OBTAIN® - A Case Study

KNOWLEDGE FLOW CORP.

OBTAIN - A Case Study

Many of the largest data centers are using OBTAIN to produce consistent, high quality documentation of their data path and power connectivity. OBTAIN can usually be justified simply from the benefits which accrue from the quality of the reports and diagrams and the efficiency of maintaining the data when compared to other methods such as TSO, spreadsheets and drawing packages. Users, however, are reaping extra rewards from using OBTAIN. It is the purpose of this document to highlight an example of what one customer has achieved and the process that they followed.

The main data center contains 120,000+ square feet of raised floor. There are two smaller satellite data centers in other cities. The company is very active in pursuing outsourcing contracts from other companies in its industry, and is growing quickly with a constant stream of equipment changes. Due to the high security surrounding the data center in this case study, we have not at the time of writing, received permission to use the company name, or to otherwise identify the data center location.

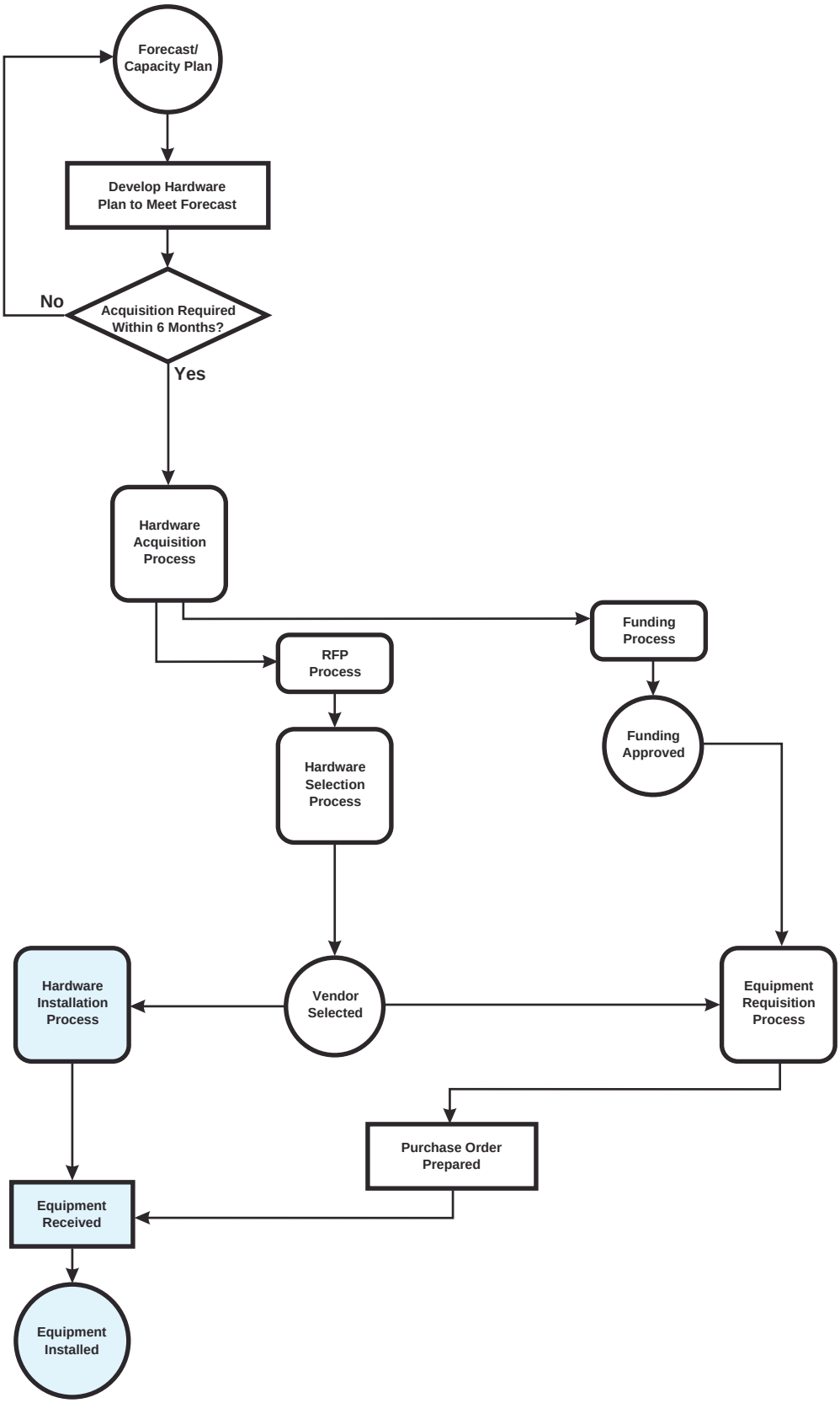
Shrinking Change Window

The company has experienced increased difficulty in planning and implementing change activity as it grows and as the change window shrinks. An effort was undertaken to use OBTAIN in a redesigned change process. The new process yielded significant benefits, which could be applicable to your data center.

