Visio Automation for Infrastructure Design and Management

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Square Mile Systems / AssetGen

2018 BICSI WINTER
CONFERENCE & EXHIBITION
Orlando, FL | February 4-8

A Few Questions

- Anyone here attended the workshops in 2014 and 2016?

- Which is easier and faster to complete?
  a. Updating a Visio drawing with changes
  b. Re-drawing into Visio a drawing sent in Cad/PDF/JPEG/BMP

- What has to happen to have 6500 racks drawn with consistent format and detail by different engineers?

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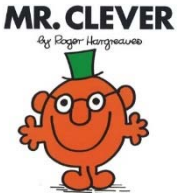
This Workshop Will Show

- What can be <u>reduced</u> with Visio

workload - skills dependent

cost - $26 or $20,000

time - 16 minutes or 25 days



- How to improve diagram quality and accuracy

All of which you can do later today - yourself!!

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Visio Automation Agenda

1. Understand Visio – out of the box
2. Diagramming techniques
   - Making it simpler for all
3. Linking Visio to data sources
   - Reduce cut/paste, diagram refresh, consistency
4. Automation for larger infrastructures
   - Automated creation and updating

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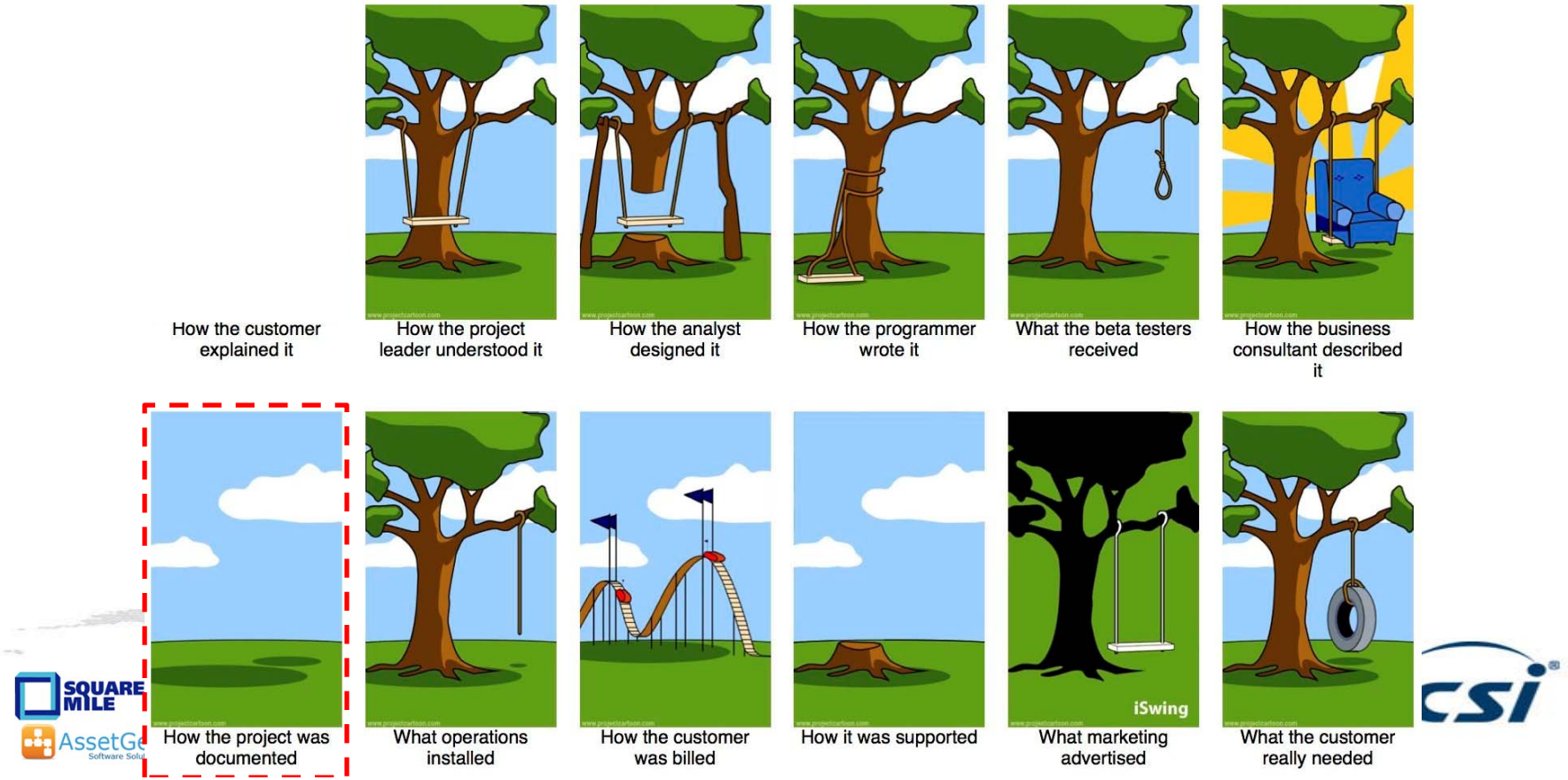
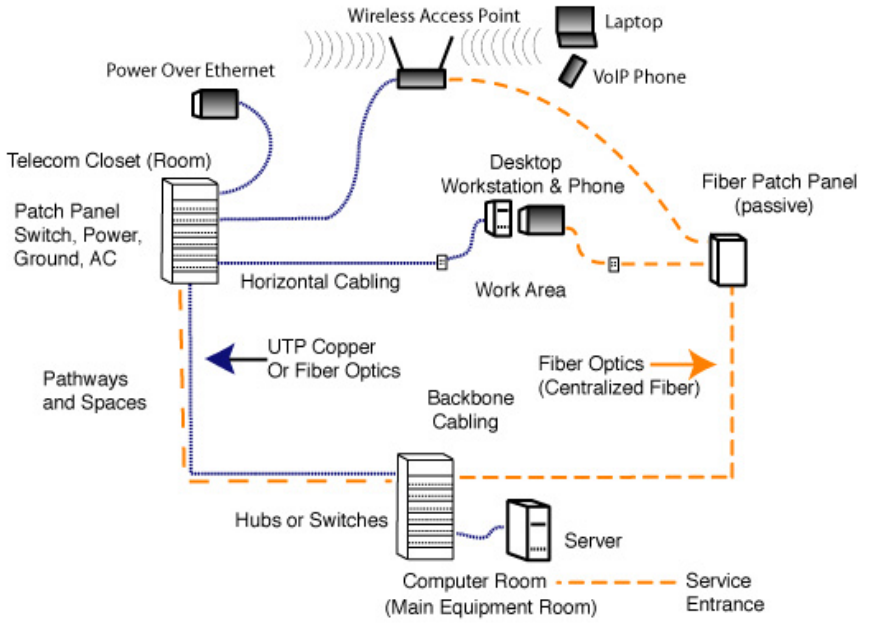
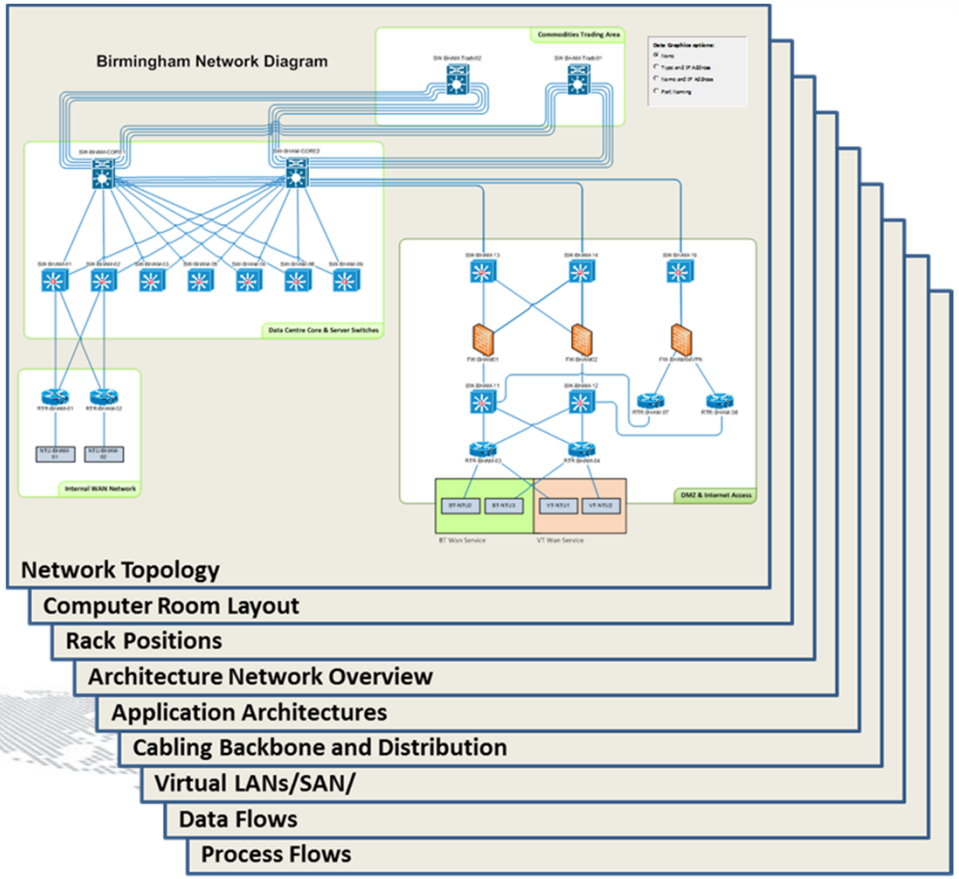
Diagrams Are Very Useful!



If A Picture Paints a Thousand Words





How do we paint a thousand pictures? Easily?

