Upgrading to the New VS: A Method Study

This paper describes steps and procedures necessary to upgrade from a medium-sized Wang VS to a New VS. Although the company described is fictitious, it is an amalgam of several real-life Wang VS users.

The Situation

Grammercy Banking and Mortgage is a medium-sized financial company on the East Coast. Its headquarters are in Bristol, Connecticut, a suburb of New York City, but its main operations and business center are on Wall Street in the city. Grammercy also maintains a data center in Palisades, New Jersey, across the Hudson River from Manhattan, an installation that came about when Grammercy had to expand its Wall Street operations. Even though the data center must be networked into the operations center, Grammercy's IT team decided long ago that with the price of office space and utilities in the city, remotely locating the data center saved money even with the additional network costs.

Grammercy uses a Wang VS12650 for a series of critical applications related to daily transactions in its banking and mortgage businesses. All transactions are captured in real time and available online. Overnight, however, the Wang VS is used to run financial models and projections, with the results available online the following morning to key executives across all of Grammercy's divisions. The information must be available by 7AM each work day because executives need time to act on the data before the start of business every morning.

Business is good for Grammercy, and with increasing business comes an increasing number of transactions. The Wang VS12650 is showing the strain of the increased load. Several times in the past few months, key data was not available on time. More than once the data did not show up on computer terminals until 8:30AM, an unacceptable situation. Moreover, the tight overnight schedule no longer provides time for maintenance of any kind, resulting in the postpone-ment of scheduled maintenance and disruption of the overnight schedule when unscheduled maintenance is unavoidable. The IT Department is well aware that things will only get worse. Grammercy's IT director has recommended to management that the company upgrade its Wang VS12650 to a Wang VS16850. When pressed, the director admitted that this solution would keep the department's head above water for eighteen to twenty months at best. Given the growth of the company, the director knows that he should recommend an upgrade to a VS18950; however, that entails buying additional capacity now that the company may not need for two years. Previous experience with his management has taught him that this is not a solution management is likely to accept.

The IT Director has an additional problem. Influential members of the management team came of age in the computer era when personal computers were considered the solution for all computing needs. They have little understanding or appreciation for the role of mainframes, which they associate with companies such as IBM. They are much more familiar with multiple processors and server farms. To them, the Wang VS is almost a relic from the distant past of computing. Their solution to the problem is to migrate the existing applications to newer, faster, more modern hardware. The IT Director was asked to prepare a presentation costing out the migration.

A working group was assembled to plan the next IT move. Management members of the group were quite receptive to most of the IT Director's presentation. Although the costs for new hardware and software conversion were steep, the director's estimates were well thought out and carefully justified. A problem arose with the director's software conversion schedule. Faced with what management perceived as an inadequate computer system, the working group pushed for a more ambitious schedule, one that left little room for error. The group's final report included the director's initial figures for hardware and software and the tighter software schedule. The group also suggested that an outside consultant monitor the software conversion. The cost of the consultant would come out of the IT Director's budget for hardware and personnel.

The report was put on the Board of Directors'

agenda for the next month's meeting. The IT Director was not invited to present which almost guaranteed the Board would defer to the judgment of senior management. Convinced the current plan was not in the company's best interests, the IT Director searched for an alternate solution he could present to management and the Board within the next two weeks.

Analysis

The key elements in this study include the following:

- the perception of the Wang VS as a legacy technology;

- the desire of management to upgrade hardware to the latest and greatest;

- Grammercy will have to convert its system in steps over the next twenty-four to thirty-six months, a time-consuming and disruptive process that does not rule out the possibility of results inferior to the original application;

- the inability of the current Wang VS to crunch numbers fast enough in the face of increasing business, meaning the computer is becoming a bottleneck to growth;

- management's refusal to adopt a more realistic schedule for software conversion;

- management's belief that the legacy Wang VS will max out within the next few years so the present is as good a time as any to replace it.

Still not addressed, but lurking in the background, is the cost of maintaining a data center separate from the operations center. The migration plan did not give any consideration to moving computer operations back to New York City.

A Solution Based on the New VS

The New VS is a 100% binary compatible system that runs the VS operating system as well as VS applications by executing their code. This means that all existing Wang VS applications execute on the New VS in the same environment as they do on a legacy VS. The binary compatibility also extends to VS files, which are bit-for-bit identical in the New VS as on the legacy VS.

With an identical execution environment, changing over from an existing VS to the New VS requires little more than a standard backup and restore. There is zero re-programming, which dramatically reduces the risk and cost of migration. Technically, there isn't even a "software migration" phase of the project. The IT Director realized that transferring Grammercy's applications from the legacy VS to the New VS involved little more than upgrading from one Wang VS to another. This feature, alone, removed the riskiest part of the move to new hardware.

