

■■■ white paper



MultiValue Database Migration Assistance Options Overview

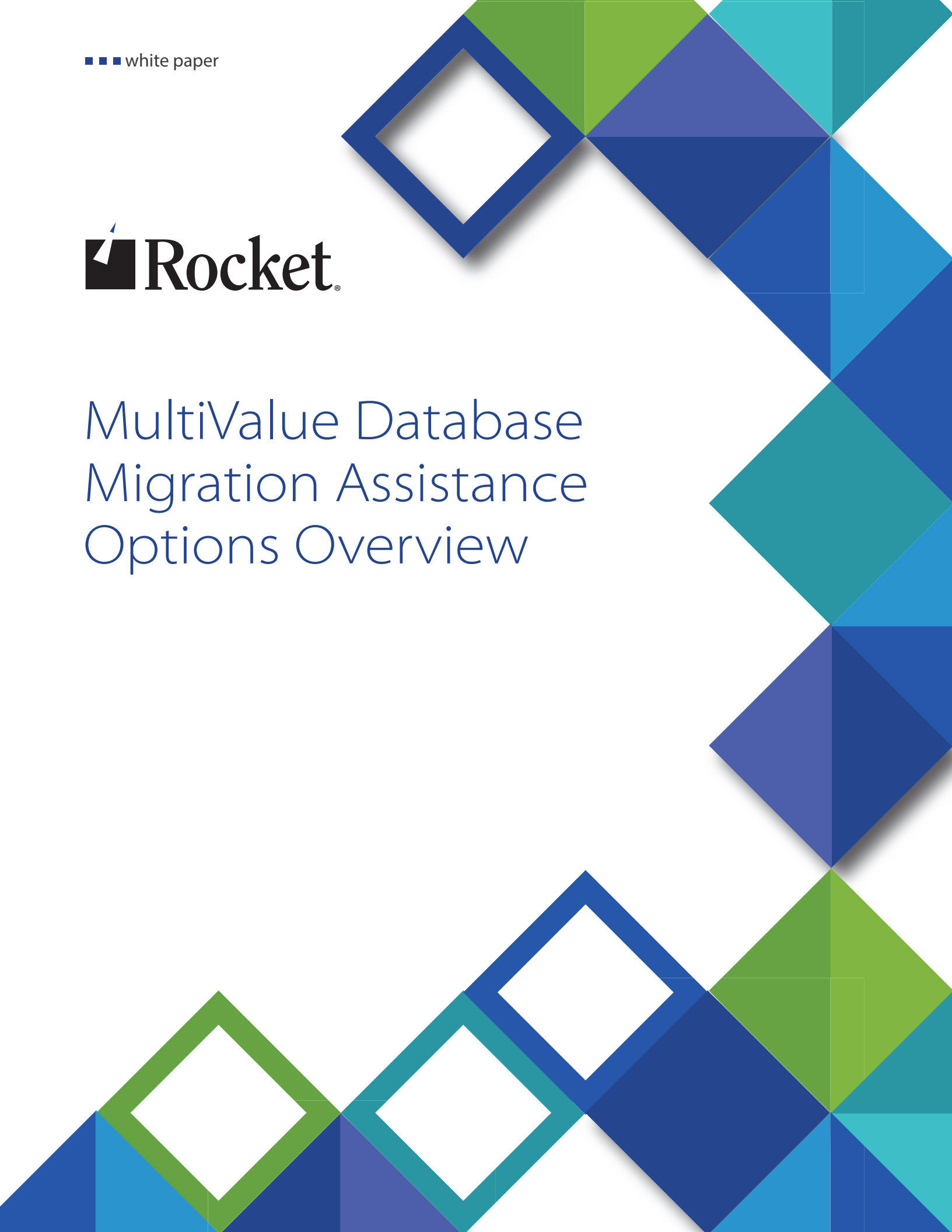




Table of Contents

Overview	3
Key Concepts	4
<i>Design Advantages of UniVerse and the Implications of the Operating System Selected</i>	4
<i>The Mission of Rocket Software MV Professional Services</i>	5
<i>Automated Migration Tool (AMT)</i>	5
Considerations for Hardware and the Operating System	6
What is Included for Free in Your Proof of Concept (POC)	6
<i>You Will Supply</i>	6
<i>Rocket Will Return</i>	7
Optional Items – Project Management and Personnel	7
<i>Project Management and All Personnel Required</i>	7
<i>Project Management</i>	7
<i>Project Management Advice</i>	7
<i>Complete Outsourcing of all IT Functions</i>	7
Optional Items – During the Migration	8
<i>Manual Effort to Migrate Remaining Programs</i>	8
<i>Install and Optimize UniVerse</i>	8
<i>Implement Printers, Terminals and Devices</i>	8
<i>Data Move Planning and Execution</i>	8
<i>Implement Distributed Files for Speed</i>	8
<i>Implement National Language Support (NLS) to make your application Multi-Lingual</i>	9
<i>Performance and Load Testing</i>	9
<i>Assistance during Acceptance Testing</i>	9
Optional Items – Security / Compliance / Backups / High Availability	9
<i>Implement Source Code Control</i>	9
<i>UNIX Security for UniVerse Data</i>	9
<i>Implement LDAP logon</i>	9
<i>Implement Automated Data Encryption for Sensitive Data (SSN, Credit Card, etc.)</i>	10
<i>Implement Fast Data Backups</i>	10
<i>Implement High Availability with Subscribing Server(s)</i>	10
<i>Use the Failover Server as a Report Server</i>	10
<i>Create a Data Warehouse / CorVu Dashboard Server</i>	10
Optional Items – During "Go Live" & Post "Go Live" Support	11
<i>Additional Staffing during "Go Live" & Post "Go Live"</i>	11



Migration of Historical Data Backup Tapes 11

Purchase of Three (3) Annual HealthChecks Now 11

Optional Items – Financing **12**

Financing 12

Lessons Learned **12**

Your Staff's Primary Responsibility – Auditing and Validation 12

Final Testing of the Application is Your Responsibility 12

Do not underfund this project! 13

Your migration project can be completed with least business impact 13



MultiValue Database Migration Assistance Options Overview



Overview

This white paper is an overview of the common steps and considerations to be taken for you to migrate onto the Rocket UniVerse data server from MultiValue (MV) databases no longer being updated, or that do not have the needed functionality or sound financial backing.

We begin with a few key concepts that provide a foundation for many of the items described. The design advantages of UniVerse are extensive, and reduce the amount of work necessary to complete your requirements.



The Automated Migration Tool is explained, including how it is utilized for either a small Proof of Concept (POC) or to assist with your actual migration. This tool saves hundreds, and for large sites, thousands of hours of labor. In addition, since it is automated, accuracy in your migration is increased.

Hardware and operating system considerations are explained, and how operating systems expand or contract the possibilities of what can be attached to them.