The original resource planning process is shown in ***Figure A***.

DataCenter Resource Planning - Original Process Flow

Figure A



The process begins with a capacity planner identifying a need for a hardware acquisition. The bottleneck of the process occurs in the section highlighted in blue. Almost all of the hardware installation planning was deferred until after the exact vendor and model of equipment was selected. The rational for this was: "Until we know for sure what is being installed, we don't know:"

- how many interfaces will there be?
- are they Escon or Bus & Tag?
- how many patch ports are required?
- what are the power, cooling, space requirements?

You Want it When?

The hardware planners are supposed to receive 40 days after equipment selection to plan and install the device(s). Unfortunately, the managers involved in the hardware selection and funding process rarely gave this amount of notice, for several good reasons:

1. Vendors are very good at reading how important an equipment acquisition is to the purchaser and what the final deadline really is. They will hold off from giving their best bid until as late as possible. Often a purchaser has to play the vendors against each other before the last few percentages of benefit can be achieved. This game can yield *large dollar returns* for companies that play it well, but it often leads to significant scheduling and planning problems for the hardware team.

2. The funding process, by its very nature, tries to defer funding as long as possible. Interest on money not spent in and of itself can add up to significant savings, but sometimes the *cash is simply not available* exactly when the equipment is required. A two or three week deferral can sometimes provide different financing options with savings from better terms.

Changing the RFP and Funding Process is Not an Option

Redesign of resource planning started with the assumption that changing the hardware selection or the funding process was not an option. The hardware planning and installation departments did not have the power to enforce lead time guarantees. They could recommend appropriate lead times, but it usually came down to "You want it by WHEN?" Also, it was in the best interest of the company to be as flexible and responsive as possible, so as to gain the best advantage during the RFP and funding.

The resource planning change revolved around a simple premise: *identify all activity that can be planned and/or performed before the exact equipment model is known*.

Consistent and Complete Hand-off

Analysis of this activity lead to the discovery that capacity planning did not have a consistent, or even a complete way, of communicating the nature of the change to the hardware planners. Information was passed in a long series of inefficient meetings, attended by large numbers of people who were responsible for learning what the change was all about, and how it impacted their area of expertise and responsibility. They were largely left on their own to develop a detailed change plan. Issues such as addressing and pathing were subject to constant revision during the hardware acquisition. Consequently, people tended to defer their planning until the last moment for fear of wasting time developing a plan, only to have it invalidated.

Start with the Capacity Planners

The redesigned planning process started with the capacity planners. OBTAIN was originally purchased as a tool to replace the manually drawn diagrams made by the hardware planners. It was discovered that the multi-user and multi-state capabilities of OBTAIN could be used for much more. To explain this best, it is necessary to elaborate on the unique features of OBTAIN, why and how they are different than other databases, and how they can be used to great advantage in data center resource planning.

It is simple to say that OBTAIN is a multi-state database, but it is much less apparent what this means and how it can be used! Common database technology uses concurrent transactions from multiple users to change the data. Even though there is concurrent activity, the database only has one state at any one moment in time. If you need to undo a transaction, all transactions after it, and before the time of the undo, must also be undone to preserve the integrity of the data. It is like going back to a checkpoint or moment in time and restoring the database to its state at that moment.

Changes Happen Asynchronously

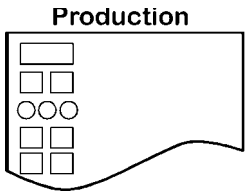
OBTAIN's workorder feature turns it into a multi-state database which is like having several separate, yet completely integrated, databases acting as one. This is a good fit with how work in a real data center is planned and performed. In reality, things happen asynchronously. Several changes are being planned, altered and performed at the same time. Some of them are implemented on schedule. Others are delayed. Some are abandoned or backed out of. Workers need to constantly adjust their plans based on changes made or planned by other people. They do this by attending endless meetings, constantly checking for changes which may impact them and adjusting their plans and schedules accordingly.

