Reducing Network Documentation Effort by Visio Automation

David Cuthbertson
Diagrams Are Very Useful!

How the customer explained it
How the project leader understood it
How the analyst designed it
How the programmer wrote it
What the beta testers received
How the business consultant described it
How the project was documented
What operations installed
How the customer was billed
How it was supported
What marketing advertised
What the customer really needed
But Not all Diagrams Help!

WHAT ARE THE GREEN, BLUE AND YELLOW THINGIES? SERVERS? APPLICATIONS? COMPONENTS?

RECTANGLES
If A Picture Paints a Thousand Words

How do we paint a thousand pictures? Easily?
Reducing Your Workload

- Architecture Overviews
- LAN/WAN/SAN Diagrams
- Inventory / Connection Lists
- Floor & Rack Diagrams

0% 20% 40% 60% 80% 100%

Automation
Current Method
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
A Few Questions

• Who has used Visio for more than 2 years?

• Which is easier and faster to complete?
  a. Drawing a Visio diagram at a planning stage
  b. Drawing a Visio diagram of an existing network

• Is it possible to get different engineers to draw the same Visio diagrams?
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 2007/10/13 Standard
  – Visio 2007/10/13 Professional
  – Visio 2010/13 Premium
  – Visio 2007/10/13 Viewer (runs in IE browser)
### Visio Version Comparison

<table>
<thead>
<tr>
<th>Feature</th>
<th>2007</th>
<th>2010</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>New and improved stencils and shapes</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Contextual right-click menus</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Improved search to make it easier to find templates and shapes</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Easy-to-apply themes to create modern diagrams quickly</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
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<tr>
<td>Organization chart solution improvements</td>
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<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Microsoft Office Fluent user interface (UI)—the Ribbon</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Improvements to containers and new container styles</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>New start experience to make it easier to find shapes</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Ability to change shape while preserving diagram layout and shape metadata</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Live preview of new pre-configured theme style changes through variations</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Shape effect options—shadow, bevel, glow, and others</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Streamlined print preview showing diagram page breaks and pan/zoom capability</td>
<td>🌟</td>
<td>🌟</td>
<td>🌟</td>
</tr>
<tr>
<td>Work together on a single diagram with your colleagues</td>
<td>2007</td>
<td>2010</td>
<td>2013</td>
</tr>
<tr>
<td>------------------------------------------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Commenting</td>
<td></td>
<td></td>
<td>☄</td>
</tr>
<tr>
<td>Easy diagram sharing through a web browser by saving to SharePoint¹</td>
<td></td>
<td>☄</td>
<td>☄</td>
</tr>
<tr>
<td>Commenting through Visio Services¹</td>
<td></td>
<td></td>
<td>☄</td>
</tr>
<tr>
<td>Co-authoring—two or more people working on a single diagram at the same time²</td>
<td></td>
<td>☄</td>
<td>☄</td>
</tr>
<tr>
<td>Use presence awareness and visibility to IM or call other people³</td>
<td></td>
<td></td>
<td>☄</td>
</tr>
</tbody>
</table>

1 — Requires Office 365 or SharePoint Server (licensed separately)
2 — Requires Microsoft SkyDrive, Office 365 or SharePoint Server (licensed separately)
3 — Requires Microsoft Lync 2013 or other compliant instant messaging (IM) client
## Data Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>2007</th>
<th>2010</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use a wizard to link diagrams to data without writing any code</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Link Diagram shapes to data</td>
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<td>☑</td>
</tr>
<tr>
<td>Ability to refresh data automatically, either on a defined schedule or manually</td>
<td></td>
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</tr>
<tr>
<td>Automatic data legend creation, providing a key for applied data graphics</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>No-code dashboards</td>
<td></td>
<td></td>
<td>☑</td>
</tr>
<tr>
<td>Expanded set of data sources, including Excel, Excel Services, SharePointLists, SharePoint Business Connectivity Services, and SQL Server</td>
<td></td>
<td>☑</td>
<td></td>
</tr>
<tr>
<td>Ability to apply a rich set of data graphics and colors to visualize data</td>
<td></td>
<td></td>
<td>☑</td>
</tr>
<tr>
<td>Ability to save to SharePoint and view diagrams in Visio Services with data refresh</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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
• 3rd Party stencils
  – netZoom, others
  www.altimatech.com
• Visioguy
  www.visguy.com
Templates, Stencils, Shapes