In addition, the New VS runs on qualified servers from Dell and IBM. By using standard server platforms, the New VS capitalizes on both present and future technology advances. This allows the IT Director to follow management's implicit policy of only acquiring the latest hardware.

Addressing the Key Items

Here is how an upgrade to the New VS would address the key items listed previously:

- obsolete technology: the Wang VS environment is not obsolete. Any weakness resides in the hardware it presently lives in. The New VS updates the hardware while retaining the environment;

- latest hardware: the New VS uses Dell PowerEdge and IBM pSeries servers, which represent state-of-the-art standard server platforms;

- legacy processing power upgrades require disruptive hardware changes: the New VS provides license-controlled performance. Performance can be adjusted at any time, without the need for a site visit;

- the legacy VS is a bottleneck: the New VS provides performance that not only can match or exceed every Wang VS—from the smallest to the

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largest—the New VS can also significantly out-perform the Wang VS18950;

- realistic software conversion schedule: there is no software conversion with the New VS any more than there would be software conversion in upgrading from one Wang VS model to another;

- the legacy Wang VS line will eventually max out: since the New VS uses modern, standard server platforms it is positioned to take advantage of new price/performance options as they appear in the market, meaning there is no limit to the performance the New VS will achieve in the future.

The New VS takes up far less floor space than a comparable legacy VS. In most cases, the New VS requires only 2U (3.5 inches) of rack space. The New VS also uses less power and needs much less cooling. By upgrading to the New VS, it may make sense to move the data center back to New York City, saving both rental and networking costs. At the very least, the New VS will free up valuable space in the existing center.

A New Proposal

Using the New VS as an upgrade path, here is how Grammercy could move its existing applications from its legacy VS to a more modern, more powerful platform.

Grammercy's complete VS installation consists of a Wang VS12650 and supporting peripherals:

- 20 GB of disk storage spread across 20 disks;

- 3 tape drives (2 4mm DDS-2 and 1 9-track 6250 bpi) for backup and other uses;

- 7 Lightspeed gateway PCs that connect the networked desktop Lightspeed workstations to the legacy VS;

- 3 Wang Data Storage Cabinets (DSCs) housing the disk drives and gateway PCs. The cabinets were originally acquired to house the 1980s SMD disks that preceded the present SCSI disks;

- 6 Wang VS workstations and 144 desktop PCs equipped with Lightspeed NVS workstation emulation software. The desktop PCs are distributed among the several company locations;

- 10 printers of various types, mostly network-based and operated by Lightspeed, but including two connected directly to the legacy Wang VS by Printer Interface Boxes (PIBs);

- company locations are interconnected by a Wide Area Network (WAN) adequate to carry the Lightspeed workstation traffic and upgradeable to handle future traffic.

Upgrade Process

There are two scenarios, depending upon whether the data center is moved or not. If the data center is moved, then Grammercy will have to build out a suitable space with the requisite cabling, cooling, power and UPS. Desktop PC workstations throughout the company will have to be redirected to connect to the New VS, and the New VS will need to interface with connections to Bristol. Eventually, after parallel testing is complete, Grammercy will disconnect the network to New Jersey.

No matter where the New VS is physically located, there are common elements of the upgrade from the legacy VS:

- Grammercy furnishes TVS with a listing of their current configuration as well as the configuration file;

- TVS selects a qualified server from Grammercy's choice of vendor (Dell or IBM) and loads the NVS software and the VS operating system;

- TVS creates and initializes the virtual volumes, creating a new GENEDIT config;

- TVS configures the New VS and tests the hardware and software;

- TVS installs the New VS at Grammercy's site;

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- Grammercy loads the New VS from their regular VS backup tapes or by temporarily connecting the legacy VS disk subsystem to the New VS and doing disk-to-disk transfers;

- virtual Lightspeed NVS server modules in the New VS are configured with temporary alternatives to the existing IP addresses of the Lightspeed NVS gateways. If new, permanent IP addresses are established, Lightspeed NVS clients may have to be pointed to the new addresses. In either case, Lightspeed NVS users will see no changes in logon, print and other Lightspeed NVS services;

- the New VS is IPLed and users are brought in to test the system;

- Grammercy conducts 30 days of parallel testing.

