

Information Flows

A Tool for
Enterprise Architecture Reengineering

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Outline

- Background – Approaches to System Change
- Introduction to Information Flows
- Initial Observations
- Organizing Information Flows
- Using Information Flows to Reengineer Systems
- Concluding Remarks

Two Approaches to System Change

- For system change, one needs a target architecture
 - **Approach 1 – Clean Slate**: Determine the requirements and build an entirely new system. If an old program is usable, you reuse it.
 - **Approach 2 – Evolutionary Migration**: Determine the requirements and migrate step by step from the existing system to the new target architecture

Introduction to Information Flows

Goals of Information Flows

- To gain a better understanding of the current spider webs of systems and their interactions and interrelationships and the overall business flow
- To improve data quality
- To reduce the risk failure of system modifications, maintenance, and migrations
- To rationalize the
 - Data
 - Systems
 - Flow
- To determine the contents of a “core” centralized database

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What are Information Flows?

An Information Flow has two major components

- Diagram(s) that depicts
 - Systems
 - Inputs to a systems from other internal systems
 - Outputs from a system to other internal systems
 - Inputs from the outside world
 - Human inputs
 - Automated feeds from external systems
 - Outputs to the outside world
 - Outputs for humans (reports, web pages, etc)
 - Automated feeds to external system

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What are Information Flows? (cont.)

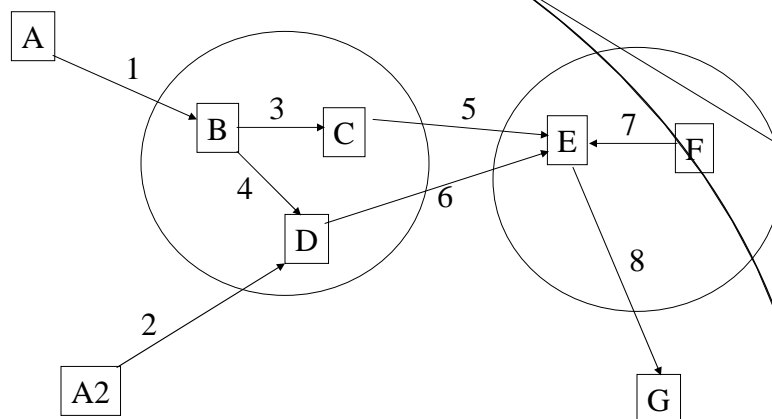
- Plus all the associated metadata
 - Description of a system including
 - Including responsible business and IT organizations
 - Description of a flow
 - Data descriptions
 - Transformations
 - Responsible organization
 - Business organization
 - IT organization

Inputs and outputs from databases internal to a system are generally not shown

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Simple Information Flow Diagram



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Basic Info Flow Metadata

System Name	System Description	Flow Name	From System	To System

Flow Name	Data Group Name	Data Description	Data Transformation

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Information Flow Levels

- **Business Level**
 - Describes the business meaning of the system and data, business user, and business criticality
- **Logical Level**
 - Describes the entities and attributes, of the data passing from one system to another
- **Physical / Implementation Level**
 - Describes the layout of the data elements as well as communications link, volume, and frequency.

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Key Points

- Building information flows is relatively straight forward
 - Getting all the details correctly can be challenging
 - Eliminating inconsistencies is more challenging
- What is most important is to
 - Maintain the information flows as systems change
 - Use them appropriately (or they can become expensive wall paper)

Initial Observations (aka *gotchas*)

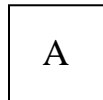
Non-Matching Inputs & Outputs

- Every arrow represents a reflexive relationship between the sender and the receiver
 - If A sends information to B then B receives information from A
 - What if the documentation of the two systems disagrees
- Compatible Definitions
 - Do both A and B agree on the definition of each data component of the flow
 - If A sends the same data to both B and C do all 3 agree
- Transformation Integrity
 - Does the transformation compromise the data integrity?

Competing Inputs

- Suppose a system receives the “same” data from two other systems.
 - Is there one ultimate source of the data or two distinct sources?
 - If only one ultimate source, are the definitions and transformations on both value chains compatible?
 - Is this a case where the “same” data comes from one source or else the other source, but never from both (potential value chain problem)?
 - If two sources, how do we compare the data, and what do we do if they disagree?