Effectively, each worker maintains their own "database" of objects, actions and relationships which pertain to their responsibilities. This "database" consists of internal knowledge supplemented by hand drawings, notes, partial offloads of configuration data to spreadsheets, MS Access, Aperture drawing files, etc. Each worker is responsible for maintaining their "database", communicating changes they make or plan to make in the real world, and integrating their changes with those happening asynchronously from other sources.

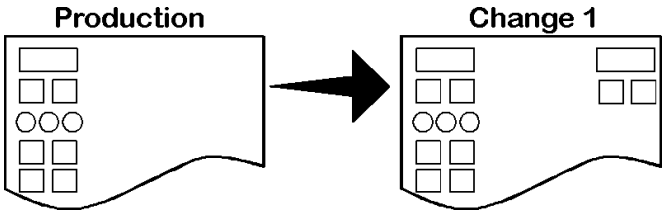
Why Can't We Have a Central Database?

There has often been a cry for a central repository that could be used by all data center workers. The problem with implementing this repository is that when there are more than two or three asynchronous changes, it becomes difficult, and at some point impossible, to maintain a single state database. The problem is nonlinear in that it grows geometrically as the number of users of the repository increases. Let's use a drawing based "database" as an example.

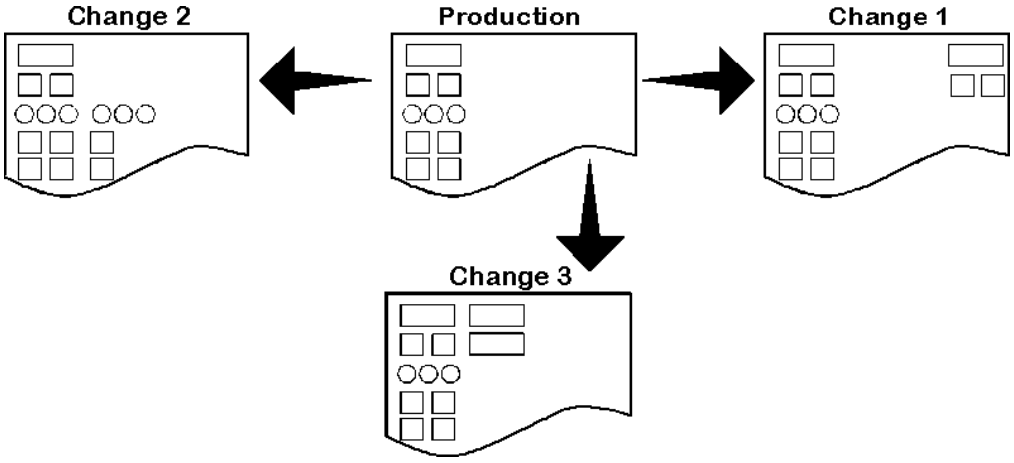
Assume that there is a production drawing, which reflects the current state of the data center at this moment.



Change process 1 starts. It involves a change to a subset of the whole data center and is only in the planning stages so a copy of the production drawing is made for planning purposes.



Asynchronous to change 1, a second and third change enter the planning stages. They too require the production data as a starting point.



Separate copies of the production drawing could be made for each asynchronous change, but consider the issues that would arise:

- which of the three changes will be implemented first?
- if changed drawing #2 is implemented, how are it's changes inserted into drawings 1 and 3?
- what happens if all three change drawings are kept in sync with each other's changes and then one of the changes is abandoned?
- what happens if change 1 becomes 1a, 1b and 1c and planning for 1c must be done even before 1a is implemented?
- if all three drawings are not kept in sync at all times but only rolled together into a production drawing via some manual process when they are implemented, how are resources used in each change reserved, so that double allocation cannot happen?

Life is complicated, especially in a large data center. And it is getting increasing complicated with more equipment, more types of equipment, more changes, shorter change windows, more people involved, and yes, more x#&@! meetings to keep things sorted.

We Need a Better Hand-off

So let's see how our case study used OBTAIN to redesign their change process. Starting with the capacity planners, they said "We need a better hand-off from your efforts to the rest of the resource planning process." It needs to be more consistent, and it needs to solidify as many aspects of the change as early as possible, so that other aspects can be added as they become known.

