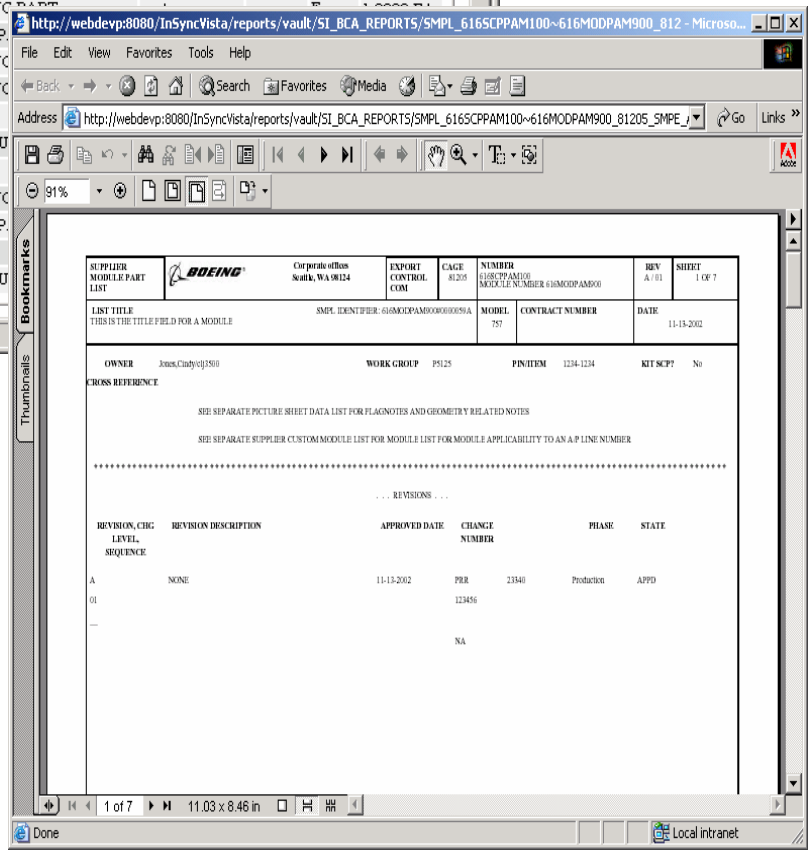


DM Analysis Tools:

- Parameter searches
- Multi-level Views
- Links to reports
- Multi-level & Single-level comparisons

TDP with a Multi-level view and linked reports.

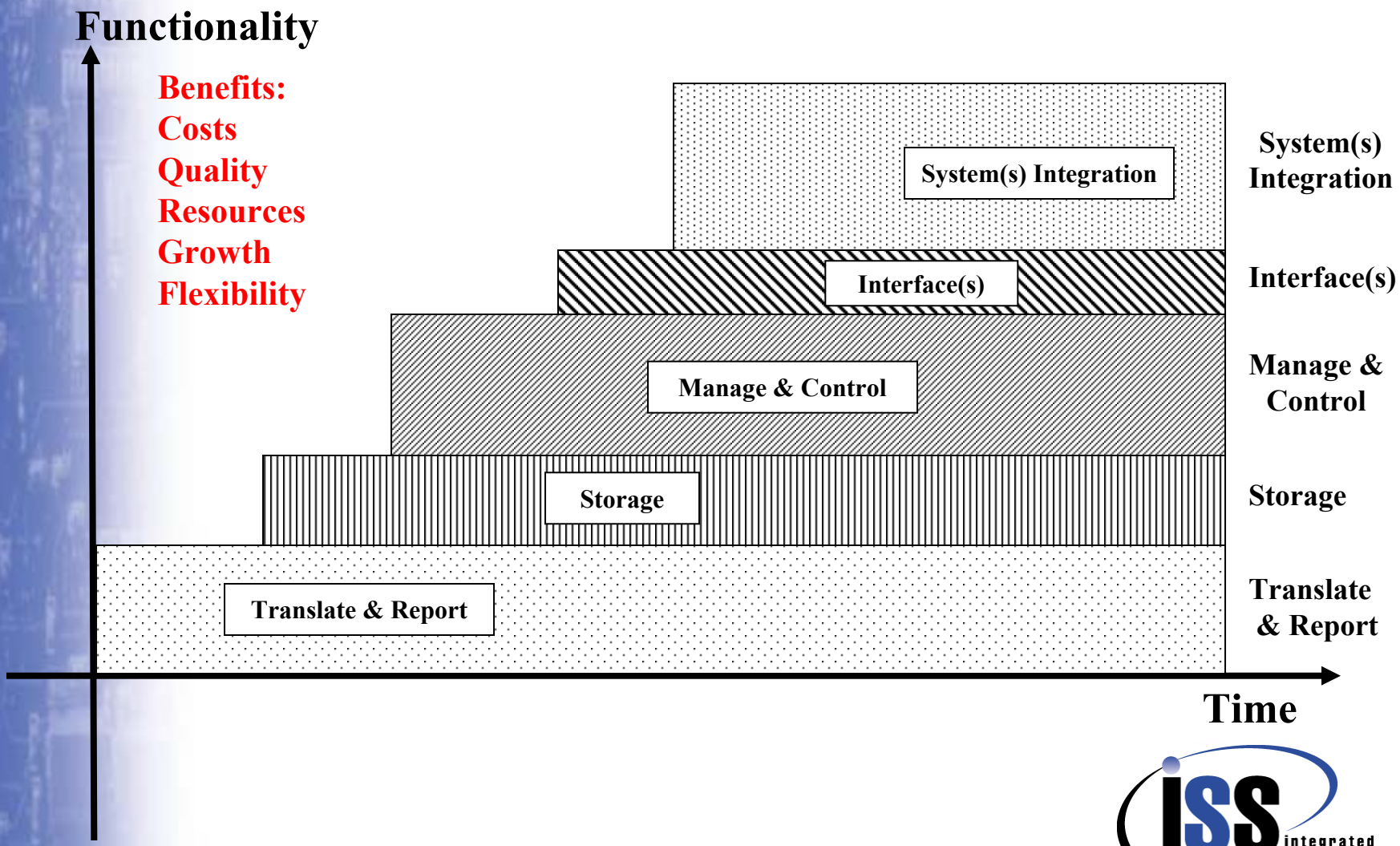




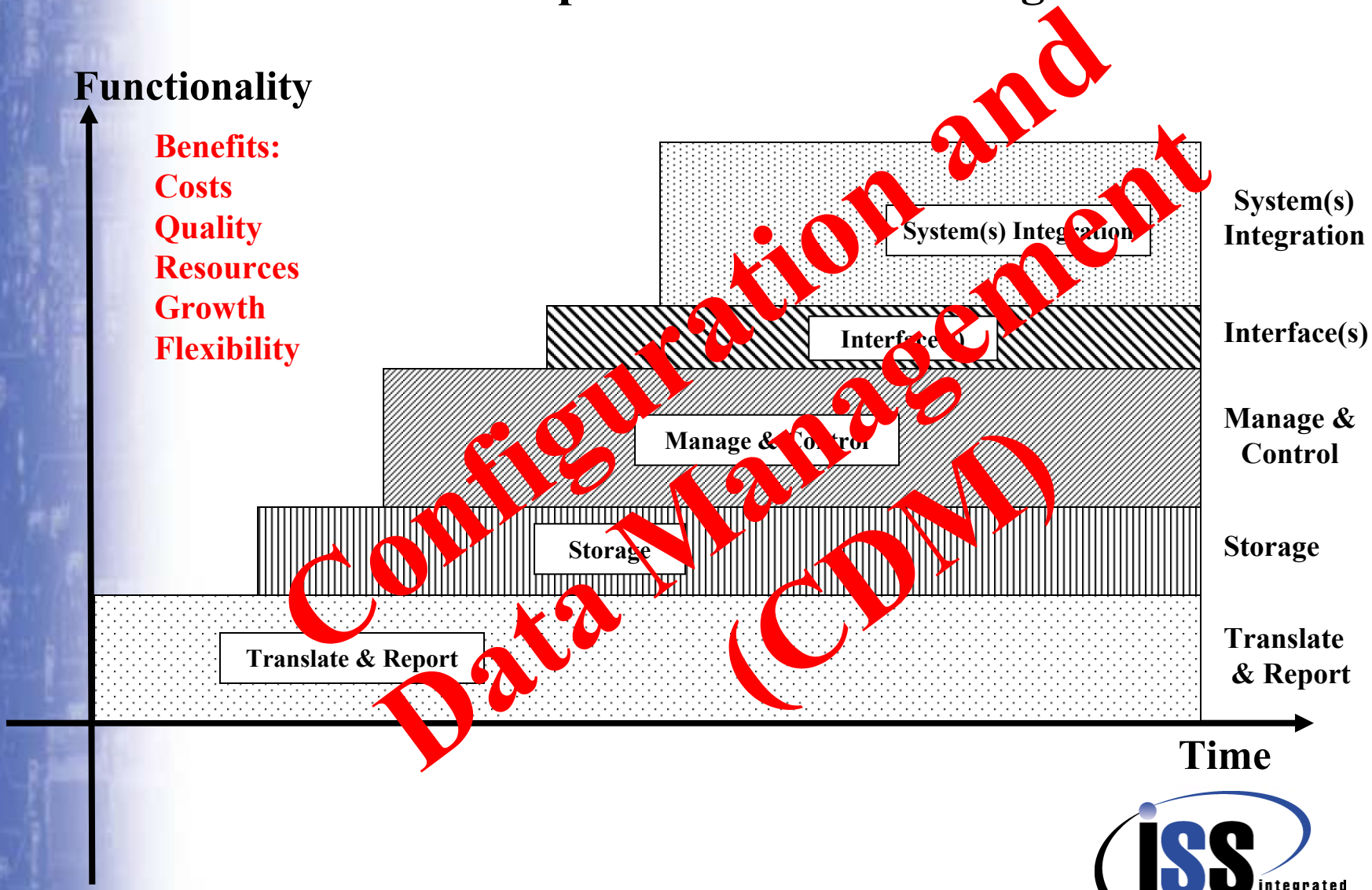
DM Analysis Tools:

- Parameter searches
- Multi-level views
- Linked access to reports
- Multi-level & single-level comparisons