We will discuss what is realistically necessary for you to complete your migration, and provide you with options that you may wish to consider implementing at the same time. While all of these options can be implemented at a later date, it often makes sense to include things at the same time that your organization is going through the effort to thoroughly test your application.

Rocket Software makes numerous recommendations as to the tasks that are necessary to be completed during the migration. The reason that we bring up so many suggestions is because customers' requirements – your requirements - are so diverse. You will not need all of the options presented. However, you will begin to see all of the things that you can plan for, now and in the future. Rocket UniVerse is a feature-rich development environment that allows you to actualize your requirements.

We provide some insight into areas where some companies have stumbled and fallen, thereby not having as clean a migration as they could have. Rocket Software encourages you to take steps that will result in the least business impact for your organization.

Rocket MultiValue Professional Services looks forward to working with you.

Key Concepts

Used throughout the paper and the migration project are:

Design Advantages of UniVerse and the Implications of the Operating System Selected

- ❖ Rocket UniVerse is built using the C programming language.
- ❖ UniVerse makes standard subroutine calls to the operating system to perform functions.
- ❖ Whatever the operating system presents, UniVerse can utilize due to the standard subroutine calls it makes to the operating system. These include:
 - Disk Subsystems, such as SANs
 - FTP
 - High Availability Solutions with automatic failover



- Languages (besides English)
 - Printer Definitions (the control sequence to control printers)
 - Remote Logon Process (LDAP)
 - Terminal Servers and other hardware interfaces
 - Virtualization
- ❖ It is common for vendors to write applications that utilize specific operating systems. Consequently, we must ensure that the auxiliary hardware and software selected work on the selected operating system. Bar Code Scanners, Image Scanners, Print Servers, Printer Definitions, SANs, Terminal Servers, etc. all must be verified that they supply the interface required to run their device. Once supplied, UniVerse can utilize the device.
 - ❖ Yes, what Operating System that you choose does make a difference on what is included and what is not. Please ask us for specific information. We may know the answer from previous experience, or we can do the research.
 - ❖ UniVerse is incredibly flexible and includes numerous standards that your applications may utilize (including, but not limited to):
 - ODBC
 - XML
 - Web Services

The Mission of Rocket Software MV Professional Services

- ❖ Rocket MultiValue Professional Services' mission is to assist customers in utilizing the U2 Product Line so they can achieve business benefits and are happy to use our products.
- ❖ Unlike classic professional services organizations, we run a thin margin model for all services work. We split out our Minimal Project Coordination activities rather than burying the cost into each hour we work.
- ❖ The vast majority of our engagements are Time and Material based. You are only charged for the actual hours worked and expenses incurred (if applicable).