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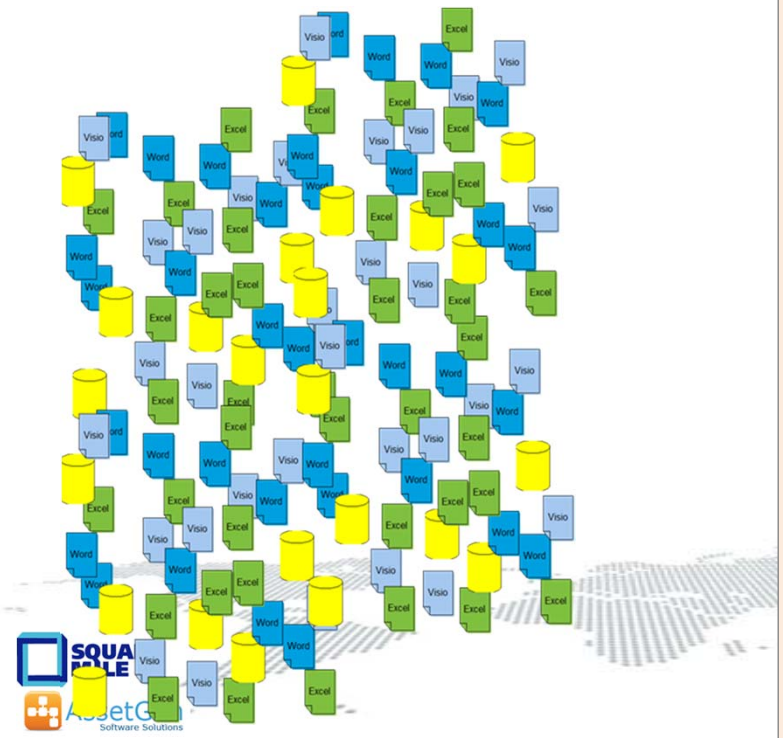
Understanding IT Dependencies Isn't Easy

Many 1,000s of documents are created by projects, operations and risk processes

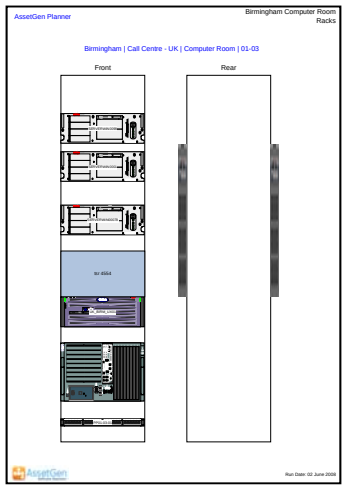


Commercial	Physical	Logical	Business
Ownership	Room	LAN	System
Support	Rack	SAN	Service
Software	Cabling	Virtual Machines	Applications
Security	Power	OS	User Data
Contracts	Hardware Build	Remote Mgmt	DR Plan
Licences	Backup	Environment	Change Impact

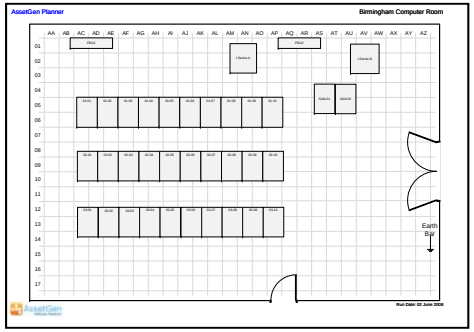
One Server ,
Multiple Mappings and Diagrams

Dependencies & Diagrams

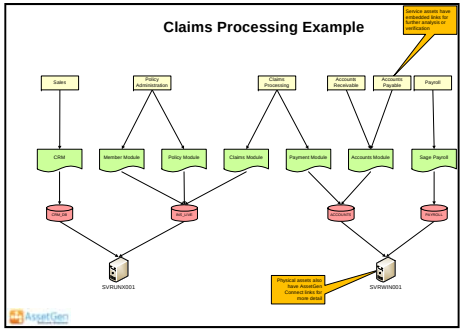
Rack



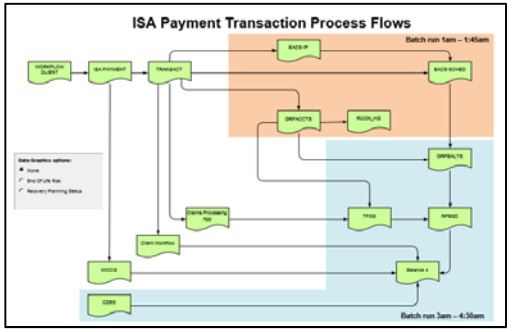
Floor Plan



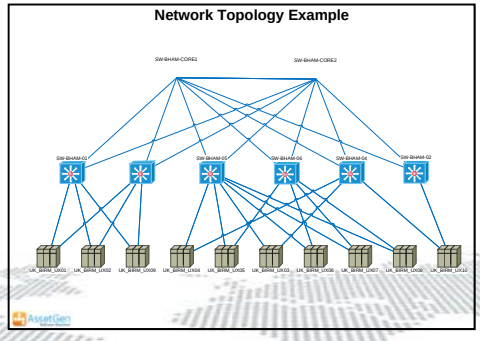
ITIL Service Map



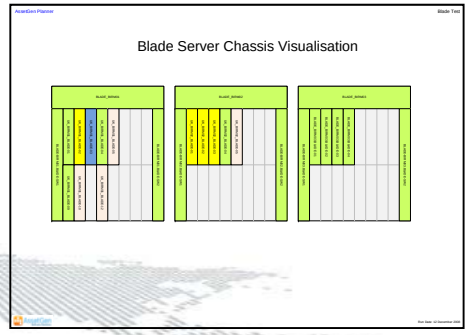
Data Flows



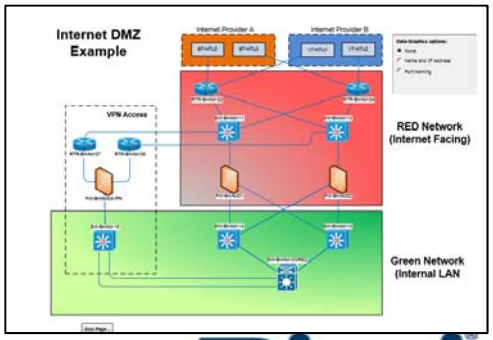
Network Topology



Build



Zones



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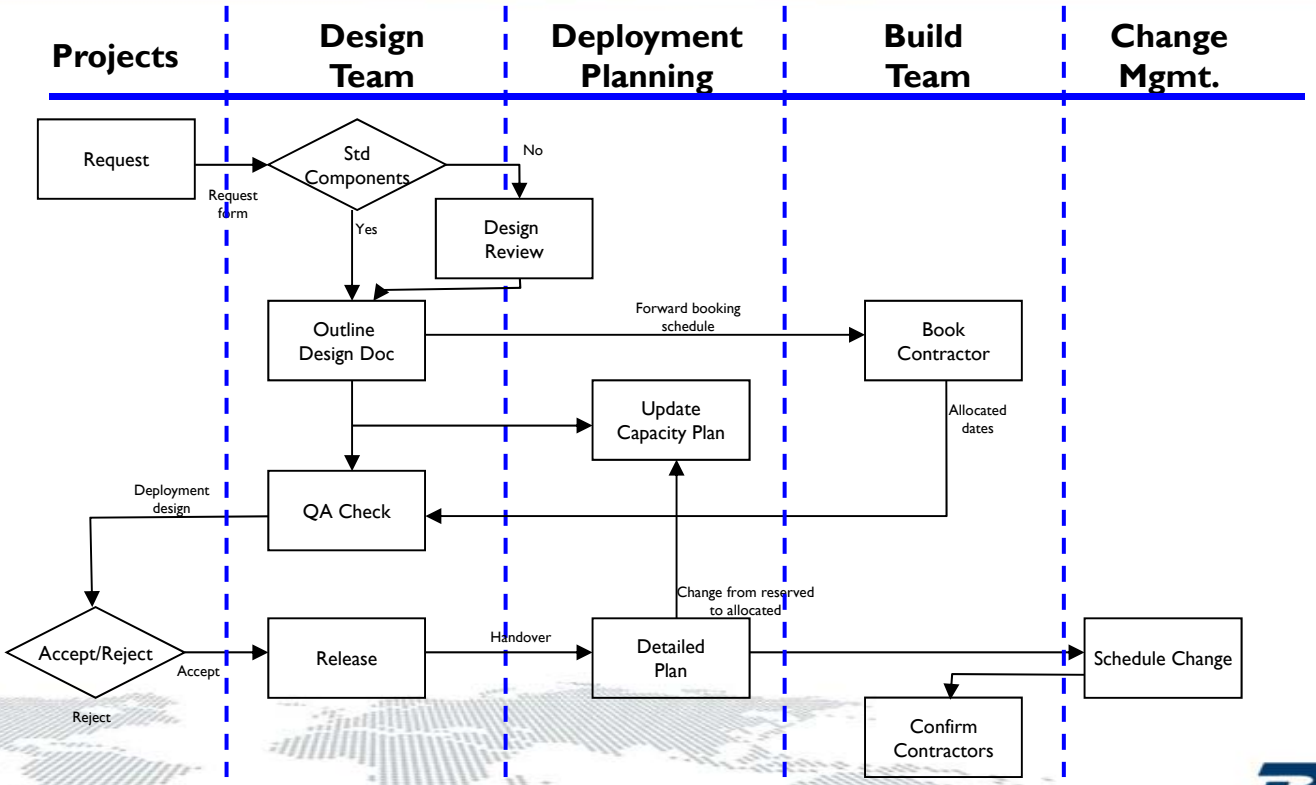
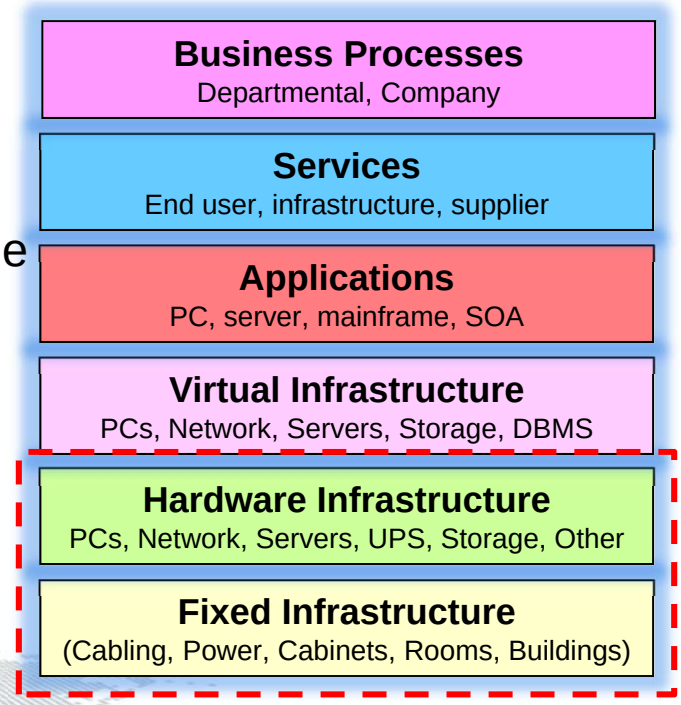
Diagrams Also Cover Processes



