# DESIGNING A SOFTWARE DATA COMPENDIUM

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Many of the engineering disciplines have organized technical data into handbooks or data compendiums.  These reference works are used by engineers for a large variety of engineering tasks throughout an engineered product's entire life cycle.  Electronic engineers, for example, are able to use compendiums of failure data in both the design and maintenance of electronic components, circuits, and systems.  Unfortunately, there is a distinct lack of such engineering aids for use by members of the software engineering community.

As part of its role as a software engineering information analysis center, the Data and Analysis Center for Software is currently designing a software engineering data compendium.  Hopefully, this compendium will serve as a start in filling in some of the gaps that exist in software engineering data.

The paper will highlight some of the more critical areas that are considered during the design of an engineering reference guide such as a data compendium.  These areas include:

- Identifying potential subject areas for the compendium.

- Identifying and evaluating potential data sources.

- Identifying key data elements and determining the most effective methods of data organization and presentation for use by software engineers.

- Summarizing the data at a level that minimizes volume while optimizing information value.

- Using automated tools to effectively and efficiently manage, organize, and report the data.
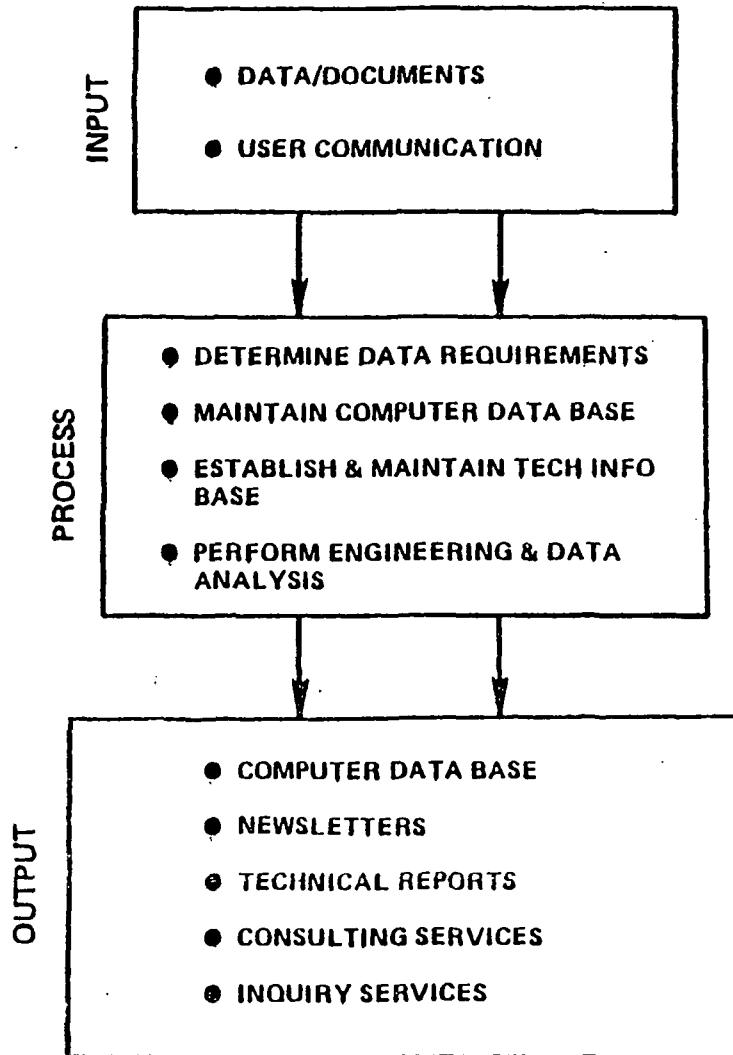
# DESIGNING A SOFTWARE DATA COMPENDIUM

FOURTH SOFTWARE ENGINEERING WORKSHOP

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# DATA & ANALYSIS CENTER FOR SOFTWARE

**INPUT**

- DATA/DOCUMENTS
- USER COMMUNICATION

**PROCESS**

- DETERMINE DATA REQUIREMENTS
- MAINTAIN COMPUTER DATA BASE
- ESTABLISH & MAINTAIN TECH INFO BASE
- PERFORM ENGINEERING & DATA ANALYSIS