It was determined that in most cases the capacity planners knew a lot about the logical connectivity changes that would be part of an overall hardware change, even before it was known how the connectivity would be physically implemented. As an example,

DataCenter Resource Planning - Redesigned Process Flow

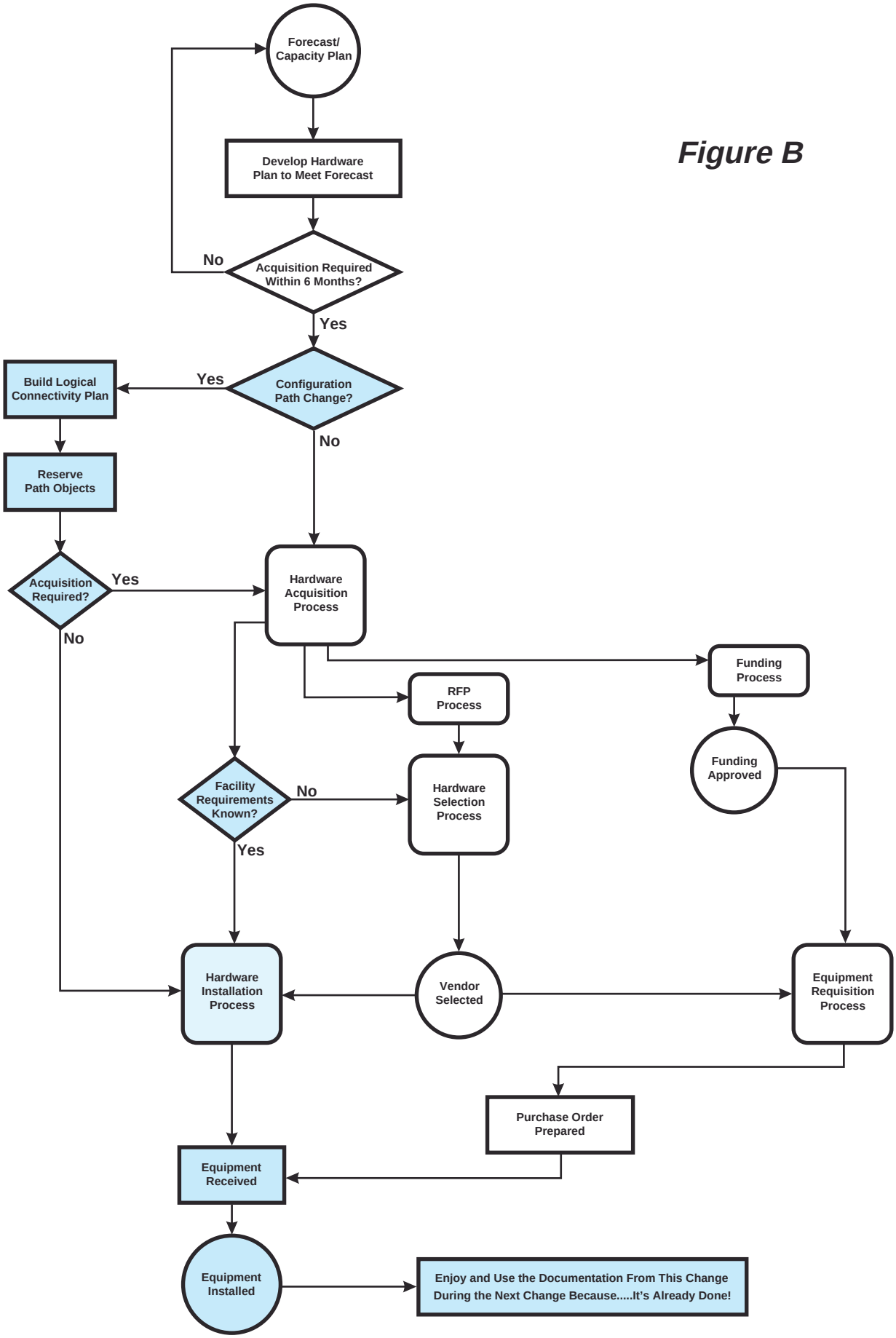


Figure B

analysis indicated that 200G of new storage would be required to meet growth. Whether the storage was taken from an existing device or would reside on a new device of an unknown model, the planners were aware of which programs would use the storage, which host images they ran in, and what type of pathing was required from the images to the storage to meet availability or performance commitments. Issues such as how many new ESCON director ports would be required, could also be determined.