Information Gaps Cause Pain

1. Buy things you don't need
2. Don't buy things you do need
3. Reverse engineer with every project
4. Unnecessary site surveys
5. Project timescales are not predictable
6. Repeated "one off" audits
7. Overload key individuals
8. Less confidence in security controls
9. Problems escalate
10. Inability to optimise team processes
11. Unplanned change disruption
12. Fault resolution takes longer
13. Duplicate what is already there



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1. Visio Basics

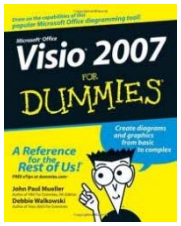
- Visio history
  - 1992 First released, 2000 acquired by Microsoft
  - Last non-MS versions had auto-discovery, equipment templates – all removed with Visio 2003
- Versions
  - Visio 2016 Standard
  - Visio 2016 Professional
  - Visio Pro For Office 365
  - Visio Viewer (runs in IE browser)
  - Visio app for iOS
  - Visio online – web based collaboration

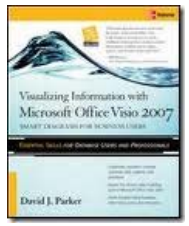
Which Version - Standard or Professional?

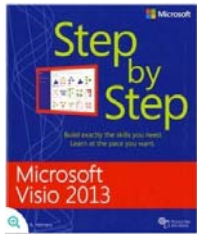
- No thought required – Go for Professional!
- Why?
  - More extensive selection of shapes
  - Data linking (look for data tab)
  - Data graphics – saves typing and redrawing diagrams
  - Visio extras
- An hour saved in a year makes it worth it!

Visio Resources And Help

- Microsoft web site
- Books
- LinkedIn group – Visio Enthusiasts
- Equipment manufacturer web sites
  - Cisco, CommScope, Siemon
  - HP, Dell, IBM, others www.visiocafe.com www.shapesource.com
- 3rd Party stencils
  - netZoom, others www.altimatech.com
- Visioguy forum www.visguy.com







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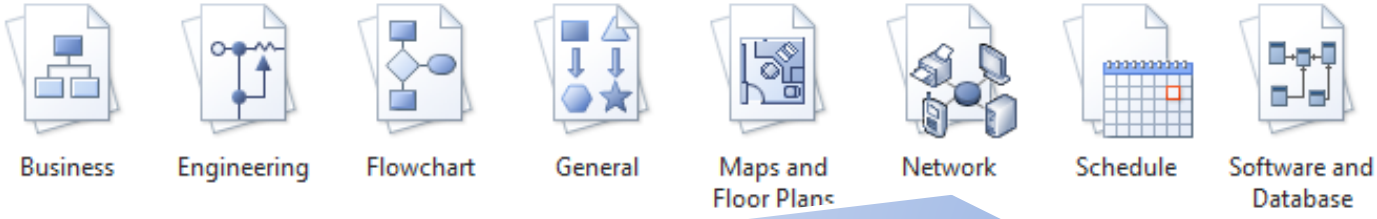
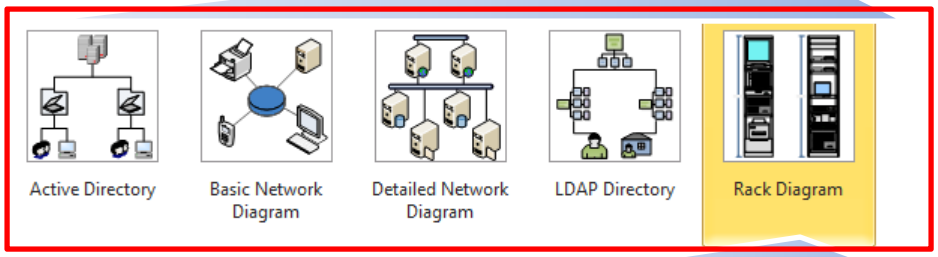
Templates, Stencils, Shapes

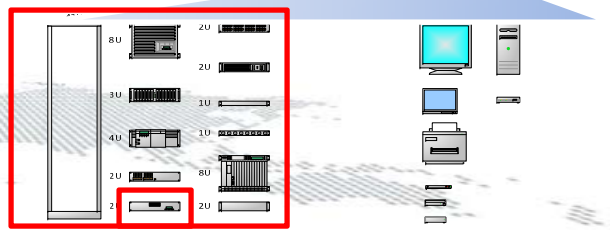
Categories



Templates



Stencils



Shape

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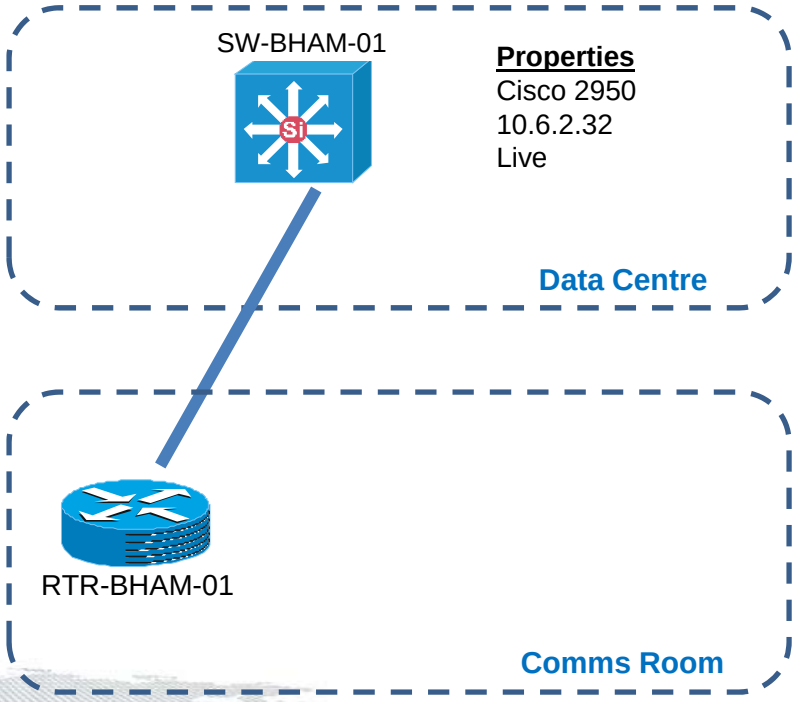
Visio Concepts and terms

- Template
- Stencil
- Shape
- Shape properties
- Connector
- Background
- Layer



Visio Basics -1

- Creating new diagram from a template
- Manipulating shapes on a page
- Aligning and Distributing Shapes
- Copy, Paste and Duplicate Shapes
- Grouping and ungrouping shapes
- Foreground and Background options
- Zooming in and Out of the Page
- Using the Drawing Toolbar to create basic shapes

Visio Basics - 2

- Connectors
- Static and dynamic glue
- Adding, deleting and moving connector points
- Using different stencils
  - Stencil search
- Shape behaviour -1d, 2d, drill down
- Working with text
  - Object text
  - Freeform text
  - Text block tool

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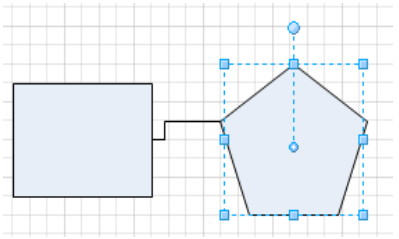
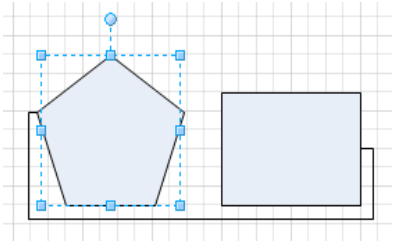
Static glue

- Static glue is to a particular connection point

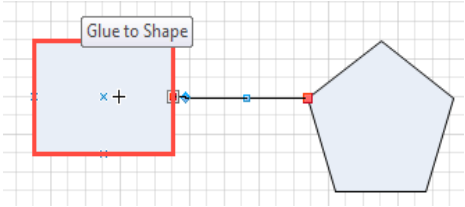


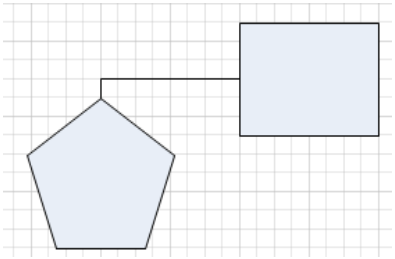
- The connection points used don’t move even if the shapes are moved