Categories
- Business
- Engineering
- Flowchart
- General
- Maps and Floor Plans
- Network
- Schedule
- Software and Database

Templates
- Active Directory
- Basic Network Diagram
- Detailed Network Diagram
- LDAP Directory
- Rack Diagram

Stencils
- Shape

Logos: SOURC EMILE, AssetGen, Bicsi
Visio Concepts and terms

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

Properties
Cisco 2950
10.6.2.32
Live

Data Centre
Comms Room
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
• 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
Using External /3rd Party Stencils

• There are lots to choose from

• Free
  – www.visiocafe.com many suppliers sets
  – Manufacturers Cisco, etc.
  – 3rd Party custom sets

• Purchase
  – NetZoom
  – Other products with embedded stencils / graphics
**Danger! - Visio File Sizes**

Two files

<table>
<thead>
<tr>
<th>Diagram</th>
<th>Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diagram 1</td>
<td>1995kB</td>
</tr>
<tr>
<td>Diagram 2</td>
<td>12kB</td>
</tr>
</tbody>
</table>

Diagram 1 is 166 times the size of Diagram 2!

Some tips to reduce file sizes
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. Define shapes
2. Gather data
3. Transfer data to diagram
4. Layout
5. Add extra detail
6. Save
7. Send / publish diagram

1. Which takes the most time?  
2. Where can errors creep in?
Diagram Process Examples

1. Purpose

2. Gather data

3. Define shapes

4. Transfer data to diagram

5. Layout

6. Add extra detail

7. Save

8. Send / publish diagram

Rack Diagram R01

Select Rack R01 Inventory

Match to Physical Shapes

Create Shapes

Place / size to position in rack

Notes, etc.

Save as Rack R01

Store on server Intranet / SharePoint

Network Diagram Orlando LAN

Switches / Router in Orlando

Match to Logical Shapes

Create Shapes and connections

Move / size for readability

Notes, etc.

Save as Orlando LAN

Store on server Intranet / SharePoint

CISCO SYSTEMS, INC.

INPUT 1

INPUT 2

100 - 240V ~
16A
60 / 50 Hz

INSTALL

RUN

12119 107 85 63 41 2 ...

4.8. Port

10/100/1000 GE MOD

FABRIC ENABLED

RJ45
Contoso, Inc.
IT Purchase Request
Sales team proposed expansion

Is This A Good Diagram?

Windows Server 2003, Datacenter Edition
CPU (MHz) 1.4
Memory (MB) 1024
IP Address 10.0.1.5
filestore-sales-01

Windows Storage Server 2003
CPU (MHz) 1.26
Memory (MB) 768
IP Address 10.0.1.6
filestore-sales-02

Windows Server 2003, Standard Edition
CPU (MHz) 2
Memory (MB) 1536
IP Address 10.0.1.14
ftp-sales-01

Windows Server 2003, Datacenter Edition
CPU (MHz) 3
Memory (MB) 2048
IP Address 10.0.1.51
sql-sales-01

Windows Server 2003, Datacenter Edition
CPU (MHz) 3.2
Memory (MB) 2560
IP Address 10.0.1.52
sql-sales-02

Windows Server 2003, Datacenter Edition
CPU (MHz) 3
Memory (MB) 2048
IP Address 10.0.1.53
sql-sales-03

web-sales-02
Administrator
Don Hall

web-sales-03
Administrator
Don Hall
Contoso, Inc.
IT Purchase Request
Sales team proposed expansion

IP Address 10.0.1.5
Memory (MB) 1024
CPU (MHz) ...