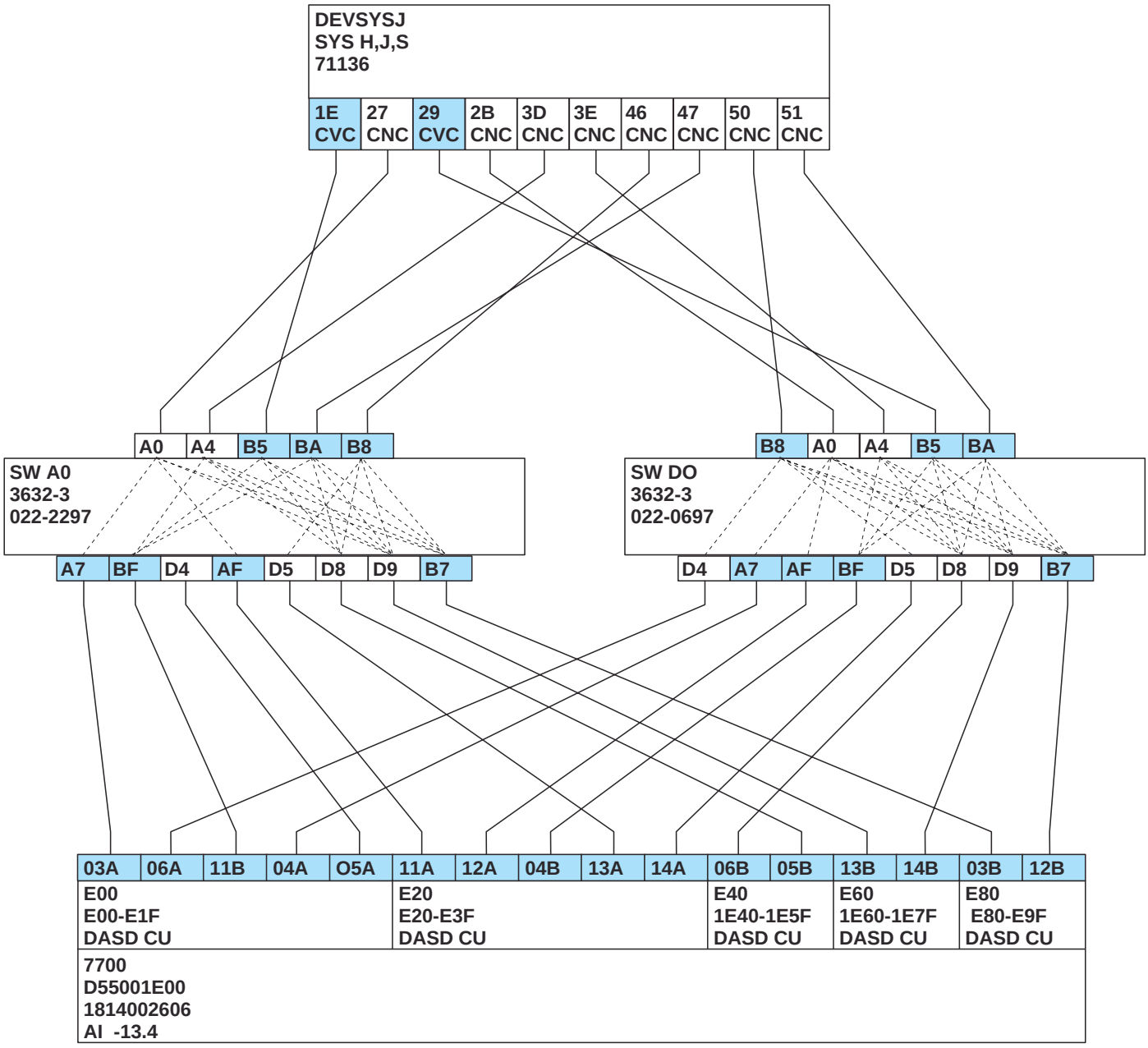
The resource planning process flow was redesigned as shown in ***Figure B***.

As soon as a capacity planner determines that a new acquisition is required within 6 months, analysis of the pathing requirements is performed and a logical connectivity plan is made. This plan is made in an OBTAIN workorder, which is a child of the production database. It automatically inherits all changes to the production data during the life of the workorder. When purely logical resources are “converted” into physical items as the plan progresses, the physical resources are locked or reserved for use by this ongoing change. Other parallel or asynchronous workorders cannot use the allocated cables, interfaces, CHPIDs, etc. Completely new resources such as new devices or ports added in this workorder, are not even seen when the configuration database is viewed from production or another workorder (unless the second workorder is made dependent on this workorder).