Dynamic glue

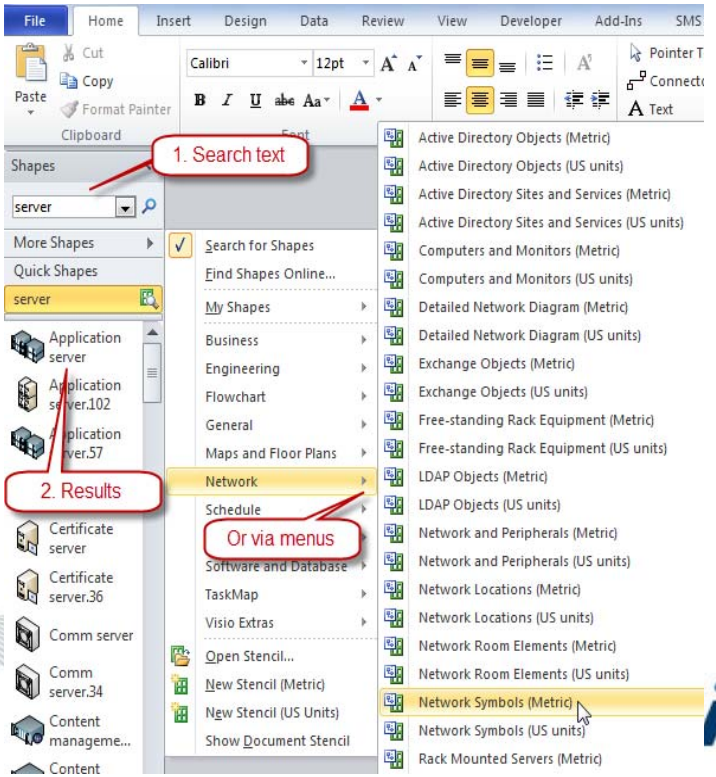
- Drag connector onto shape and wait until shape is highlighted in red
- If you move the shapes relative to each other the connection moves appropriately





Using Different Stencils (and searching)

- Use Shapes tab
- Select via menus
- Use Search options
- External stencil sets
  - Suppliers, 3rd party



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Danger! - Visio File Sizes

Two files

Diagram 1	1995kB
Diagram 2	12kB

Diagram 1 is 166 times the size of Diagram 2!

Some tips to reduce file sizes

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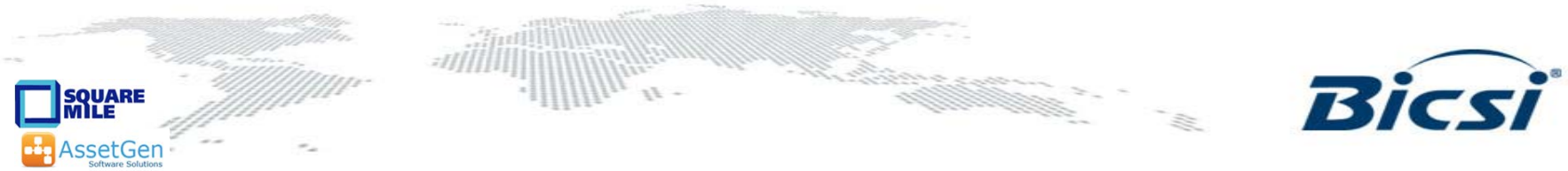
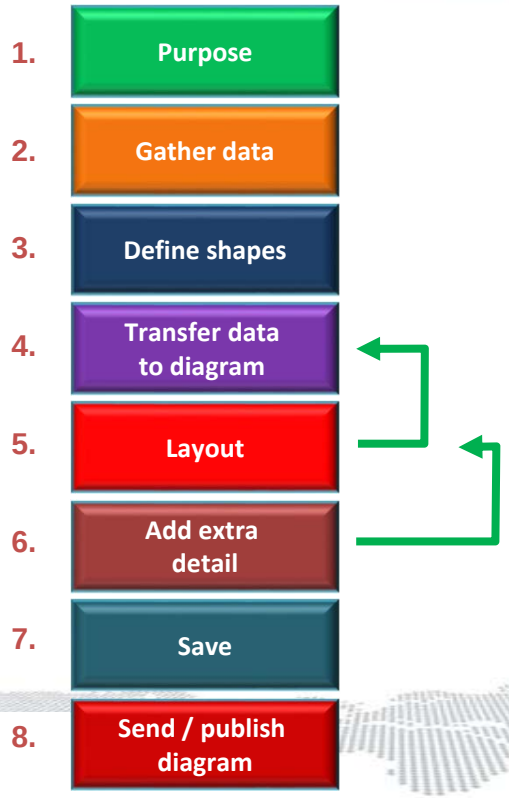
2. Diagramming Techniques

Good diagramming practice

1. The detail that you see
   - What is seen visually / printed
2. Additional data / information within diagram
   - Additional action by viewer – display, click, show layer, etc.
3. How you get to other information
   - Drill down, open files, launch remote session



The Process of Creating a Diagram



1. Which takes the most time?

2. Where can errors creep in?

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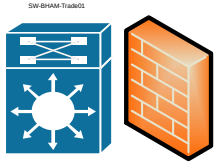
Diagram Process Examples

1.	Purpose	Rack Diagram R01	Network Diagram Orlando LAN
2.	Gather data	Select Rack R01 Inventory	Switches / Router in Orlando
3.	Define shapes	Match to Physical Shapes	Match to Logical Shapes
4.	Transfer data to diagram	Create Shapes	Create Shapes and connections
5.	Layout	Place/size to position in rack	Move/size for readability
6.	Add extra detail	Notes, etc.	Notes, etc.
7.	Save	Save as Rack R01	Save as Orlando LAN
8.	Send / publish diagram	Store on server Intranet/SharePoint	Store on server Intranet/SharePoint



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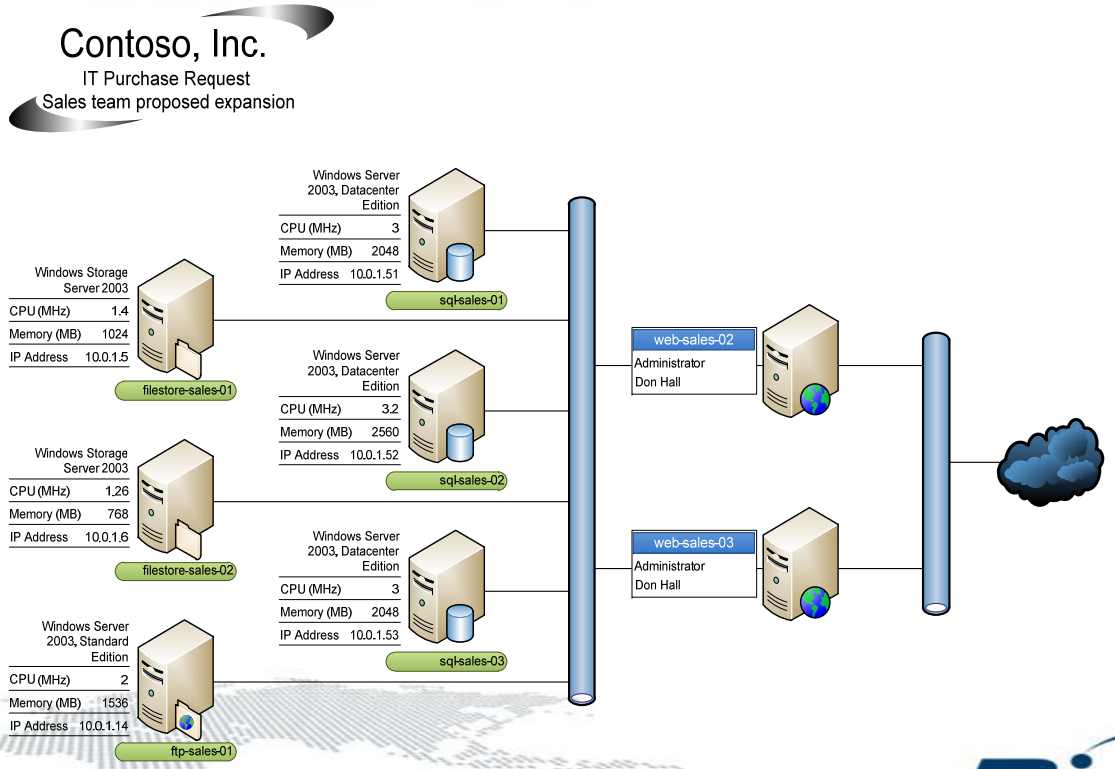
Is This A Good Diagram?