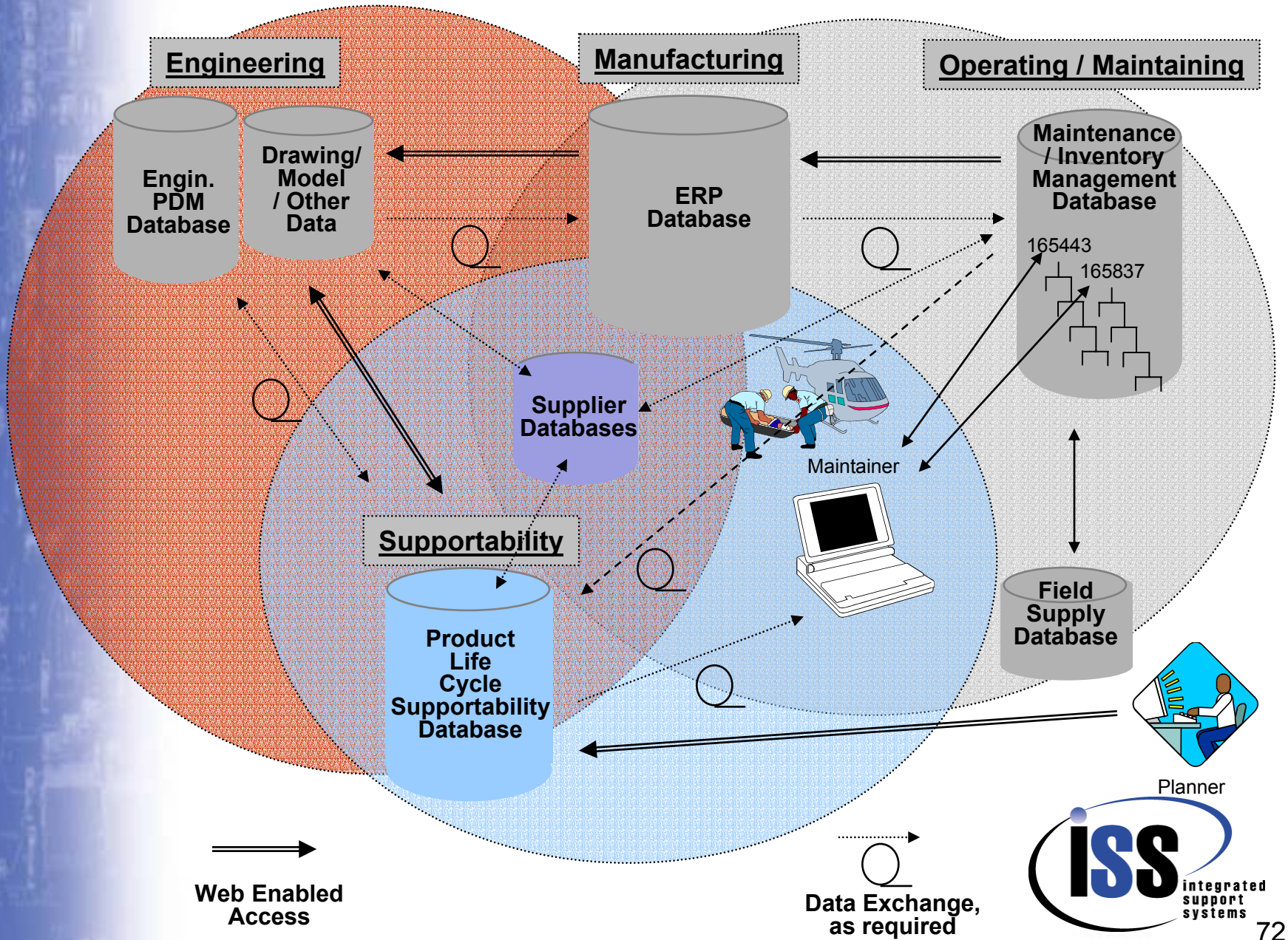
Enterprise Supply Chain Digital Data Implementation Planning



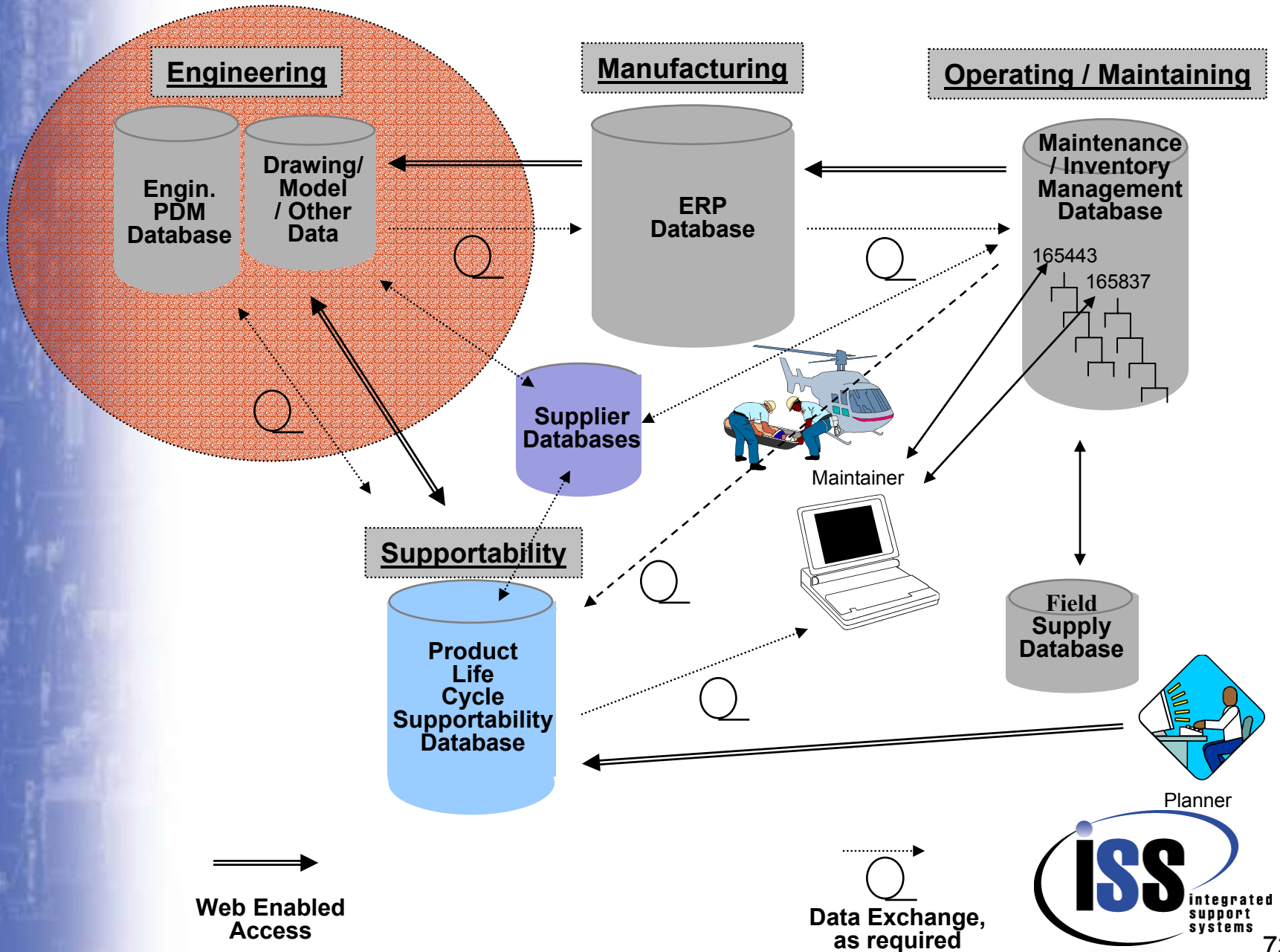
Enterprise Supply Chain Digital Data Implementation Planning



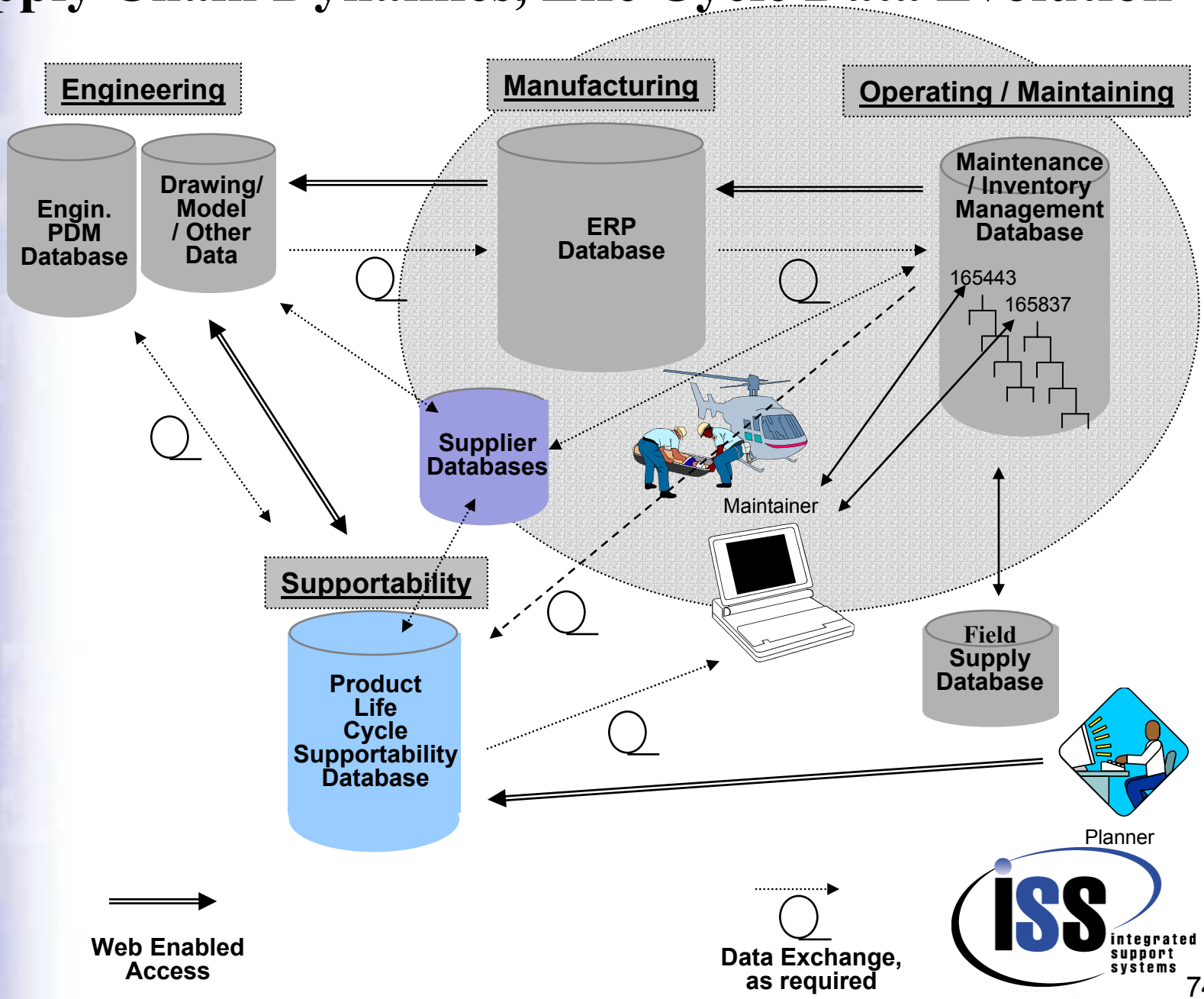
Supply Chain Dynamics, Life Cycle Data Evolution