OBTAIN generates logical path diagrams which look like this:

Control Unit Diagram

Figure C



The highlighted CHPIDs, director ports or interfaces on the 5500 device could be real allocations of objects, or they could be purely logical objects which are allocated physically at a later time. Regardless, the planners would have a clear idea of how many new director ports or CHPIDs might be required, and if they are not currently available they could be ordered as part of the same hardware requisition that is bringing in the new storage device. This prevents the scenario where a new device arrives on the floor, and a mad scramble ensues to find the required director ports (sometimes leading to ports being "borrowed" from a different director until some new ones can be shipped).

Planning the path requirements in this manner provides two other benefits: large pools of extra CHPIDs and ports do not have to be maintained, ordering the extra CHPIDs and ports as part of the same hardware requisition as the new device, allocates the real cost of the change to the capacity issue which prompted it.

As the hardware acquisition process continues, decisions are made about the use of new or current storage devices, and the list of possibilities begins to narrow. It still may not be known whether it will be an EMC, an IBM Ramac or an HDS device, or whether it will be an Amdahl CMOS machine, or an IBM, but the approximate number and size of the devices will begin to firm up *before* the actual choice of vendor and model is made. At the point in time when the physical placement of the boxes can be made with reasonable assurance, the physical implementation of the previously defined logical pathing can begin.