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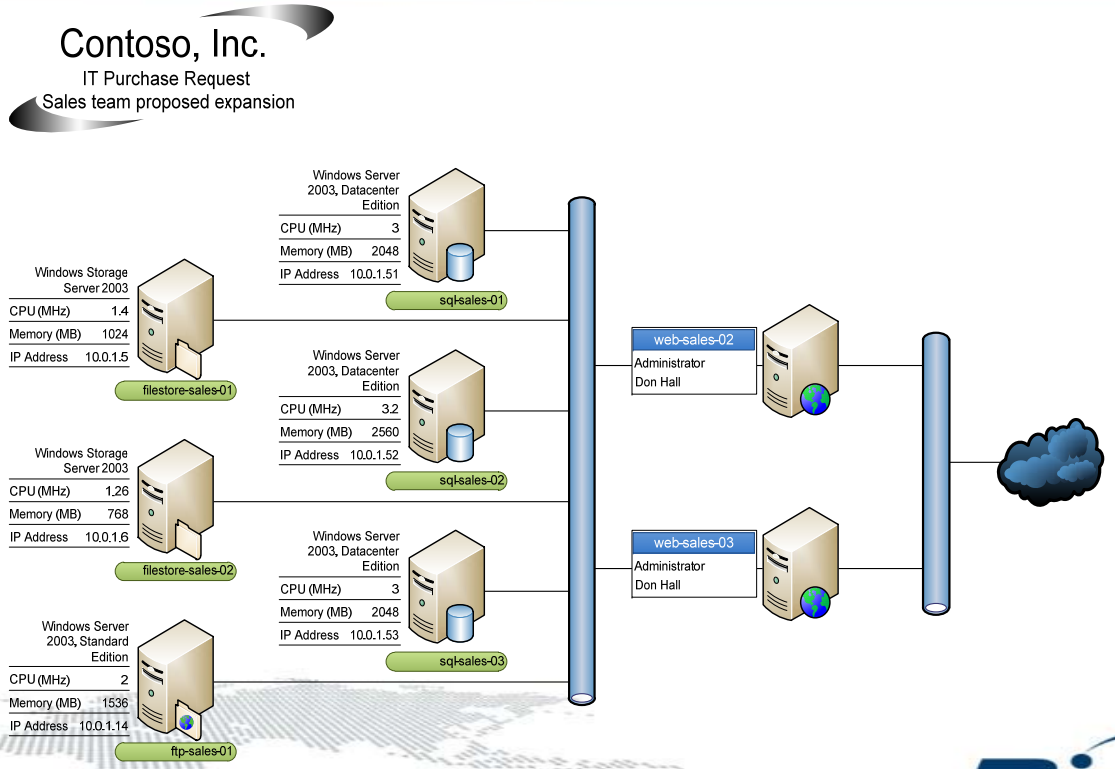
Does It Have These Characteristics?

1. Title
2. Purpose
3. Author
4. Version
5. Date
6. Instructions
7. Symbols
8. Attributes
9. Connections
10. Grouping
11. Background / layers



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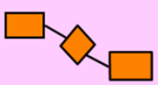
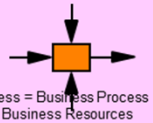
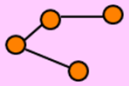
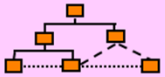
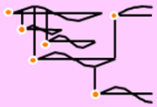
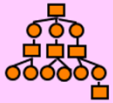
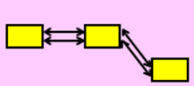
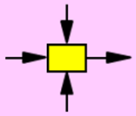
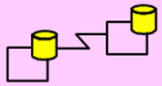
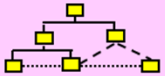
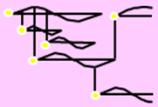
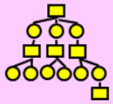
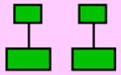
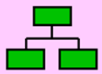
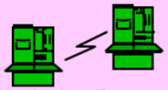
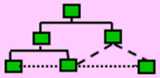
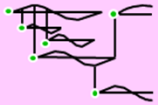
abstractions / perspectives	DATA *What*	FUNCTION *How*	NETWORK *Where*	PEOPLE *Who*	TIME *When*	MOTIVATION *Why*
SCOPE *Planner* contextual	List of Things - *Important to the Business*  Entity = Class of Business Thing	List of Processes - *the Business Performs*  Function = Class of Business Process	List of Locations - *in which the Business Operates*  Node = Major Business Location	List of Organizations - *Important to the Business*  People = Class of People and Major Organizations	List of Events - *Significant to the Business*  Time = Major Business Event	List of Business Goals and Strategies  Ends/Means=Major Business Goal/Critical Success Factor
ENTERPRISE MODEL *Owner* conceptual	e.g., Semantic Model  Entity = Business Entity Rel. = Business Relationship	e.g., Business Process Model  Process = Business Process I/O = Business Resources	e.g., Logistics Network  Node = Business Location Link = Business Linkage	e.g., Work Flow Model  People = Organization Unit Work = Work Product	e.g., Master Schedule  Time = Business Event Cycle = Business Cycle	e.g., Business Plan  End = Business Objective Means = Business Strategy
SYSTEM MODEL *Designer* logical	e.g., Logical Data Model  Entity = Data Entity Rel. = Data Relationship	e.g., Application Architecture  Process.= Application Function I/O = User Views	e.g., Distributed System Architecture  Node = IS Function Link = Line Characteristics	e.g., Human Interface Architecture  People = Role Work = Deliverable	e.g., Processing Structure  Time = System Event Cycle = Processing Cycle	e.g., Business Rule Model  End = Structural Assertion Means =Action Assertion
TECHNOLOGY CONSTRAINED MODEL *Builder* physical	e.g., Physical Data Model  Entity = Tables/Segments/etc. Rel. = Key/Pointer/etc.	e.g., System Design  Process= Computer Function I/O =Data Elements/Sets	e.g., Technical Architecture  Node = Hardware/System Software Link = Line Specifications	e.g., Presentation Architecture  People = User Work = Screen/Device Format	e.g., Control Structure  Time = Execute Cycle = Component Cycle	e.g., Rule Design  End = Condition Means = Action
DETAILED REPRESEN-TATIONS *Subcontractor* out-of-context	e.g. Data Definition  Entity = Field Rel. = Address	e.g. Program  Process= Language Statement I/O = Control Block	e.g. Network Architecture  Node = Addresses Link = Protocols	e.g. Security Architecture  People = Identity Work = Job	e.g. Timing Definition  Time = Interrupt Cycle = Machine Cycle	e.g. Rule Specification  End = Sub-condition Means = Step
FUNCTIONING ENTERPRISE	**DATA** Implementation	**FUNCTION** Implementation	**NETWORK** Implementation	**ORGANIZATION** Implementation	**SCHEDULE** Implementation	**STRATEGY** Implementation

John A. Zachman, Zachman International

Zachman Framework Example

Different views
for
Different people

Visio Examples

- Floor plans
- Importing CAD / other formats
- Layers
- Data center floor plans
- Backgrounds
- Hyperlinking

3. Linking Visio To Data Sources

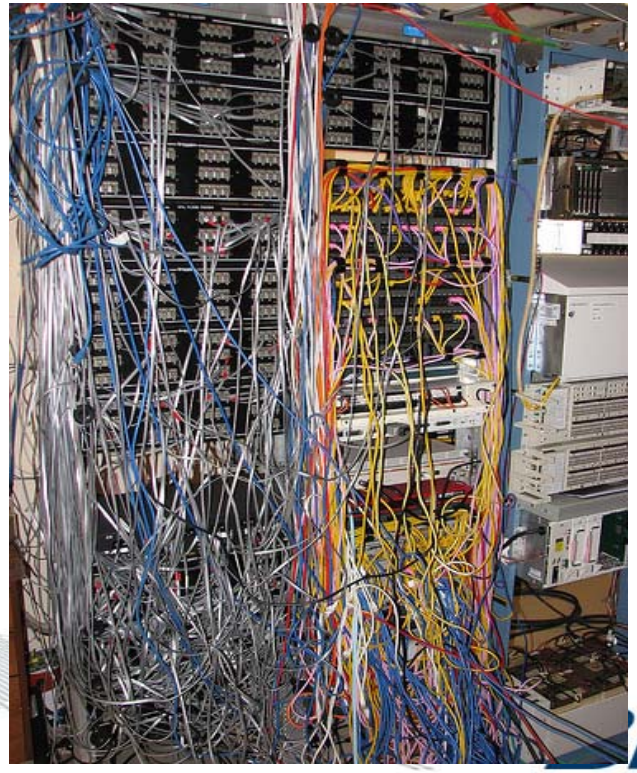
- Saves typing mistakes
- Enables refresh of data
- One diagram can serve multiple purposes
  - Less to maintain
- Multiple views of one device
  - Less to maintain
- Enables use Of Data Graphics Feature

Understanding Reality

To understand infrastructure and manage change

We need multiple views

- Rack schematics
- Equipment configuration
- Physical connectivity
- Logical end point connectivity
- End device connectivity



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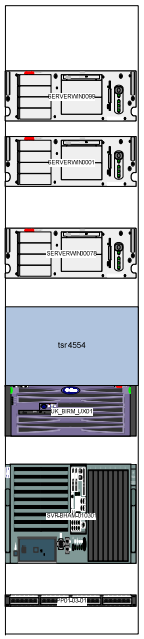
Types Of Information / Documentation

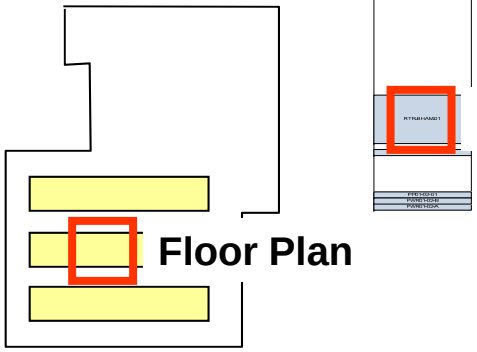
What should be updated with a server or network change?

1. Update project documentation with “as built” details
2. Update asset/inventory list
3. Update rack diagrams
4. Update network patching records
5. Update switch port usage and capacity
6. Update floor plan rack capacity
7. Update power usage spreadsheet(s)
8. Update storage / backup system documentation
9. Update systems architecture documentation
10. Update DR lists and documents
11. Update supplier maintenance records
12. Update billing and charging data

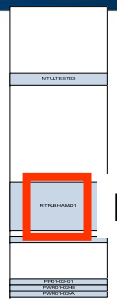


The larger the environment – the more there is….