Since Grammercy's Wang VS is a production machine, the IT Director does not want to disturb the production environment both when bringing up the New VS and during pre-cut-over parallel operation. Rather than moving existing peripherals from the legacy VS to the New VS (and losing the opportunity to upgrade to newer technology), the IT Director has decided to equip the New VS with the following, recommended by TVS:

- 4 hot-swappable 73 GB disk drives;

- 2 Super DLT (SDLT) tape drives;

- multi-host RAID to bridge the two systems during testing. After cut-over, the RAID will be available to meet Grammercy's increasing need for data storage. During testing, however, the RAID will allow data to move between the two systems via a nightly, hands-off automated procedure;

- 1 rackmount UPS. Even though Grammercy traditionally uses a large UPS for the computer facility, experience has shown that UPS failures can cause as many, or even more, outages as utility power failures do in some areas. The most reliable way to ensure that the New VS and its critical devices do not lose power unexpectedly

is to house a dedicated, smaller UPS in direct proximity to the New VS, in the same rack;

Although the IT Director could have decided to move some existing VS disk storage to the New VS, neither he nor TVS seriously considered this option. The New VS disk system is fault tolerant and high-performance, while most legacy VS disk systems are not fault-tolerant and are limited to SCSI-1 performance. In addition, many legacy VS disk drives are already past their design lifetimes. The IT Director did opt to keep one legacy tape drive connected to the New VS for accessing historical tape data. With the correct choice of newer, backward-compatible tape technologies this isn't strictly necessary, but Grammercy's Wang 4mm tape drives are in good shape so neither he nor TVS saw any overriding reason to discard them.

Since Grammercy still has to exchange 9-track tape data with other companies, it needs to connect a 9-track tape to the New VS. Grammercy's legacy 9-track tape drive is obsolete and no longer supported, so the IT Director elected to replace it with a newer, reconditioned front-loading 6250 bpi SCSI tape drive that is commonly available and maintainable. He chose a front-loading, rack-mounted drive. Although tabletop models were available, the IT Director had the rack space available, and wanted to keep top surfaces free for other purposes.

The printers operated through Lightspeed NVS will not change, since Lightspeed NVS on the New VS functions identically to Lightspeed NVS on the legacy VS. The PIB-connected printers will move to the TVS Virtual PIB, which resides in one or more Linux PCs, provides full microcode loadability and supports all existing PIB printer types configurable in the VS OS.

If Grammercy had had any native Wang printers, those would have been replaced either by equivalent PIB-compatible industry-standard printers on Virtual PIBs or by network printers operated through Lightspeed NVS. In some cases it may be possible to convert a native Wang printer to use a standard Centronics interface and thus be connected via the TVS Virtual PIB.

The IT Director will replace the six Wang worksta-

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tions at the data center with low-end PCs running the TVS workstation client. The client is simpler than Lightspeed NVS but has no file transfer or printer support capability. If any of the workstations need more performance he can replace any (or all) of them with Lightspeed NVS desktop PCs.

Other desktops, already Lightspeed NVS, remain unchanged except for possible IP address updates in their configurations to connect to the New VS instead of to the former Lightspeed NVS gateway PCs.

Smaller tape drives such as 4mm and DLT will be housed in a rackmount enclosure from Dell or IBM or Storcase. Then, the entire New VS system will be housed in a portion of one of the existing racks. The IT Director could have upgraded to a newer "look" in rack hardware, but decided to use those funds for other purposes. When he runs out of rack space for other equipment in the data center, the IT Director will purchase new racks for the New VS and use the older racks elsewhere.

When testing is complete to everyone's satisfaction, the Grammercy IT Department cuts over to the New VS and the legacy VS is shut down. In this example, once Grammercy has prepared the space for the New VS, the time from installation to cut-over can be as little as thirty days.

Summary

Faced with a compelling need to upgrade its Wang VS12650 to meet the demands of its growing business, Grammercy Banking and Mortgage originally chose to migrate existing applications to newer, faster hardware. While the IT Director recognized the need for more processing power, he also recognized the risks of an aggressive software conversion schedule. However, his management was leery about upgrading the current Wang VS, which they perceived to be past its useful life.

In the past, the IT Director would have had only the two options on the table: upgrade to a more powerful Wang VS or migrate applications to a new platform. The New VS afforded him a third, less costly, less risky opportunity, by combining the best parts of both paths. Since the New VS is 100% binary compatible with existing legacy VS systems, the IT Director determined he could move his existing applications to a New VS with little more than a normal backup and restore.

Faced with a management that constantly pushed for the acquisition of the latest computing technology, the New VS was attractive to Grammercy and to the IT Director, because it uses standard server platforms from Dell and IBM. The competitive server marketplace virtually guarantees that the New VS will capitalize on future improved price/performance ratios.

Another attractive feature of the New VS was its license-controlled performance. The IT Director acquired, and paid for, the level of performance he presently needed. As business demands increase, he will increase the New VS performance without the need for any disruptive hardware modifications.

Finally, the entire move, from legacy VS to the New VS, took about thirty days. This included the time it took to order and connect newer disk and tape drives, redirect the Lightspeed NVS clients, move native Wang printers to VPIBs on the New VS and transfer applications and data from the legacy VS to the New VS. In the end, Grammercy wound up with more performance and reliability for less cost when compared with a migration to another platform; and, the New VS upgrade resulted in very little impact on production. With the New VS capable of outperforming even the fastest Wang VS, Grammercy will be able to manage its rapidly increasing information demands far into the future.

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