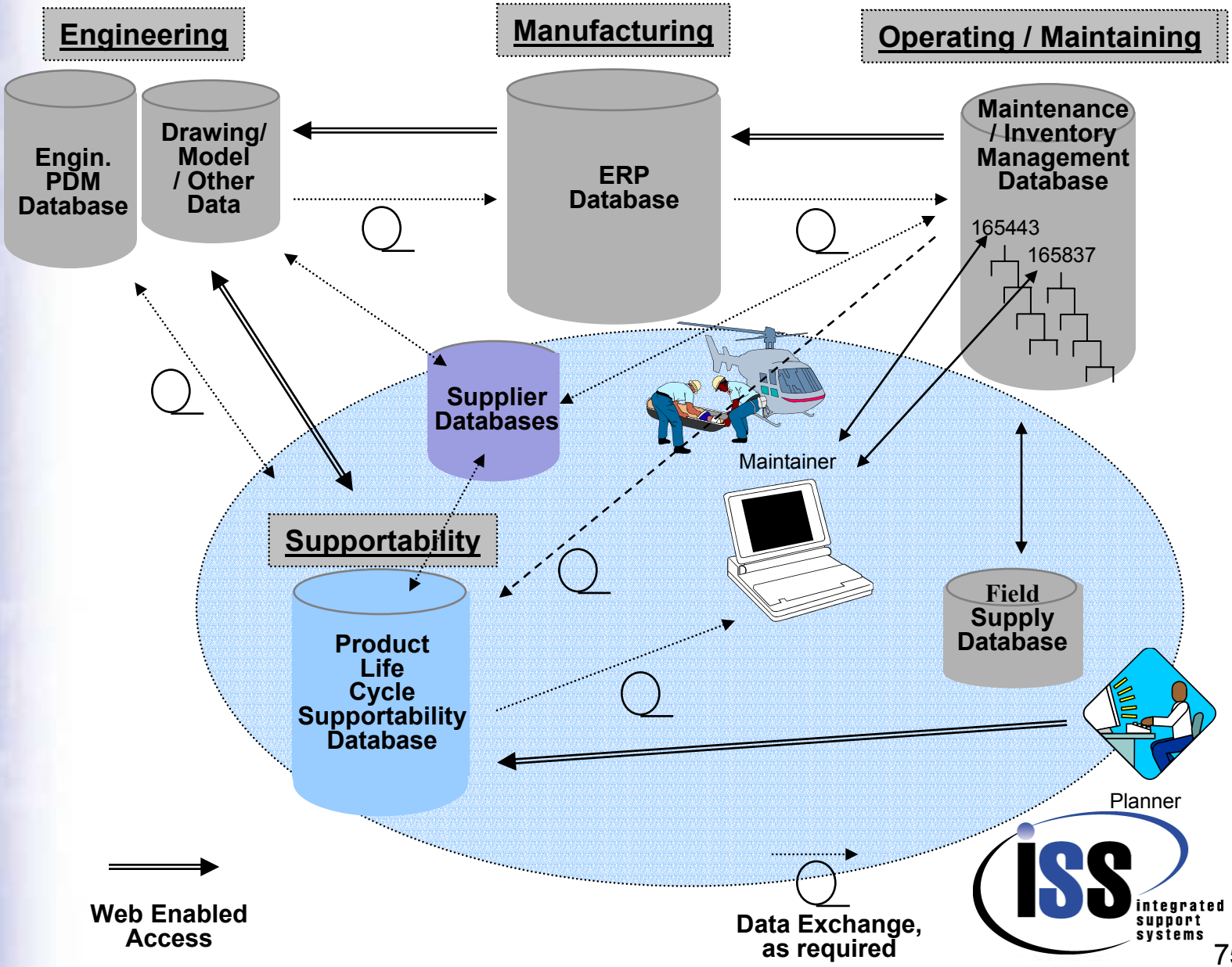
Supply Chain Dynamics, Life Cycle Data Evolution



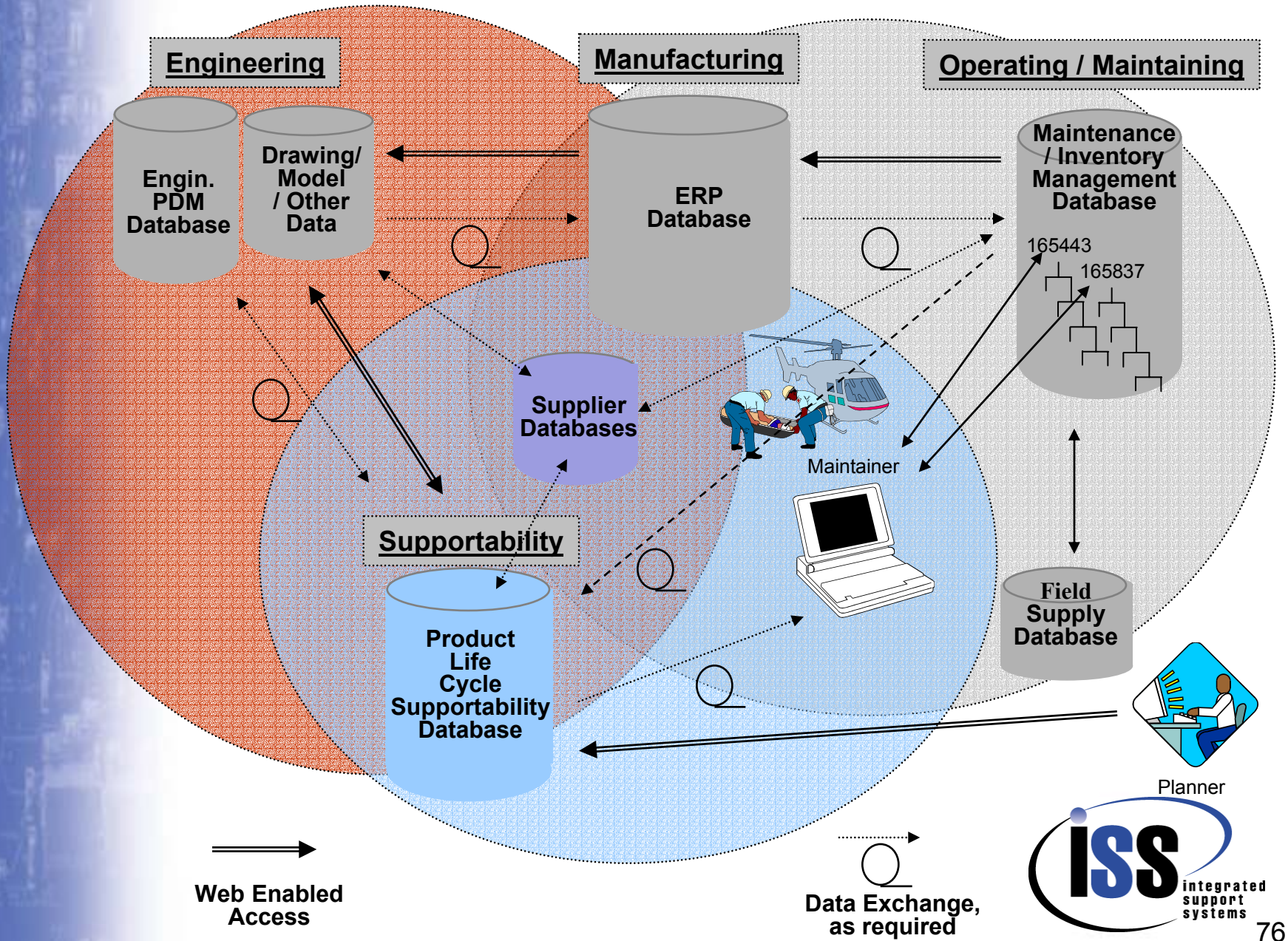
Supply Chain Dynamics, Life Cycle Data Evolution