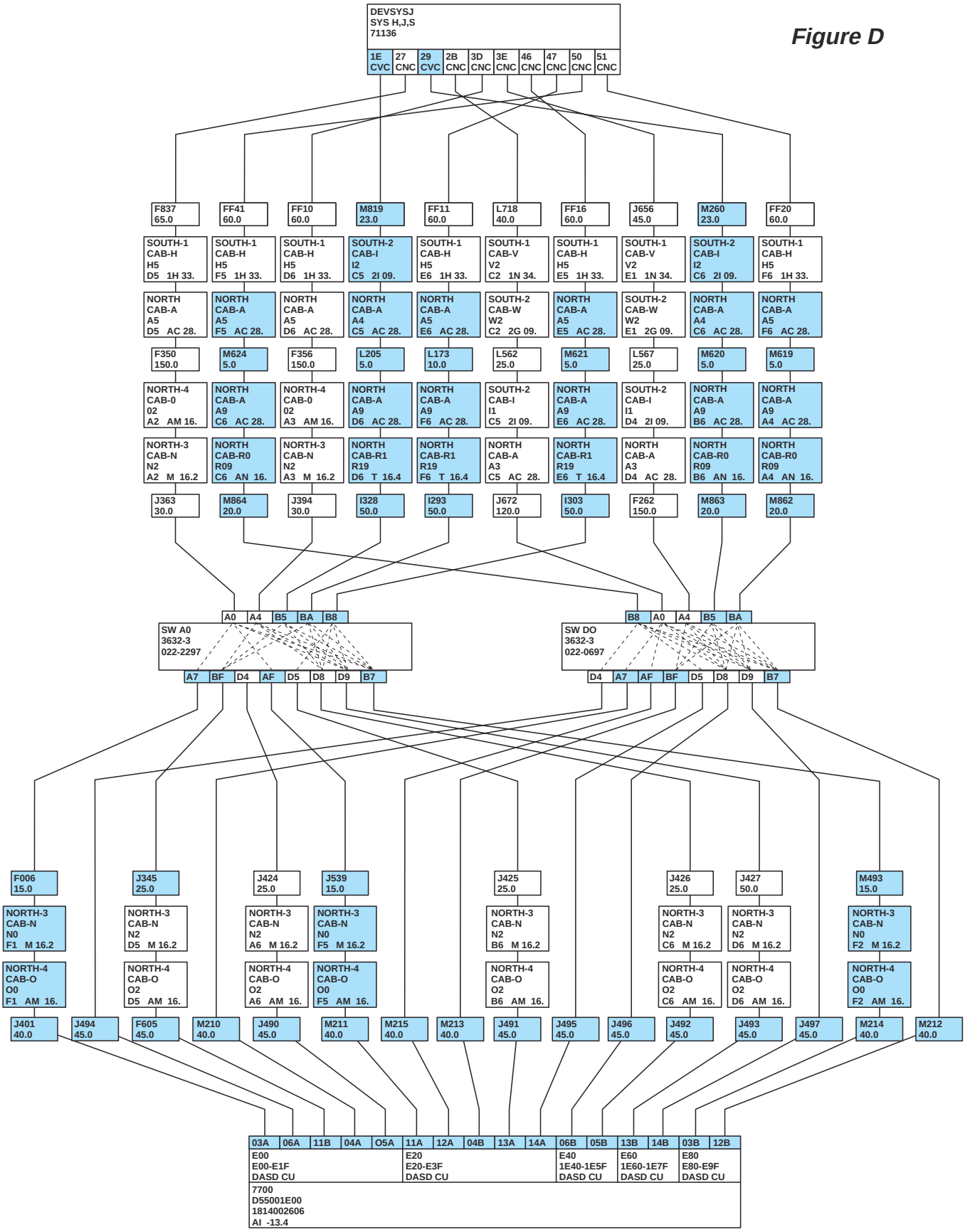
Planning is Organized and Consistent

A planner can use OBTAIN to convert the logical paths into physical paths by replacing them with cables and patch panel slots, etc. If the required cabling is not in stock, it, like the director ports, can be ordered as part of the hardware requisition. When the final hardware selection is made, much of the planning has been completed in an organized and consistent manner. There is less need to attend meetings, since interested workers can log into a workorder and see for themselves what changes are being made as part of the transaction audit trail, or they can view the systems and subsystems diagramatically with changes highlighted.

Figure D is the same subsystem change as Figure C after the physical implementation of the "logical" pathing.

Control Unit Diagram

Figure D



Our case study customer approached us with another problem that they have built over several years. One-by-one they have accumulated a wide variety of equipment, connectivity and change management databases. Like most sites, they would like to have a single, official repository for this data. Unlike some sites, they have thought the issue through far enough to realize, that the idea of a single database is a fantasy that cannot be implemented realistically. Instead, they are concentrating on how to tie everything together into a working system with automatic or semiautomatic data exchange.

Figure E shows the database connectivity that they would like to achieve. Our initial analysis of this request turned up another side to the problem. Parallel to this set of electronic files, exists a wide variety of paper based files. Often it is the paper system that ties the workflow together. The electronic databases are used to reference data and generate reports some of which become part of the paper file system.

It is our conclusion, that any attempt to tie the electronic databases together must include the paper system, since it is the glue that currently holds the workflow together. ***Figure F*** is an example of one of the many paper documents in this system. The highlighted sections of the Equipment Requisition form are not part of the original. We added the highlighting to indicate which parts of the form contain sensitive financial data that is not available on all copies of the form.

One focus of our work with this customer, involves the use of Lotus Notes to convert paper documents, such as the equipment requisition, into electronic form with rich text fields tied to database records in OBTAIN. We are also building ties between OBTAIN and other products such as Aperture to automate the flow of data among best-of-breed tools.