**OUTPUT**

- COMPUTER DATA BASE
- NEWSLETTERS
- TECHNICAL REPORTS
- CONSULTING SERVICES
- INQUIRY SERVICES

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# DESIGNING A S/W DATA COMPENDIUM

● ENGINEERING DISCIPLINES USUALLY HAVE HANDBOOKS

● EXAMPLE:
  ELECTRONIC ENGINEERS – COMPONENT FAILURE HANDBOOKS

● SOFTWARE ENGINEERS DO NOT HAVE HANDBOOKS OR
  DATA COMPENDIUMS

● AS AN IAC, DACS IS DESIGNING A SOFTWARE ENGINEERING
  DATA COMPENDIUM

● GOAL:

  TO SERVE AS A START FOR A SOFTWARE ENGINEERING
  HANDBOOK

# CRITICAL AREAS IN DATA COMPENDIUM DESIGN

- IDENTIFYING SUBJECT AREAS

- IDENTIFYING AND EVALUATING DATA SOURCES

- IDENTIFYING KEY DATA ELEMENTS AND METHODS
  OF ORGANIZATION

- SUMMARIZING THE DATA AT AN OPTIMUM LEVEL

- USING AUTOMATED TOOLS

# IDENTIFYING POTENTIAL SUBJECT AREAS

- POSSIBLE SUBJECT AREAS
  - FAILURE/TEST DATA
  - COST/PRODUCTIVITY DATA
  - COMPONENT DATA
  - PROJECT/MANAGEMENT DATA

## IDENTIFYING & EVALUATING POTENTIAL DATA SOURCES

● POTENTIAL SOURCES

- BSDS (6SPR/SMN RELATED DATASETS)
- RADC PRODUCTIVITY DATABASE (PRODUCTIVITY)
- NASA SEL DATABASE (PRODUCTIVITY, COMPONENT DATA, PROJECT DATA, SPR/SMN, TEST RESULTS)
- FAA/CSC DATABASE (PRODUCTIVITY, SPR/SMN)

● EVALUATION CRITERIA

- AVAILABILITY
- COMPLETENESS
- APPLICABILITY
- CONSISTENCY
- MEDIA (MACHINE READABLE)

# IDENTIFYING KEY DATA ELEMENTS & METHODS OF ORGANIZATION

● KEY DATA ELEMENTS DERIVED FROM SUBJECT AREAS

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┌─────────────────────┐
│   SUBJECT AREA      │
└──────────┬──────────┘
           ↓
┌─────────────────────┐
│   DATA ELEMENTS     │
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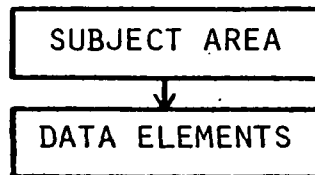
● ORGANIZATION DEPENDENT ON SUBJECT & SUMMARIZATION
   LEVELS

# SUMMARIZING DATA AT OPTIMUM LEVEL

● DATABASE "DUMPS" RESULT IN INFORMATION OVERLOAD

● HIGH SUMMARIZATION LEVELS RESULT IN INFORMATION LOSS

● BALANCE BETWEEN INFORMATION OVERLOAD & LOSS MUST BE BALANCED

# USING AUTOMATED TOOLS

● DATABASE MANAGEMENT SYSTEMS – MDQS

● STATISTICAL PACKAGES – SPSS

● TEXT PROCESSING TOOLS – RUNOFF

# AVERAGE PROGRAMMER HOURS

| COMPONENT TYPE | DESIGN | | | DEVELOPMENT | | | TESTING | | |
|---|---|---|---|---|---|---|---|---|---|
| | CREATE | READ | REVIEW | CODE | READ | REVIEW | MOD | INTEQ | REVIEW |
| String Processing | | | | | | | | | |
| Scientific Command & Control | | | | | | | | | |
| Business & Financial | | | | | | | | | |
| Database Application | | | | | | | | | |
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