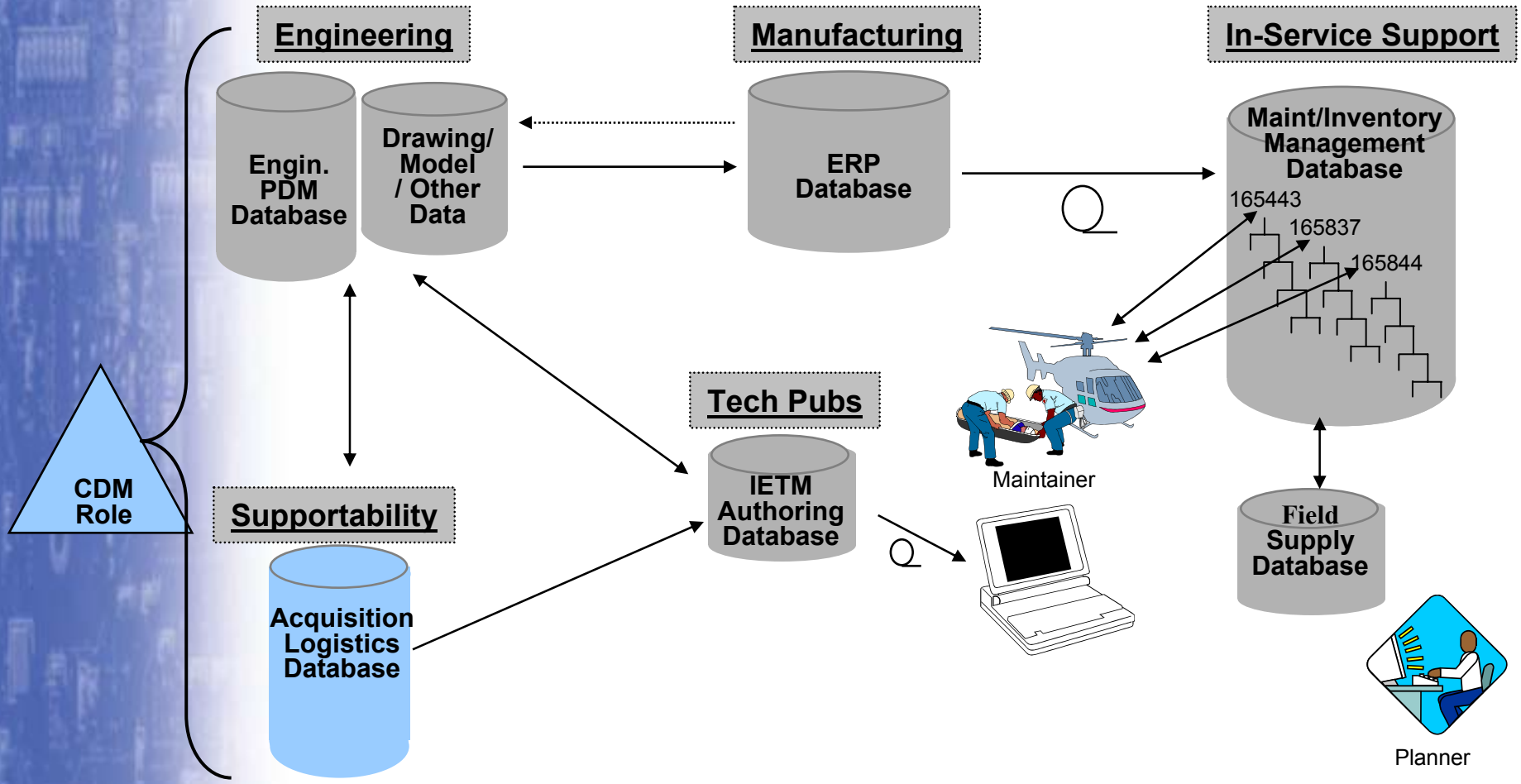
Supply Chain Dynamics, Life Cycle Data Evolution



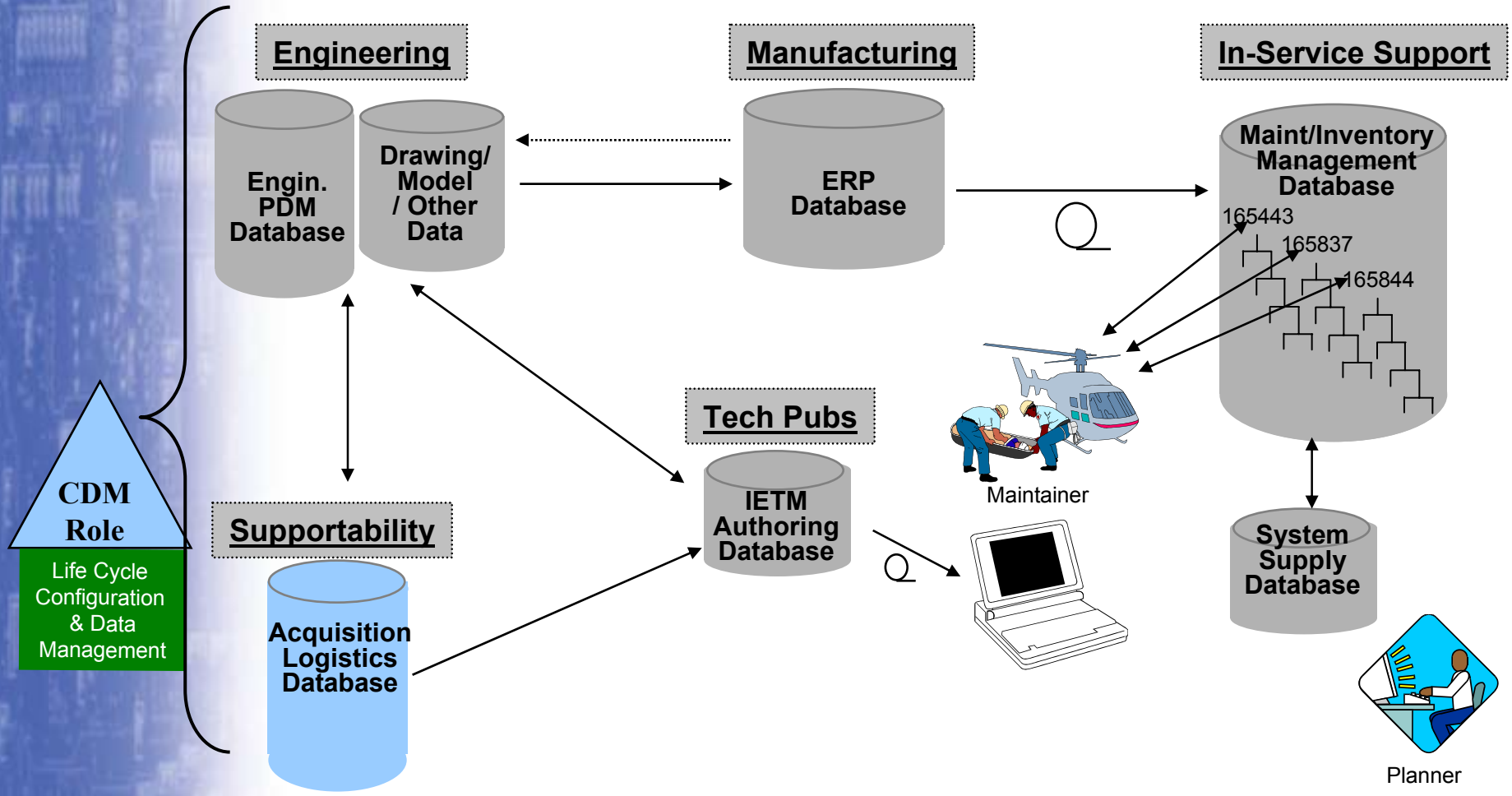
Supply Chain Dynamics, Life Cycle Data Evolution



Typical Life Cycle Data/Process Interaction



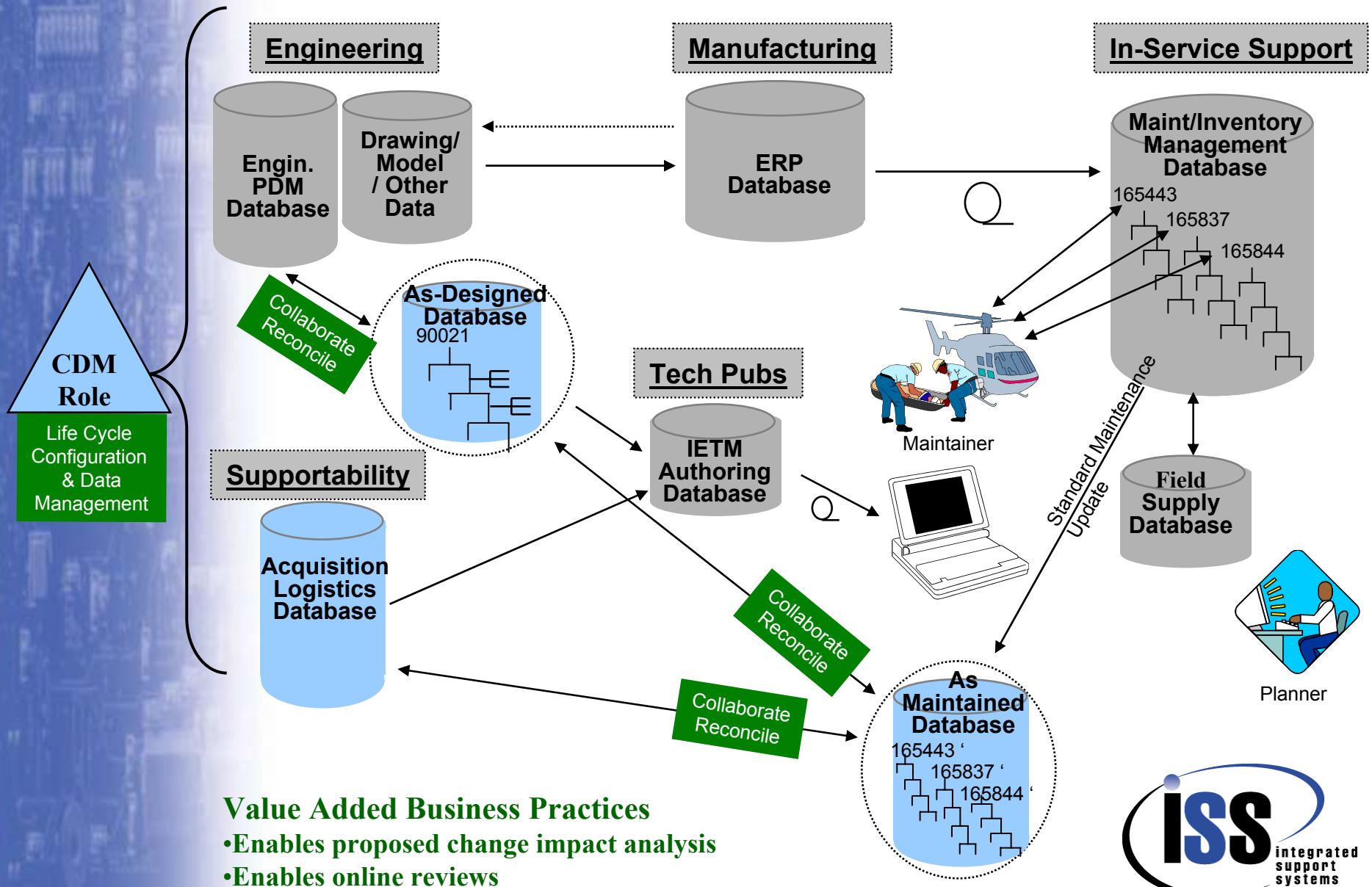
Life Cycle Configuration Data Management