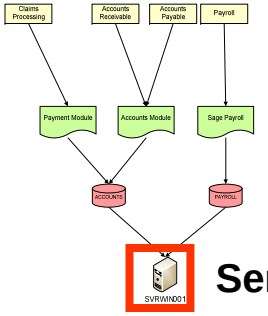
Multiple Device Instances in Diagrams



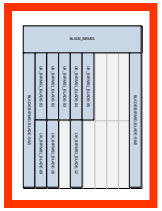
Floor Plan



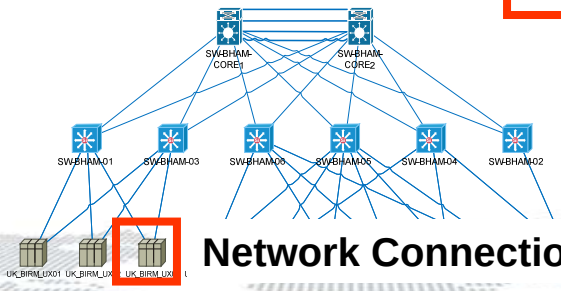
Rack Position



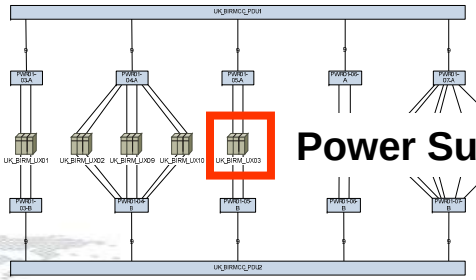
Service view



H/W Build



Network Connections



Power Supply

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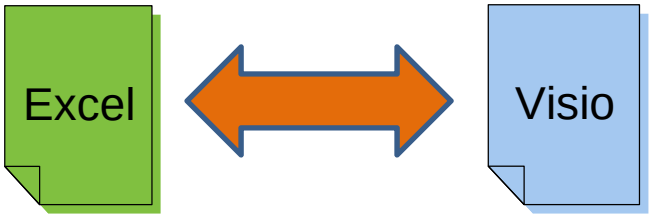
Reducing The Workload!



Floor box list	Floor plan
Cabinet list	Equipment room floor plan
Patch panel list	Backbone cabling diagram
Inventory	Network diagram
Inventory	Rack diagram
Inventory	Server connectivity diagram

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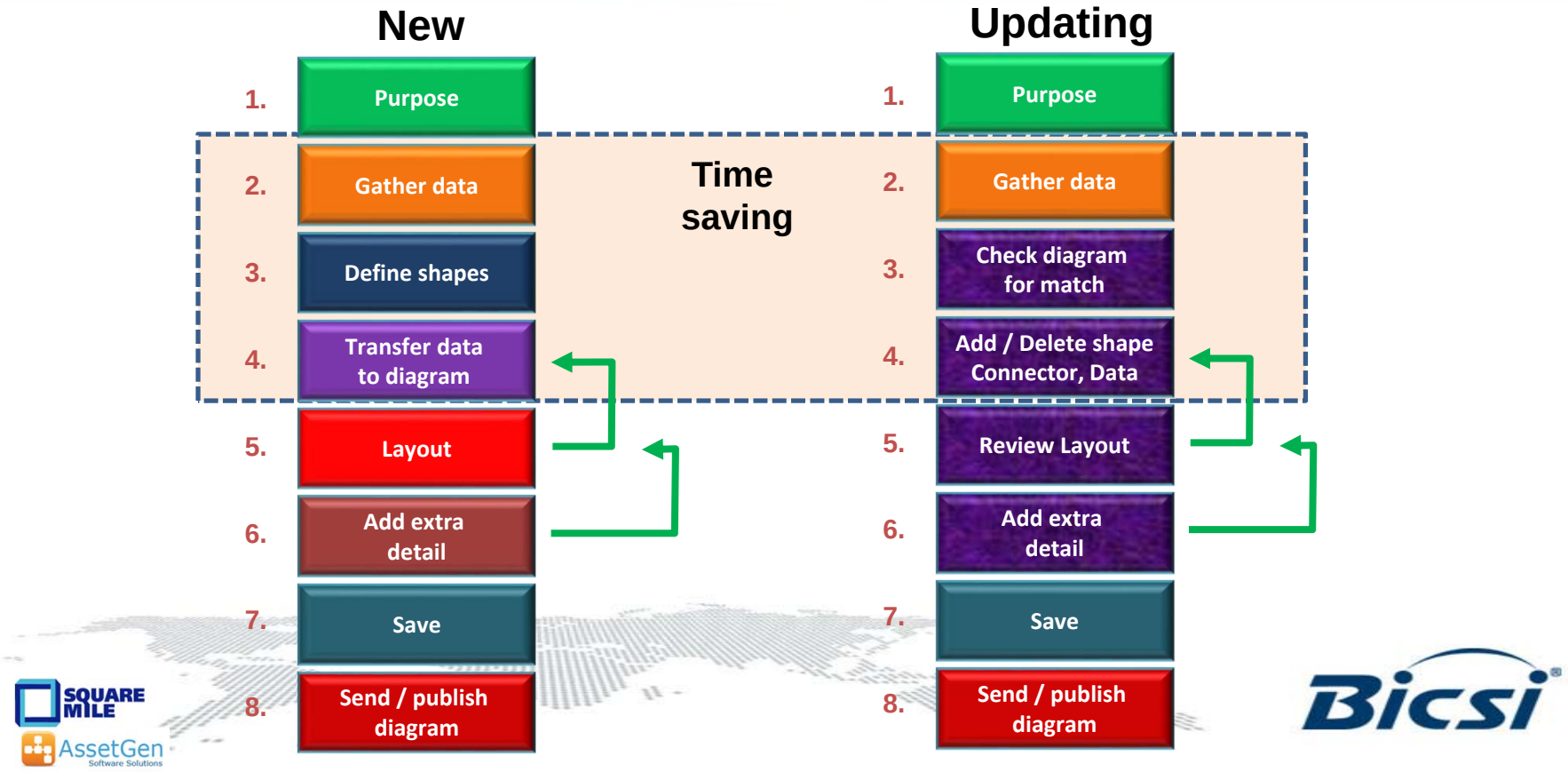
Using External Data Sources



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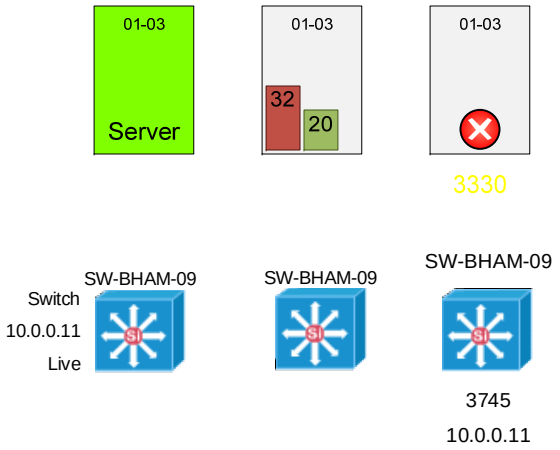
Visio Data Graphics

- Standard feature 2007/10/13/16 Professional

- Enables use of embedded data
  - Display multiple text fields around a shape
  - Data bars to show capacity
  - Use icons for status differences
  - Change shape colour based on data value



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Limitations Of Visio / Data Source

- Good for quick diagrams
- The data transfer and refresh is automated, but the filtering and selection is manual
- It doesn't connect shapes together
  - Limits value in a network environment
- New devices are not added to diagrams

First Steps For Multiple Diagrams

- Control use of shapes / stencils
- Follow best practices for diagram information
- Save reference versions in common areas
  - File locations
  - Web site
  - SharePoint
- Use a common source where possible for shape data
  - Databases preferred to spreadsheets
  - Create views to suit diagram information need

4. Automation For Larger Infrastructures

- Looking beyond a few spreadsheets
- Minimise manual maintenance effort
  - Scale and separation of roles demands it
- Improving accuracy and consistency
  - Software driven diagram production
- Infrastructure document management
  - Shared across teams, controlled access

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Automating Documentation - Example

- Manual method – draw a rack diagram 2 – 5 hours
  - Gather rack inventory data and positioning
  - Find Visio shapes for equipment
  - Draw the rack

- Automated method with software 10 seconds
  - Tick rack for cabinet drawing
  - Visio rack diagram produced

- 100 racks – 16 minutes or 25 days or $26 vs $20,000 ($100hr)
- 6500 racks???