Windows Server 2003, Datacenter Edition
CPU (MHz) 3
Memory (MB) 2048
IP Address 10.0.1.51

Windows Server 2003, Datacenter Edition
CPU (MHz) 3
Memory (MB) 2560
IP Address 10.0.1.52

Windows Server 2003, Standard Edition
CPU (MHz) 2
Memory (MB) 1536
IP Address 10.0.1.14

Administrator
Don Hall
web-sales-02

Administrator
Don Hall
web-sales-03

Administrator
Don Hall
web-sales-04

sql-sales-01

sql-sales-02

sql-sales-03

ftp-sales-01

filestore-sales-01

filestore-sales-02

filestore-sales-03

Bicsi®

Software Solutions
### Enterprise Architecture – Zackman Framework

<table>
<thead>
<tr>
<th>Perspectives</th>
<th>Abstractions</th>
<th>DATA</th>
<th>FUNCTION</th>
<th>NETWORK</th>
<th>PEOPLE</th>
<th>TIME</th>
<th>MOTIVATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCOPE</td>
<td>Planner</td>
<td>List of Things - Important to the Business</td>
<td>List of Processes - the Business Performs</td>
<td>List of Locations - in which the Business Operates</td>
<td>List of Organizations - Important to the Business</td>
<td>List of Events - Significant to the Business</td>
<td>List of Business Goals and Strategies</td>
</tr>
<tr>
<td></td>
<td></td>
<td>List of Processes</td>
<td>Function = Class of Business Process</td>
<td>List of Locations</td>
<td>Node = Major Business Location</td>
<td>People = Class of People and Major Organizations</td>
<td>Time = Major Business Event</td>
</tr>
<tr>
<td>MODEL</td>
<td>Designer</td>
<td>List of Data Entity</td>
<td>Function = Class of Business Process</td>
<td>Process = Business Process</td>
<td>People = Role</td>
<td>End = Structural Assertion</td>
<td></td>
</tr>
<tr>
<td>SYSTEM</td>
<td></td>
<td>Entity = Data Entity</td>
<td>Process = Application Function</td>
<td>Process = Application Function</td>
<td>People = User</td>
<td>End = Action Assertion</td>
<td></td>
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<tr>
<td>MODEL</td>
<td></td>
<td>Rel. = Data Relationship</td>
<td>I/O = Business Resources</td>
<td>I/O = User Views</td>
<td>Work = Deliverable</td>
<td>Mean = Action</td>
<td></td>
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<tr>
<td>TECHNOLOGY</td>
<td>Builder</td>
<td>Logical Data Model</td>
<td>Distributed System Architecture</td>
<td>e.g., Logical Data Model</td>
<td>e.g., Human Interface Architecture</td>
<td>e.g., Presentation Architecture</td>
<td>e.g., Rule Design</td>
</tr>
<tr>
<td>CONstrained</td>
<td></td>
<td>Entity = Data Entity</td>
<td>Node = IS Function</td>
<td>People = User</td>
<td>Time = Execute Cycle = Component Cycle</td>
<td>End = Condition</td>
<td></td>
</tr>
<tr>
<td>DETAILED</td>
<td>Subcontractor</td>
<td>Physical Data Model</td>
<td>Technical Architecture</td>
<td>e.g., Physical Data Model</td>
<td>e.g., Security Architecture</td>
<td>e.g., Timing Definition</td>
<td></td>
</tr>
<tr>
<td>Representations</td>
<td>out-of-context</td>
<td>Entity = Tables/Segmement/etc.</td>
<td>Network Architecture</td>
<td>e.g., Physical Data Model</td>
<td>e.g., Presentation Architecture</td>
<td>e.g., Rule Specification</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rel. = Key/Pointer/etc.</td>
<td>e.g., Program</td>
<td>e.g., System Design</td>
<td>Time = Interrupt Cycle = Machine Cycle</td>
<td>End = Sub-condition</td>
<td></td>
</tr>
<tr>
<td>FUNCTIONING</td>
<td>ENTERPRISE</td>
<td>Data Definition</td>
<td>e.g. Data Definition</td>
<td>e.g. Program</td>
<td>e.g. Network Architecture</td>
<td>e.g. Security Architecture</td>
<td>e.g. Rule Specification</td>
</tr>
<tr>
<td>DETAILED</td>
<td>REPRESENTATIONS</td>
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<td></td>
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</tr>
</tbody>
</table>
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
Multiple Device Instances in Diagrams

- Rack Position
- Network Connections
- Floor Plan
- H/W Build
- Service view
- Power Supply
Reduce The Workload!