Value Added Business Practices

- Full visibility of proposed design changes and implemented changes in service
- Accurate baseline documents evolution (history of change)
- Accessible audit trail of configuration change

Collaboration & Reconciliation of Service Data



Value Added Business Practices

- Enables proposed change impact analysis
- Enables online reviews
- Enables "life cycle" product structure comparisons for exception reporting

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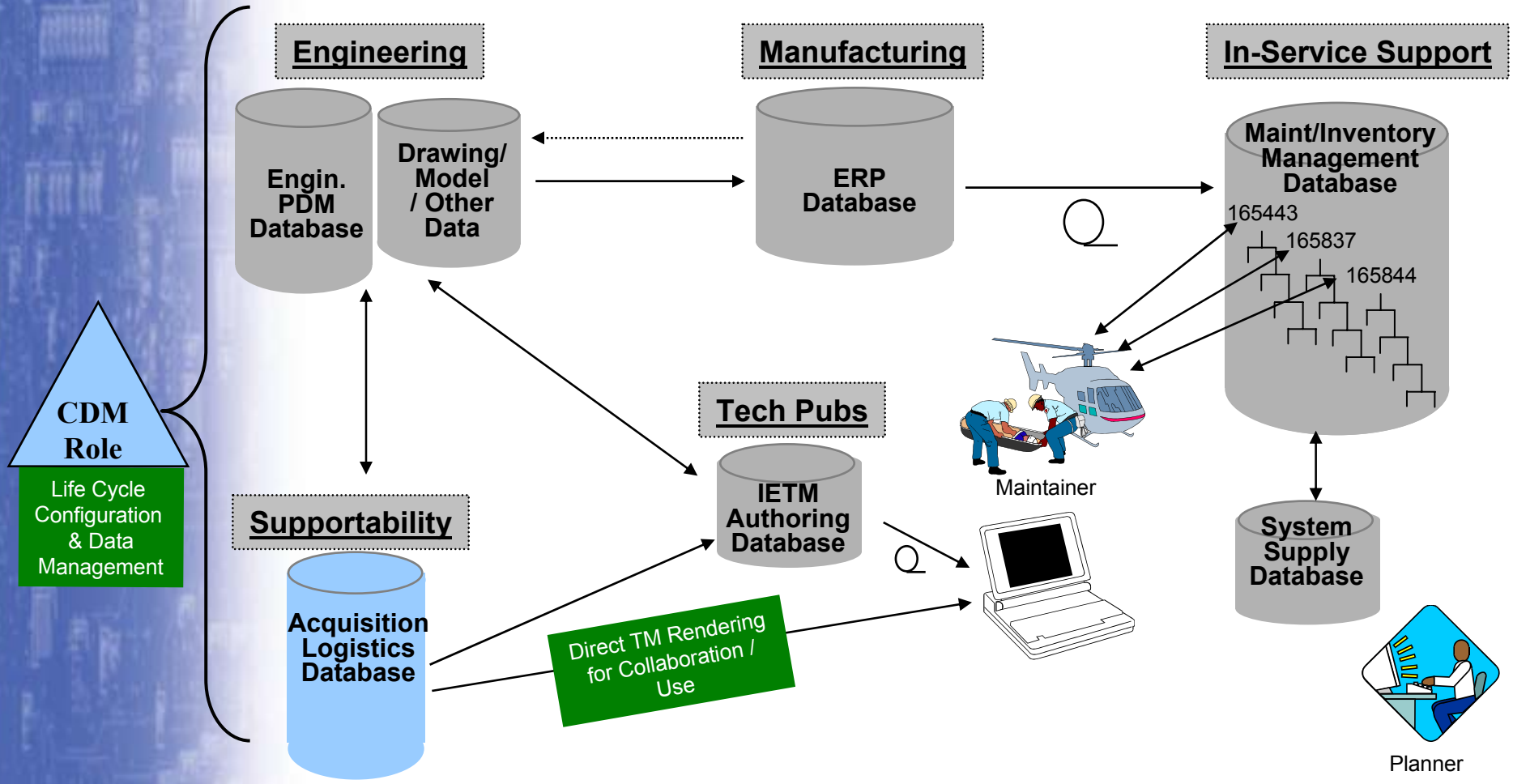
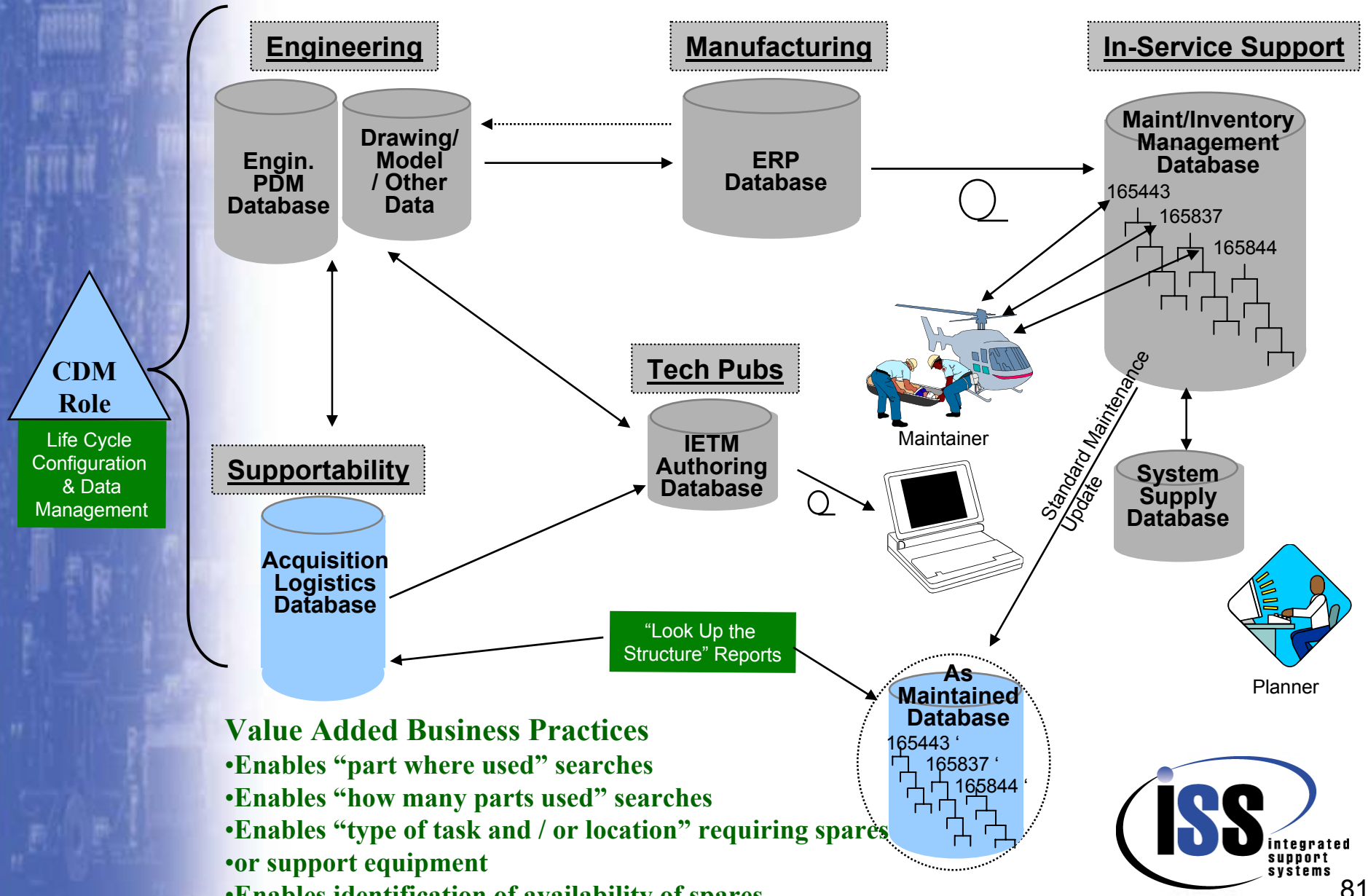
Collaboration & Reconciliation of O&M Data



Value Added Business Practices

- **Supportability data may be rendered in "ETM" views to enable collaboration and change impact analysis**
- **Supportability data could be used as the single source repository for ETM / IETM requirements. No need for a "redundant data repository."**

Collaboration & Reconciliation of Use Data



Value Added Business Practices

- Enables "part where used" searches
- Enables "how many parts used" searches
- Enables "type of task and / or location" requiring spares
- or support equipment
- Enables identification of availability of spares