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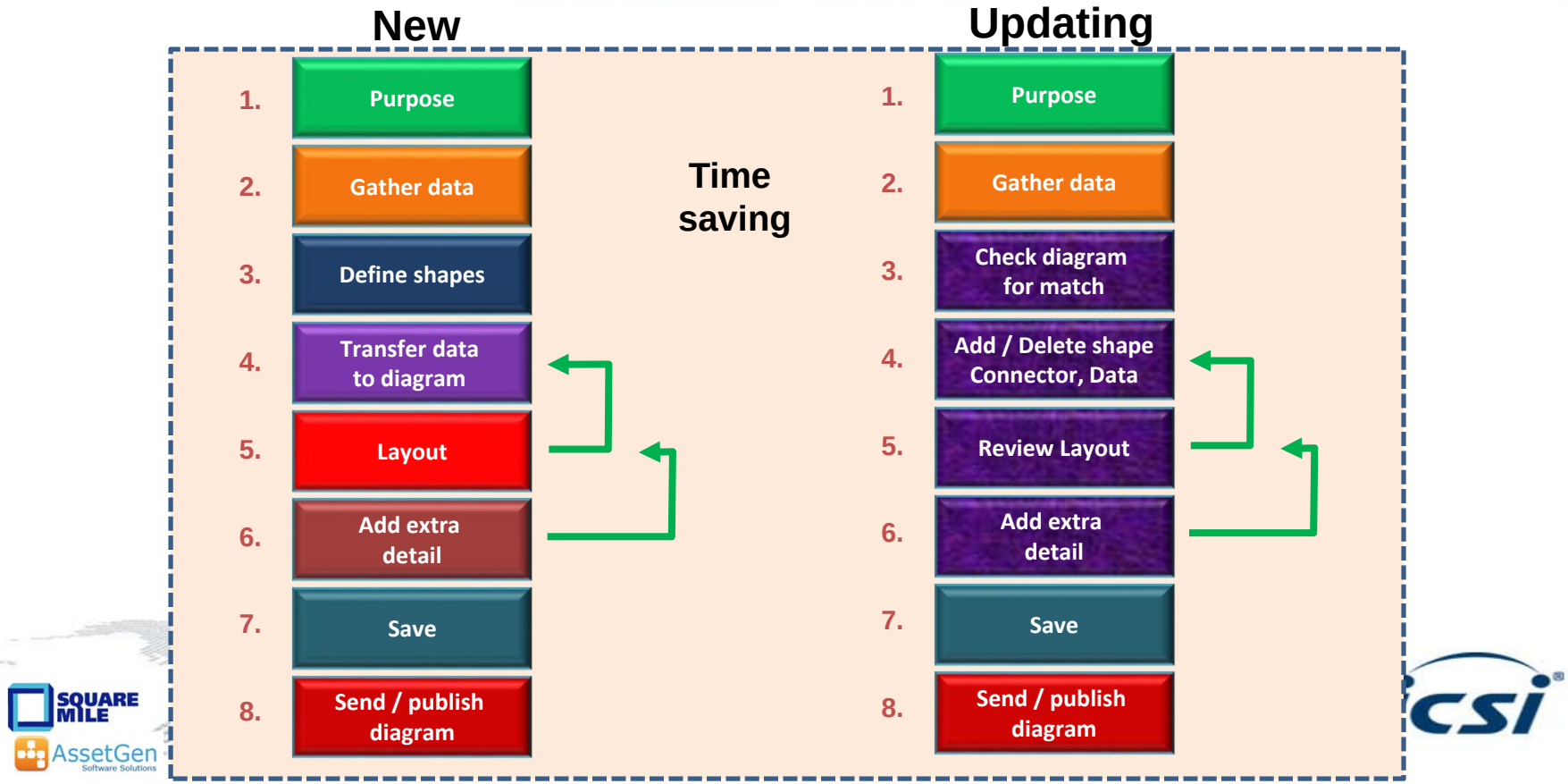
Automated Enterprise Drawing

- Should we draw and redraw diagrams in Visio or have a GUI that does this onto a database?
  - Yes for simple views (i.e. rack, path)
  - No for anything that requires layout or crosses technologies
    - Physical – floor plans, blown fiber, cabling runs, OSP
    - Logical – LAN/SAN/VLAN/WAN/VLAN system
- If we are refreshing data, then we have to update existing shapes, adding/removing shapes and connectors.
  - Beyond Excel/Visio data linking

Extending Visio Automation



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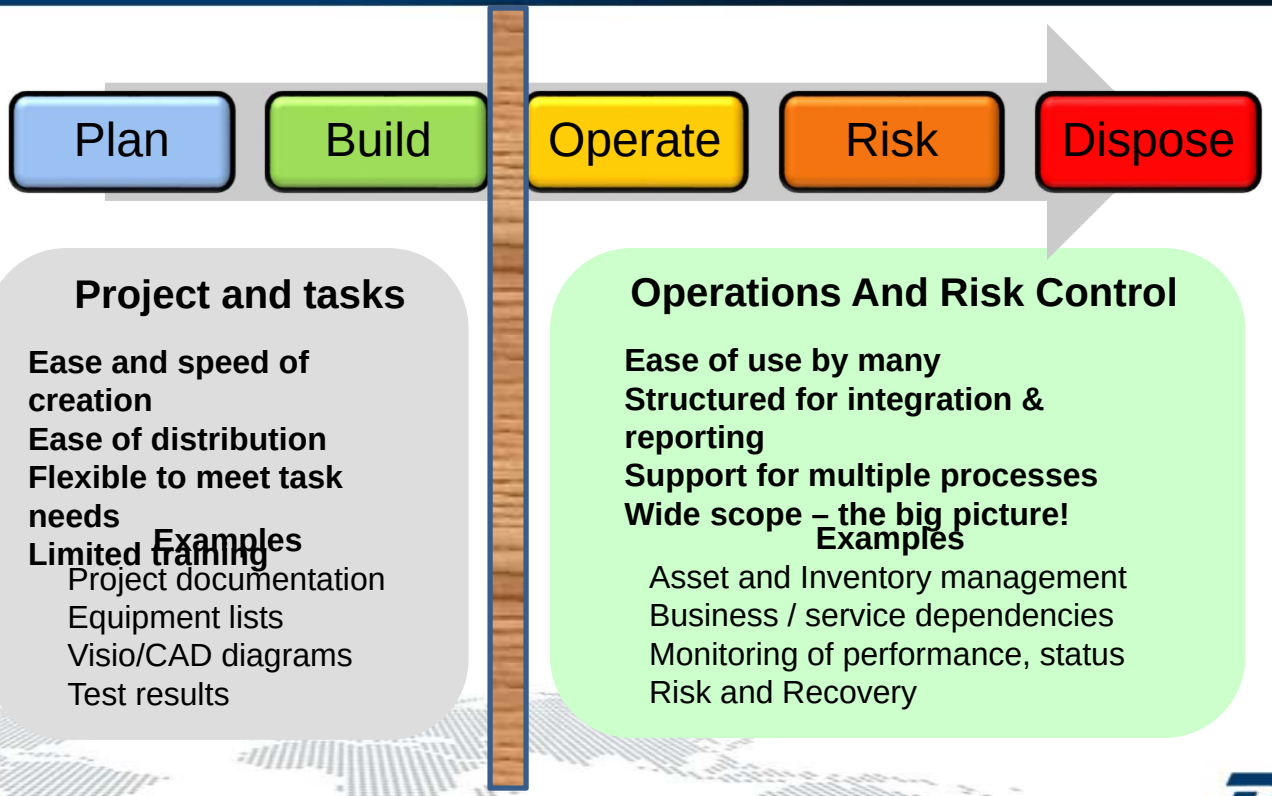
Simple Goals

- Draw 60 rack diagrams and save on a file server, in folders listed by room location
- Check and update 100 site network diagrams with changes in devices, connections and data
- Refresh an updated set of build documents covering racks, hardware, cabling, power within a data center transition project
- When – now, tonight, every Friday

Many Infrastructure Information Needs



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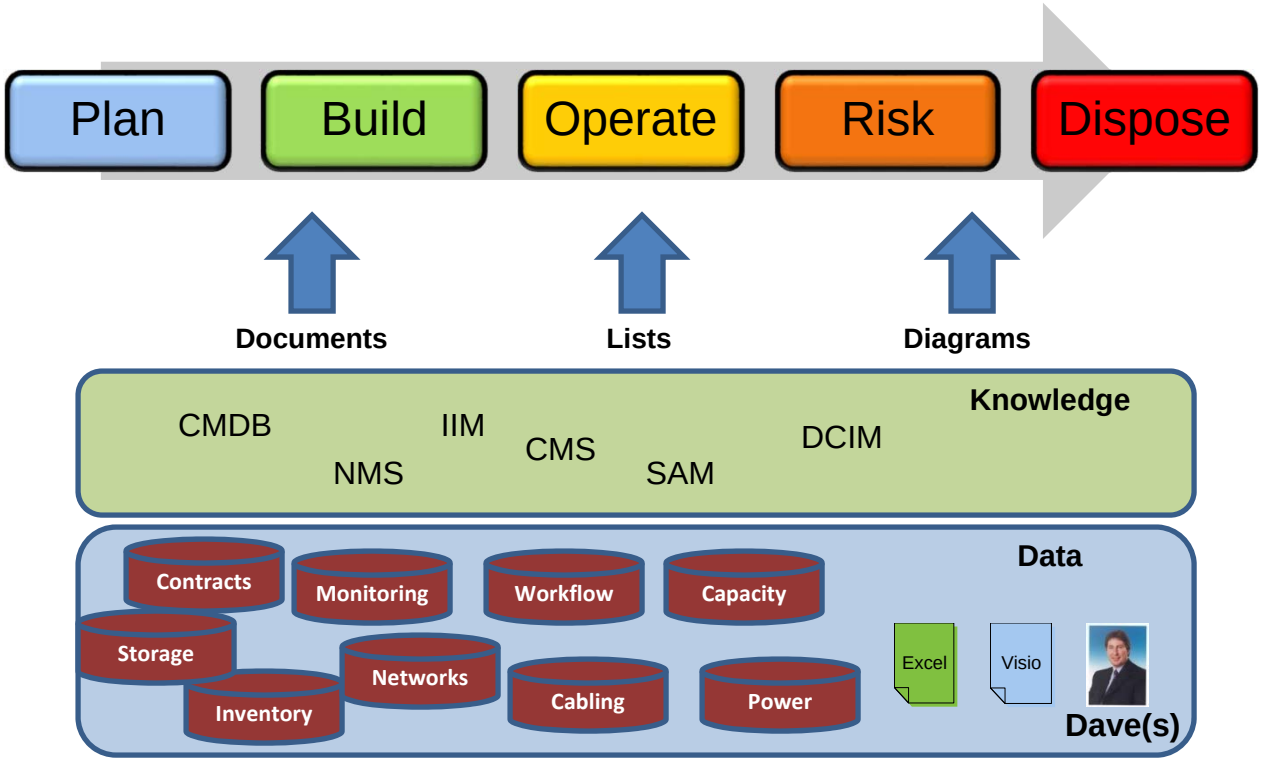
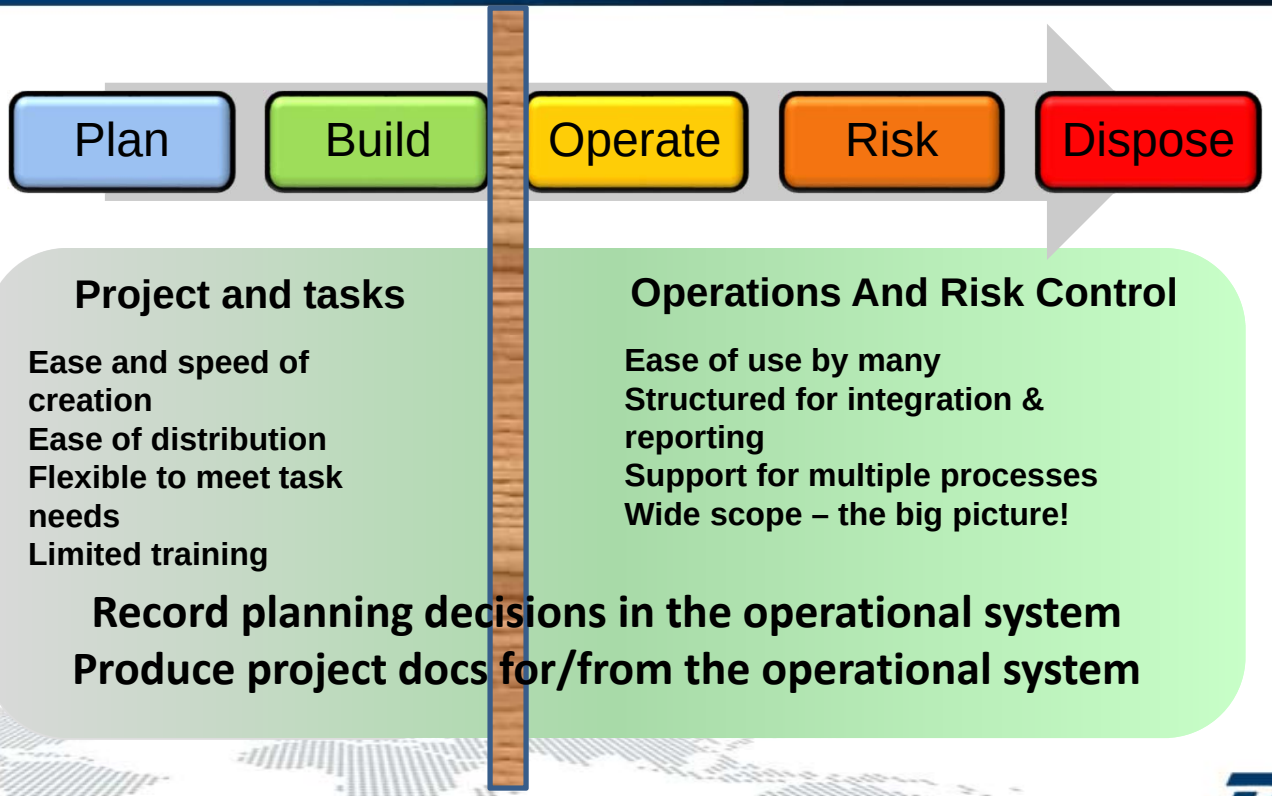
Leverage Data Sources