- Excel
- Floor box list
- Cabinet list
- Patch panel list
- Inventory
- Inventory
- Inventory

- Visio
- Floor plan
- Equipment room floor plan
- Backbone cabling diagram
- Network diagram
- Rack diagram
- Server connectivity diagram
Using External Data Sources

New

1. Purpose
2. Gather data
3. Define shapes
4. Transfer data to diagram
5. Layout
6. Add extra detail
7. Save
8. Send / publish diagram

Updating

1. Purpose
2. Gather data
3. Check diagram for match
4. Add / Delete shape Connector, Data
5. Review Layout
6. Add extra detail
7. Save
8. Send / publish diagram

Time saving
Visio Data Graphics

• Standard feature 2007/10/13 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
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
Extending Visio Automation

**New**
1. Purpose
2. Gather data
3. Define shapes
4. Transfer data to diagram
5. Layout
6. Add extra detail
7. Save
8. Send / publish diagram

**Updating**
1. Purpose
2. Gather data
3. Check diagram for match
4. Add / Delete shape Connector, Data
5. Review Layout
6. Add extra detail
7. Save
8. Send / publish diagram

Time saving
Simple Goals

• Draw 60 rack diagrams and save on a file server 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

Project and tasks
- Ease and speed of creation
- Ease of distribution
- Flexible to meet task needs
- Limited training

Examples
- Project documentation
- Equipment lists
- Visio/CAD diagrams
- Test results

Operations And Risk Control
- Ease of use by many
- Structured for integration & reporting
- Support for multiple processes
- Wide scope – the big picture!

Examples
- Asset and Inventory management
- Business / service dependencies
- Monitoring of performance, status
- Risk and Recovery
Leverage Data Sources

Plan | Build | Operate | Risk | Dispose

Documents | Lists | Diagrams

Knowledge:
- CMDB
- IIM
- NMS
- CMS
- SAM
- DCIM

Data:
- Contracts
- Monitoring
- Workflow
- Capacity
- Storage
- Networks
- Cabling
- Power

Dave(s)

Tools:
- Excel
- Visio
Maintain - Infrastructure Knowledge

**Plan**  **Build**  **Operate**  **Risk**  **Dispose**

**Project and tasks**
- Ease and speed of creation
- Ease of distribution
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**Operations And Risk Control**
- Ease of use by many
- Structured for integration & reporting
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- Wide scope – the big picture!

**Record planning decisions in the operational system**
**Produce project docs for/from the operational system**
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
Simplify Infrastructure Data Capture

• Data capture focuses 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
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. Update operational systems as part of planning processes
Review From The Start

- Architecture Overviews
- LAN/WAN/SAN Diagrams
- Inventory / Connection Lists
- Floor & Rack Diagrams

<table>
<thead>
<tr>
<th>Automation</th>
<th>Current Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>20%</td>
<td>80%</td>
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<tr>
<td>40%</td>
<td>60%</td>
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<td>60%</td>
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<td>80%</td>
<td>20%</td>
</tr>
<tr>
<td>100%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Visio Automation Tips and Techniques

• Lots of productivity features are unknown
  – Save yourself and others a lot of effort!
  – 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
www.microsoft.com
http://blogs.office.com/b/visio/
https://www.facebook.com/MicrosoftVisio

www.squaremilesystems.com
Free SMS Visio utilities
Downloads and videos
Webinars/videos
Visio automation, documenting cabling, etc.

www.assetgen.com
Evaluation software
Free “DCIM/CMS” evaluation version
Webinars
Data center practices, Visio integration