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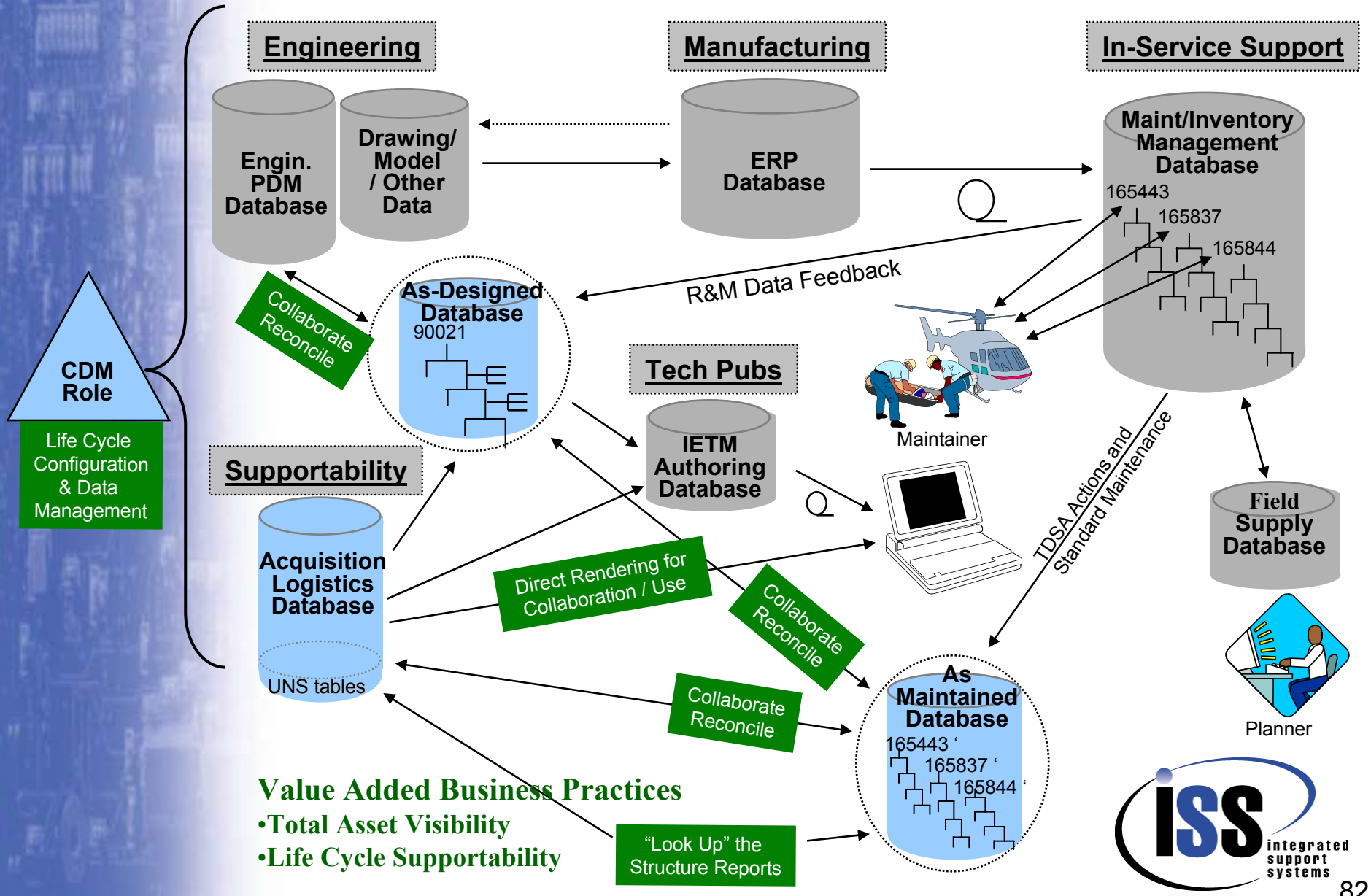
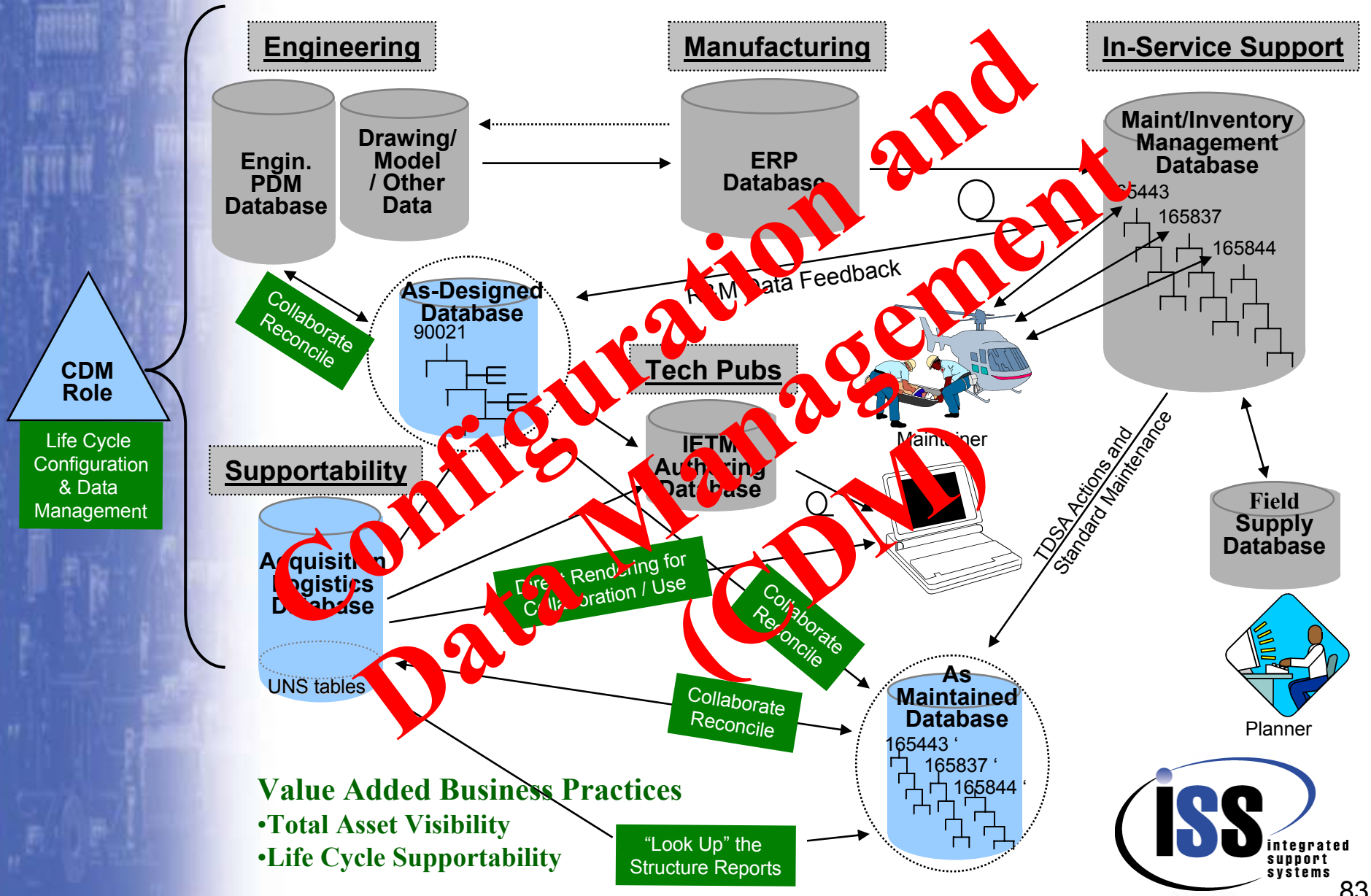
Life Cycle Supportability & Total Asset Visibility



Life Cycle Supportability & Total Asset Visibility



Value Added Business Practices

- **Total Asset Visibility**
- **Life Cycle Supportability**

Summary

- Information is the key to value chain
- CDM is key to “right” information
- CDM required Womb to Tomb
- CDM required Top to Bottom