Maintain - Infrastructure Knowledge



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Infrastructure Documentation Workflow

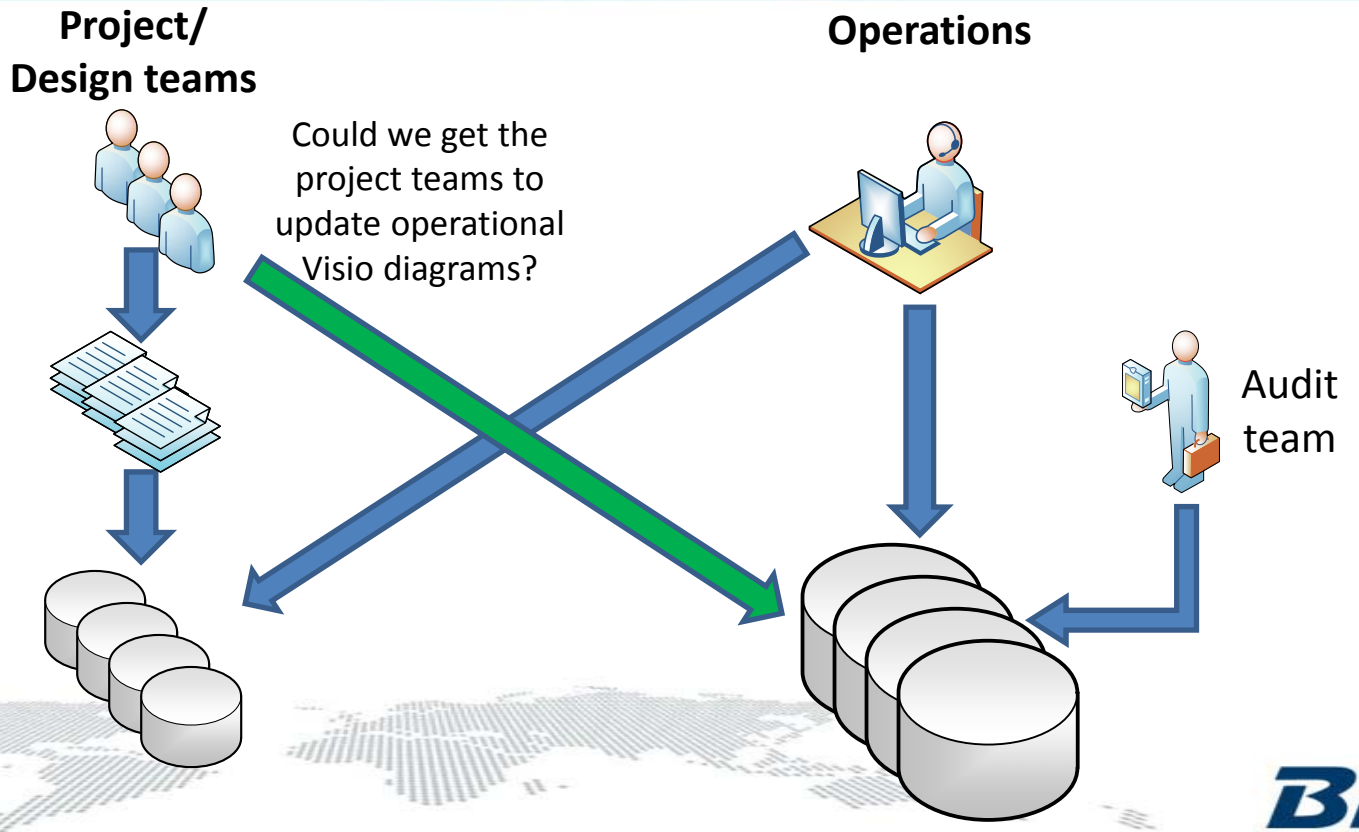

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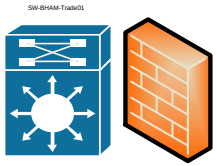
Diagram Automation Examples

1.	Purpose	Rack Diagram R01	Network Diagram Orlando LAN
2.	Gather data	Select Rack R01 Inventory	Switches / Router in Orlando
3.	Define shapes	Match to Physical Shapes	Match to Logical Shapes
4.	Transfer data to diagram	Create Shapes	Create Shapes and connections
5.	Layout	Place/size to position in rack	Move/size for readability
6.	Add extra detail	Notes, etc.	Notes, etc.
7.	Save	Save as Rack R01	Save as Orlando LAN
8.	Send / publish diagram	Store on server Intranet/SharePoint	Store on server Intranet/SharePoint



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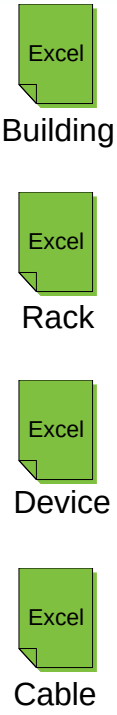
Simplify Infrastructure Data Capture

- Data capture focusses on delivering database load files
- Visualization is either created automatically, or by combining data with existing backdrops - floor plans
- No need to check across multiple diagrams / documents for consistency and format

A faster, less complex and less costly audit, which doesn't require high skill levels within the audit team as the software system creates the visualization



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Making Trusted Data A Reality

1. Establish policies, standards and ownership of data and diagrams.
   Make it simpler and easier for engineers and managers

2. Have project / operations use common terms & formats
   Supply templates, naming system, labels, etc.

3. Reduce the numbers of documents / files to maintain
   Consolidate into centralised systems and make them easy to find
   Link / create / update Visio diagrams, reports, excel from databases

4. Use operational systems to support planning processes

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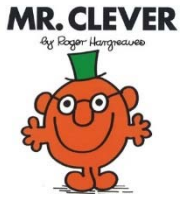
This Workshop Has Shown

- What can be <u>reduced</u> with Visio

workload - skills dependent

cost - $26 or $20,000

time - 16 minutes or 25 days



- How to improve diagram quality and accuracy

All of which you can do later today - yourself!!

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Visio Automation Tips and Techniques

- Lots of productivity features are unknown
  - Save yourself and others a lot of effort planning and managing infrastructure!
  - Learn more about Visio
- Linking to existing data sources has many benefits
  - Less errors, easier to refresh diagrams and update them
  - Use the data graphics feature to reduce diagram numbers
- For larger environments
  - Assess the value of database driven systems

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Additional Materials

www.microsoft.com

www.assetgen.com

Evaluation software

Webinars

Free “DCIM/CMS” evaluation version

Data center practices, Visio integration

www.squaremilesystems.com

Free SMS Visio utilities

Training/webinars/videos

Downloads and videos

Onsite/remote Visio training, documentation methods, etc.