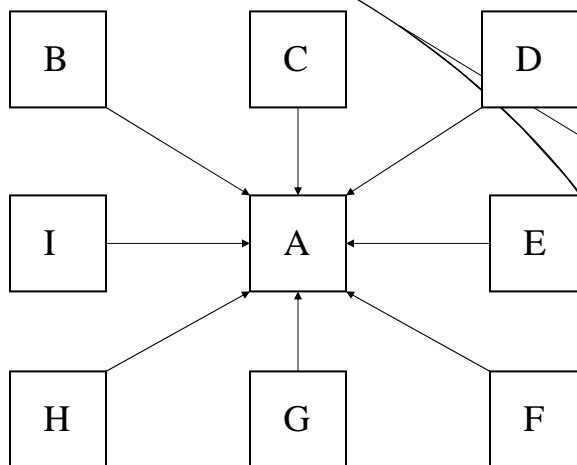
The Wall Flower



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The Black Hole

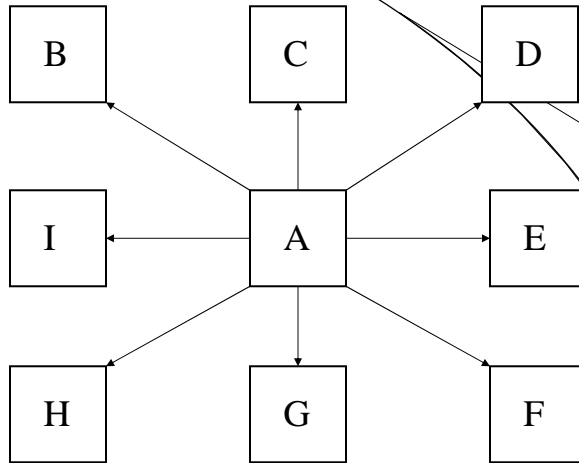


Alias the Data Prison

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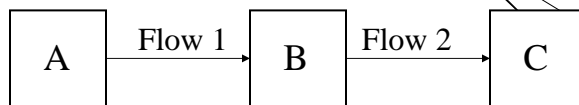
The Radiator



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High Tech Telephone Game



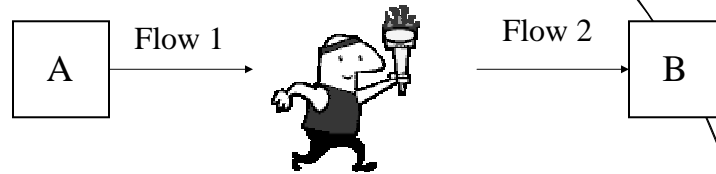
- What if the same data group appears on Flow A and also on Flow B?
- What if this pattern continues on to System D?

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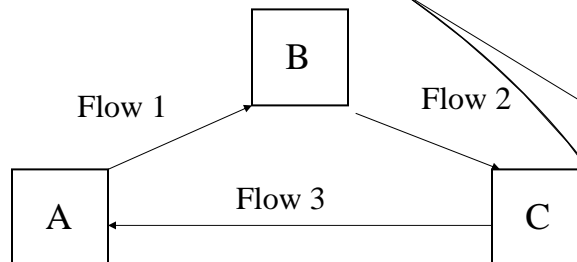
Low Tech Telephone Chain

System A outputs a report and a person enters data from the report into system B



This is the real telephone game

Cycles



What happens if the same data group appears on all three Information Flows?

Is anyone in control?

Organizing Information Flows

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Organizing Information Flows

- If there are a small number of systems, everything is depicted on one diagram.
- If there are a large number of systems, flows can be organized
 - By Organization
 - By Line of Business
 - By Business Function

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Look For

- The overall set of flows should be end-to-end from a business perspective
- Flows go from transaction systems to financial systems
- Flows that follow the CIF (or GIF)

Major Sources & Sinks

- Only expect to see
 - a major source near the beginning of the business flow
 - A major sink near the end of the business flow
- Financial systems and Data Warehouses are typically major sinks as well as the source for reporting

Using Information Flows to Reengineer Systems

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Cost Reduction

- Gartner Group has estimated that maintenance of the bridges costs between 50 and 80% of the IT budget maintenance (building them is cheap!)
- Every data item on a flow is potentially replicated data which needs to be kept synchronized
- Every flow between two systems must be
 - Tested and/possibly
 - Modifiedwhen the system at either end is changed

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Data Dispersal

- If a data group (or element) is part of a flow, then at least two systems may maintain that data group (or element)
 - Data quality issues
 - Synchronization issues
 - Transformation issues
 - Data storage costs
 - Back up and recovery costs

System Modification & Maintenance

- Information flows help mitigate the risks of systems modification and maintenance
- Whenever any system is modified, the information flows give you a list of
 - “Adjacent” systems that may need modification
 - Data bridges, including their transformations, that may need modification
 - And everything needs to be tested.
- Guide for sequencing a series of changes

COTS Products

- For a COTS product implementation the information flows indicate
 - Where the COTS product fits into the overall flow
 - The list of systems that need to interface with the COTS product
 - The data bridges that need to be built
 - The data transformations that need to be performed by the data bridge.

Systems Replacement & Migration

- Whenever a system is replaced you know
 - All the data feeds to your replacement system
 - All the data feeds from your replacement system to other systems
- For systems migrated to another platform, every bridge must be sent across the network

(Risk Management)

Data Quality

- To test data quality, one must know the full value chain for the data elements being tested.
- Information flows provide the
 - Original source for each data element
 - Chain of sources for use of the data
 - List of places where the data may have been changed or transformed.
- One must still go to the external sources for accuracy verification (usually statistical sampling)

Information Flow Data Quality Example

- Researcher requested data about a sets of events from a federal agency that maintains that data
- Researcher searched agency's website for data regarding the same set of events and found the dates conflicted with dates provided to her directly from the agency
- Federal agency needed to find and correct data error
- Information Flow model revealed the problems and supported development of a remediation plan

Observations

- Governance – Regulation of information flow and congruity - is a characteristic of information maturity. (MetaGroup) Without effective information and data governance, data quality suffers.
- Data Stewardship – Accountability and responsibility for information and data quality, content, security, and availability – will enable congruent information flows. Absence of data stewardship results in risk of conflicting, redundant, problematic information flows.

“Core” Centralized Database

- A centralized database does not need to store every data item
- Only data items that are shared among the systems are prime candidates to be in the “core” centralized database.
 - Reduces cost
 - Improves performance
 - Possible easier buy in by owners

Business Process Reengineering

- Information flows provide guidance for
 - Sequencing system changes or replacements
 - Testing
 - Reducing risk when making changes

Concluding Remarks

Thank you

Questions