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The CDM Role

The Center of Universe

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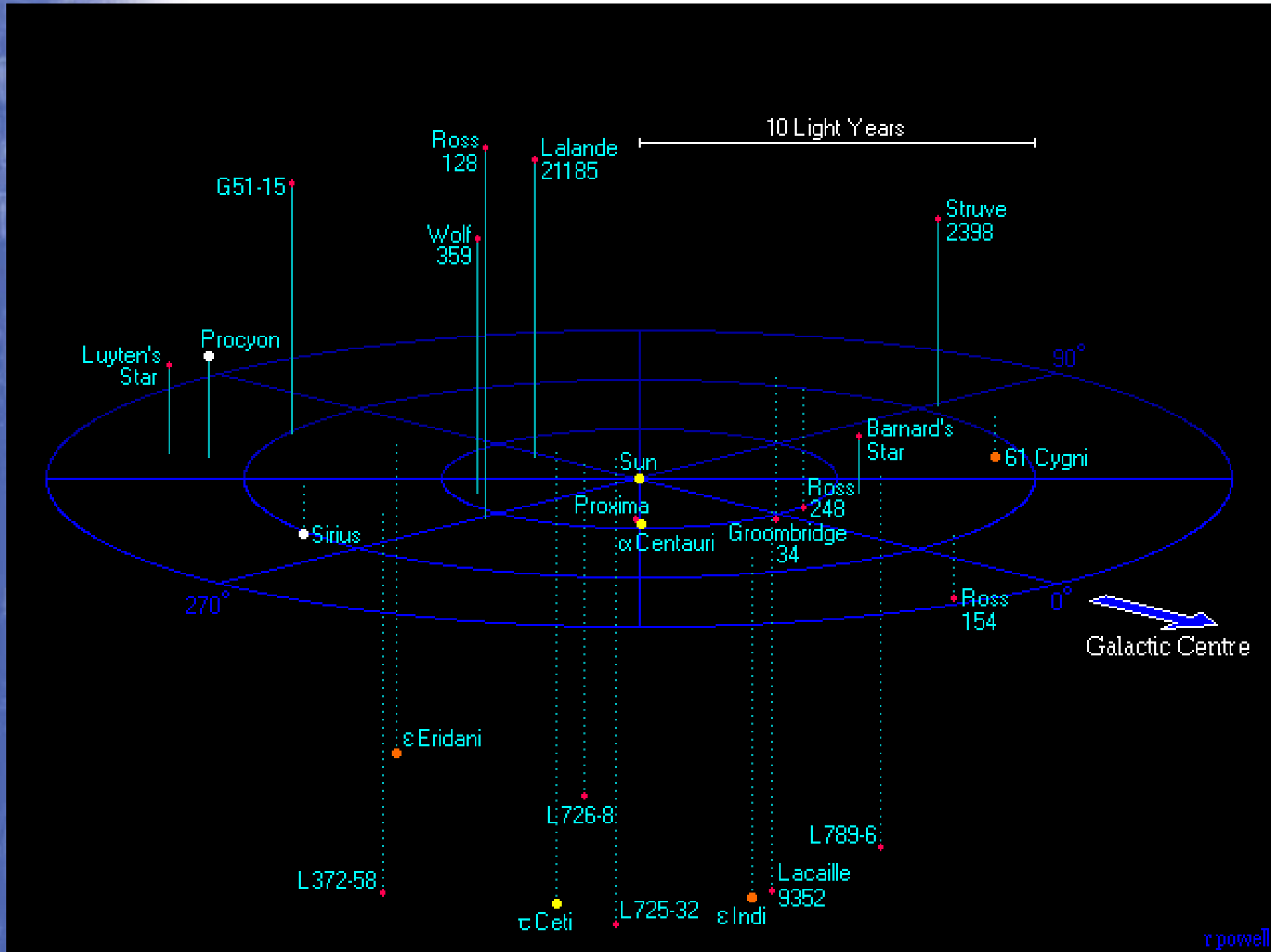
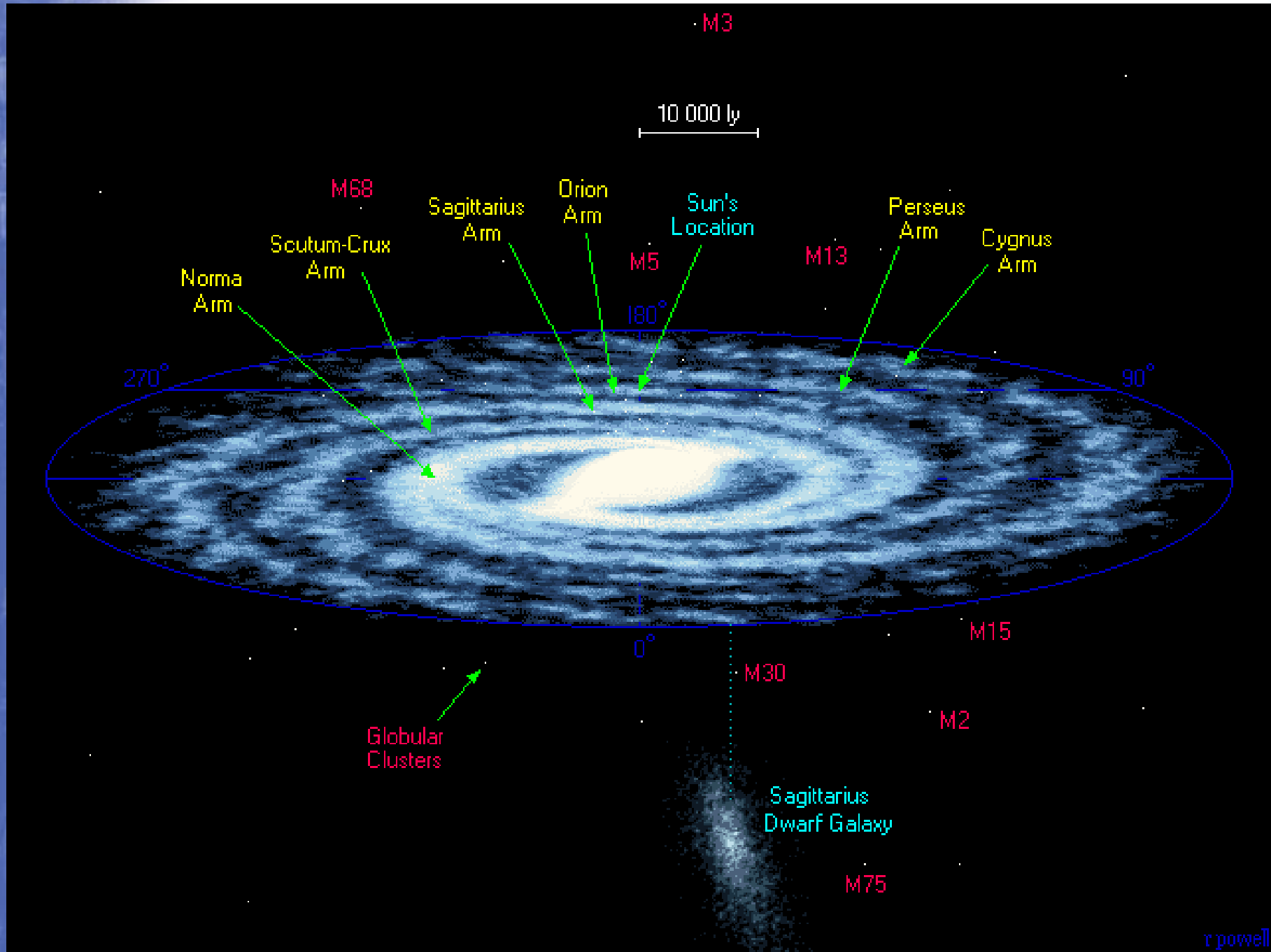
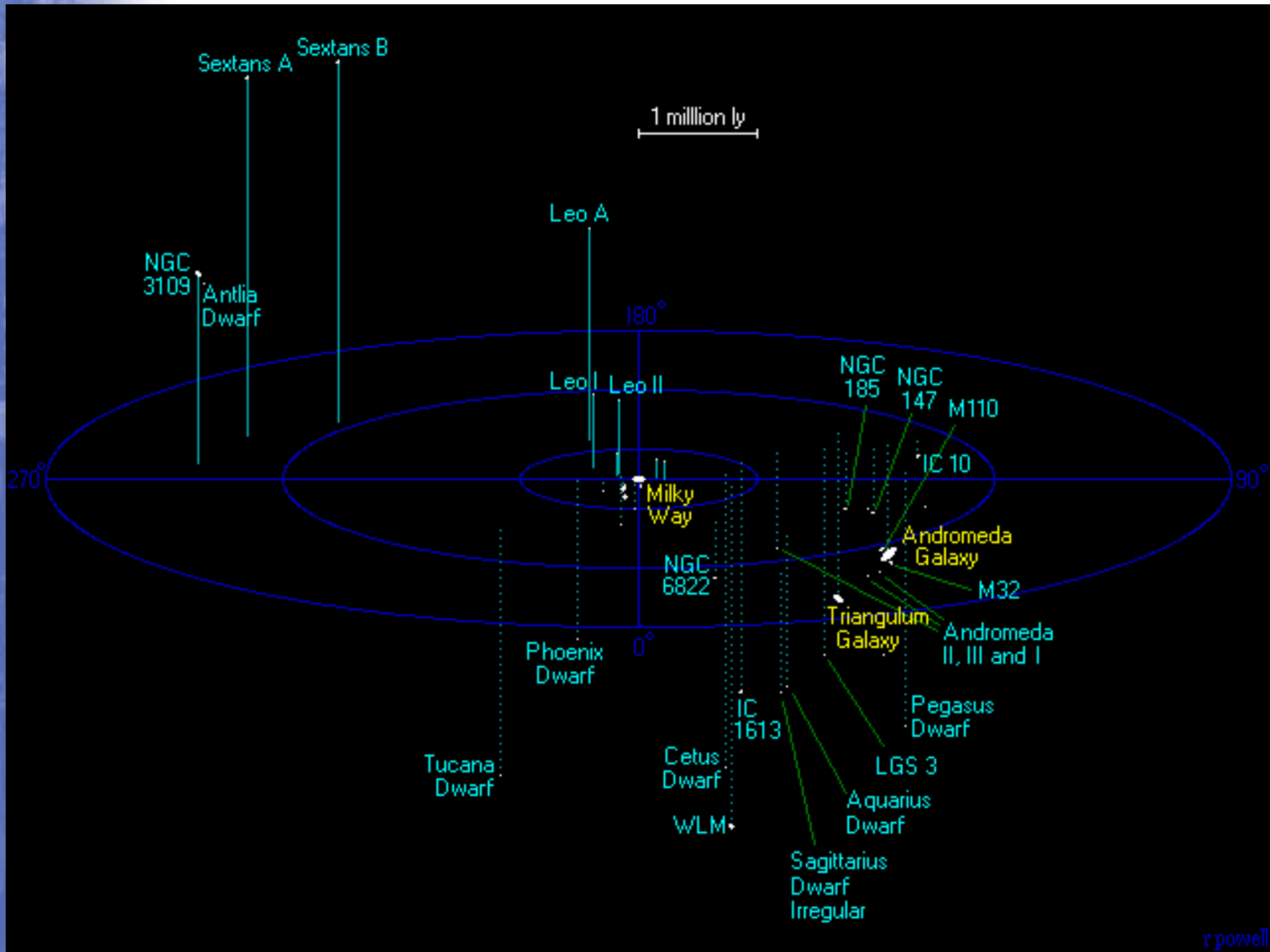
The Nearest Stars