Data Center Asset Management - Planned and Actual

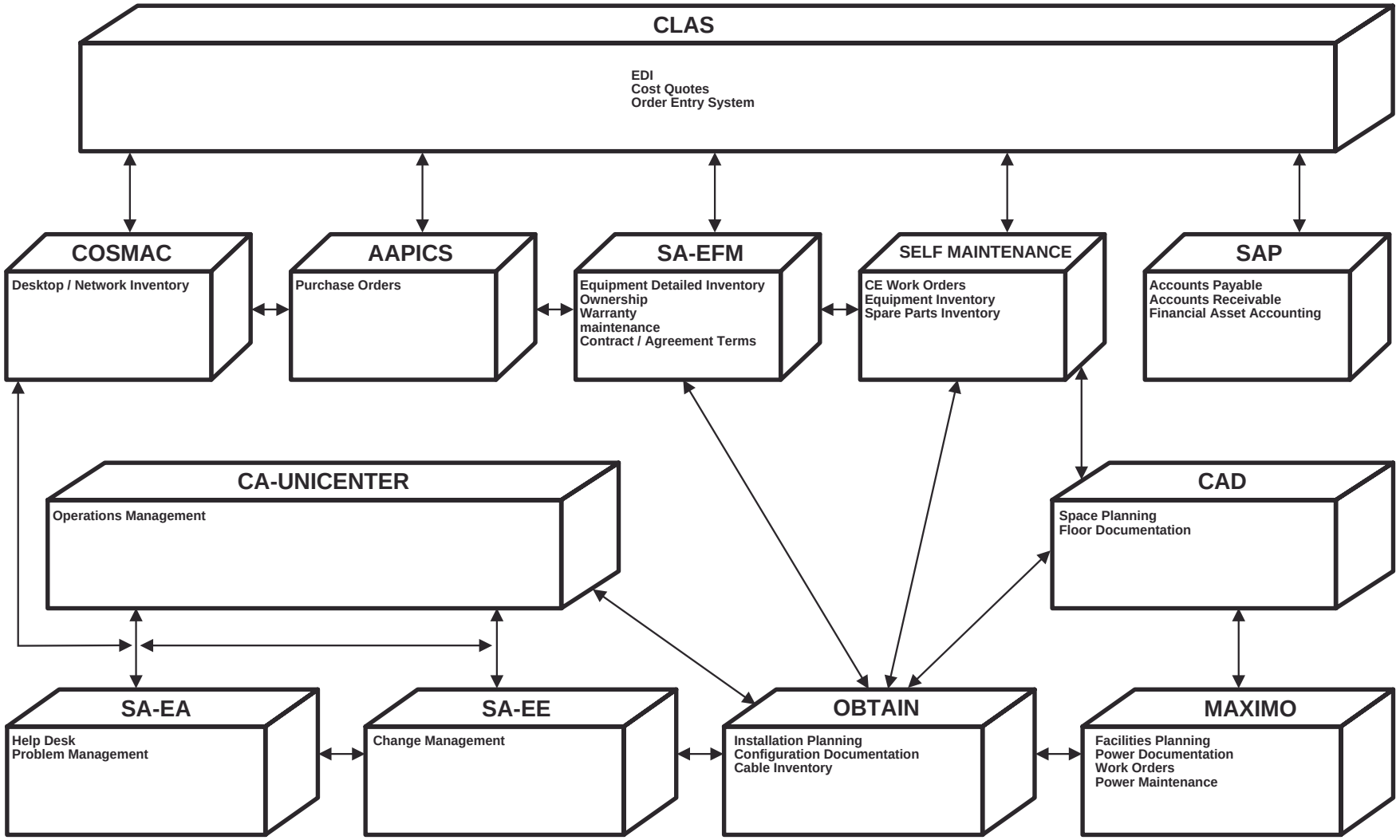


Figure E

Figure F

EQUIPMENT REQUISITION

SHIP TO Attn:	BILL Attn:	SUPPLIER: QUOTE #: BUYER/CODE: PHONE:

Invoice Approval:

ITEM	UNIT QTY	EQUIP/ PART	MODEL/ FEATURE	DESCRIPTION	UNIT COST			EXTENDED NET COST	MONTHLY MAINT	WRTY MOS
					LIST	DISC	NET			
EXTENDED TOTAL										

COMMENTS:

	LEASE	CAPITAL	MAINT
DISC'D TOTAL:			
CONTINGENCY:			
TAXES/FREIGHT:			
INSTALLATION:			
TOTAL COSTS:			
TERM/MONTHS:			
CONTINGENCY:			

COST CENTER:
CATEGORY/TYPE:
LOCATION:

USEFUL LIFE: _____ YEARS

FUNDING:

CHARGE CODES	COST CTR	ACCT CODE

MAINTENANCE/WARRANTY

DELIVERY SCHEDULE:

PREPARED BY:

REQUESTED BY:

NAME _____ DATE _____

APPROVALS:

NAME _____ DATE _____ NAME _____ DATE _____

NAME _____ DATE _____ NAME _____ DATE _____

COPIES:

Conclusion

OBTAIN provides consistent, high quality documentation for data centers. Though this documentation can be created and maintained with less effort than other methods such as TSO files, spreadsheets and drawing packages, there are other benefits from using OBTAIN. Changes to a data center's workflow could yield savings such as:

- less time spent in meetings due to a better hand-off of information from capacity planners to hardware planners and installers
- less unscheduled interruptions (such as phone calls) between planners to gather or disseminate changes in a plan. Users can check with OBTAIN to get the data they require.
- less lead time required for installation due to better preplanning.
- less installation work performed during the shrinking change window.
- better use of resources i.e.: a smaller but better managed pool of free director ports, CHPIDs or patch panel slots and cables.
- precise before and after diagrams which highlight exactly what is changing can be interpreted quicker and with less chance of error.

We would welcome the opportunity to demonstrate at your site how OBTAIN can be used to improve your documentation and workflow today, and to give you an update of where we are going tomorrow.