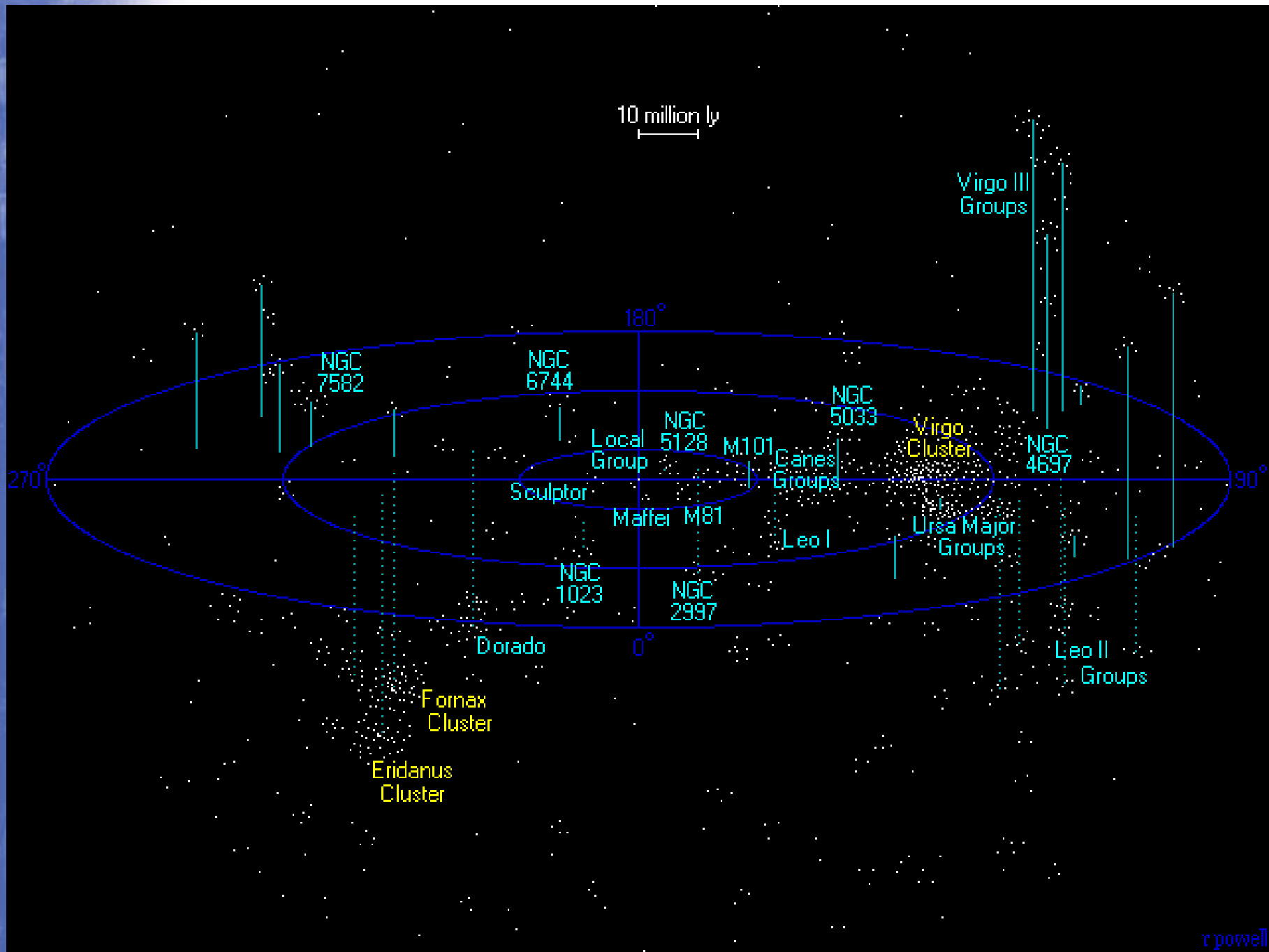
The Milky Way Galaxy



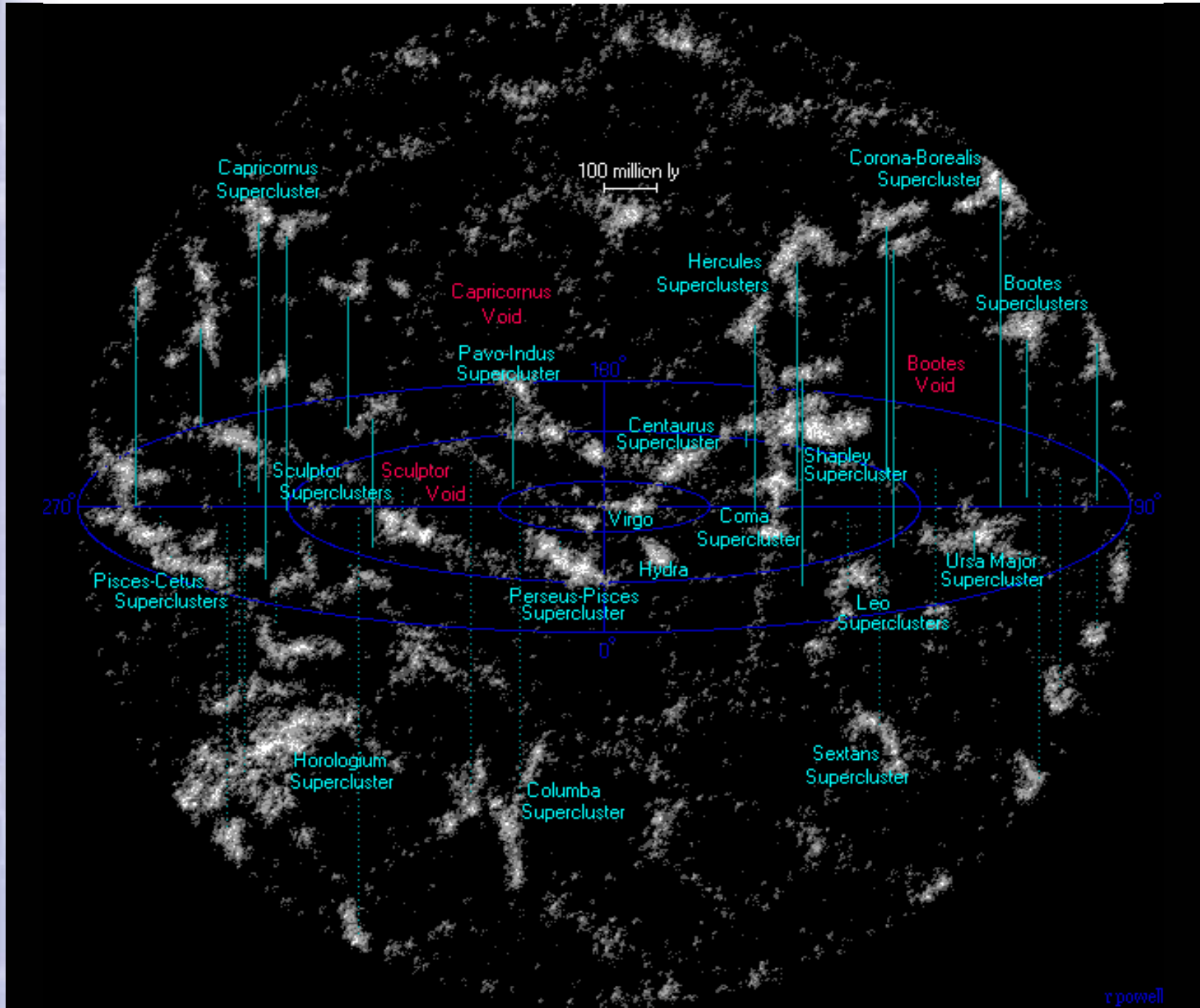
The Local Group



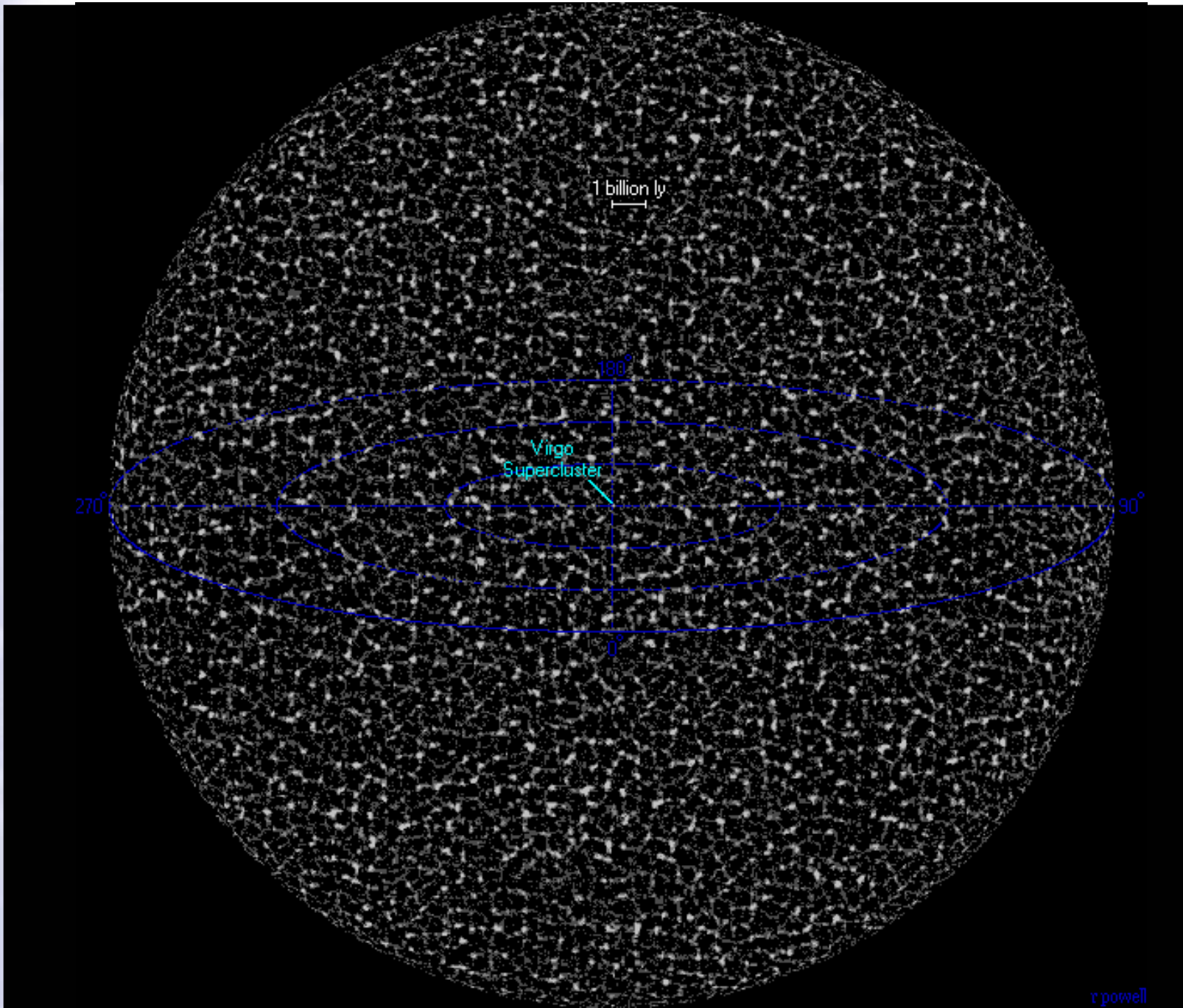
The Virgo Super Cluster



The Nearest Super Clusters



The Visible Universe



The Visible Universe

Configuration and Data Management (CDM)

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The Top Ten Reasons why you need to be automating Configuration/Data Management

 # 6 All the other functions have already been automated.

 # 7 Your "tech savvy" management is now aware that semiconductors are not part-time orchestra leaders and microchips are not very, very small snack foods.

 # 8 Computers are unreliable, but people are even more unreliable.

 # 9 Automation will provide a system that any fool can use, however, only the CM and DM fools will use it.

 # 10 Under most rigorously controlled business environment, people will continue do as they damn well please.

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The Top Ten Reasons why you need to be automating Configuration/Data Management

 # 1 If you continue to do it manually, you will go blind.

 # 2 If all you have is a hammer, everything looks like a nail. If all you have is a computer, everything looks like magic.

 # 3 Technology will provide you one more excuse as to why you can't get anything released.

 # 4 Automation will provide a faster means to transform your statistics to meet the necessary performance criteria.

 # 5 The only human institution resisting automation is the cemetery.