Automated Migration Tool (AMT)

The Automated Migration Tool (AMT) was developed by Dr. John F. Nunziato, U2 Data and Migration Specialist for Rocket Software, over the course of 18 years. The purpose of the tool is to assist in the migration, re-hosting, and enhancement of applications running on native MultiValue or derivative MultiValue systems to the Rocket U2 databases.



The functionality of our specialized AMT makes migration easier through use of four modules and a series of utilities.

- ❖ **Personality Module** identifies MultiValue flavor, syntactical constructs, and variants compared to the Rocket U2 databases.
- ❖ **Migration Profile Module** defines the project's source/target systems and other information including locations of the program files, PROC files, PARAGRAPH files, and dictionary files.
- ❖ **Reporting Module** produces reports such as "where used," "what changed," "stats report," "personality module report," "documentation report," and many more. Each and every process produces a report documenting results.
- ❖ **Benchmarking Module** provides performance statistics for the converted application.
- ❖ **Utilities** include programs that perform diffs, check for nulls, perform pre-stores, do finds, perform advanced searches, and make code replacements.

Considerations for Hardware and the Operating System

Rocket Software offers free advice on the selection of your hardware and operating system. We utilize a comparative approach to estimate the size of hardware that your organization would require.

Our hardware recommendations include items that will make the UniVerse data server run considerably faster. You will gain from Rocket Software's considerable experience in performing large, formal benchmarks at the hardware manufacturers' facilities.

What is Included for Free in Your Proof of Concept (POC)

Rocket Software offers a brief, free, proof of concept to demonstrate the capabilities of the Automated Migration Tool (AMT) and demonstrate how easy it will be to migrate from your current database onto UniVerse.

You Will Supply:

A small green screen application with data. This should include a few accounts comprising:

- ❖ BASIC programs
- ❖ Menus
- ❖ Dictionaries and Data Files



Rocket Will Return:

Your migrated application and data that will work for 85% to 95% of the functionality supplied.

A few migrated accounts processed through the AMT with:

- ❖ BASIC programs
- ❖ Menus
- ❖ Dictionaries and Data Files

Optional Items – Project Management and Personnel

Project Management and All Personnel Required

- ❖ Rocket Software can provide a complete solution, including all of the Project Management and Programming Resources to complete your project.
- ❖ Rocket does not provide final unit and systems integration testing of the application. Your staff is much better prepared to complete this testing as they know the application and data.

Project Management

- ❖ Rocket Software can provide Project Management to complete the project.

Project Management Advise

- ❖ You may have the Project Management resources to complete the project, but they may not have experience with a migration. Rocket Software can provide valuable insight and coaching of your Project Manager throughout the process.

Complete Outsourcing of all IT Functions

- ❖ Rocket Software can supply complete outsourcing, including application design, development, maintenance, and all DBA activities for a complete solution.
- ❖ For continuity, we commonly hire/retain your current staff through the transition, and possibly for the long term.
- ❖ Migrations are an excellent time to transition to outsourcing.
- ❖ In the near future, we will be offering constant monitoring of your systems through a system we are developing. We will notify you when it becomes available.



Optional Items – During the Migration

Manual Effort to Migrate Remaining Programs

- ❖ While the AMT will reduce the amount of work by hundreds, if not thousands of hours, there is still the last 5% to 15% of the migration that must be handled manually. Rocket MultiValue Professional Services will provide personnel that have experience in migrations to complete the project in a timely fashion.

Install and Optimize UniVerse

- ❖ Rocket will install UniVerse on the Primary Server and optimize the configuration for the projected growth over the next 3 years.

Implement Printers, Terminals and Devices

- ❖ Rocket MultiValue Professional Services will implement printers and terminals at both the UNIX and UniVerse levels and test these installations.
- ❖ We will work with print server, terminal server, and device suppliers to get their equipment working on your selected hardware.
- ❖ Note: We do not recommend continuing the use of terminals. We can install terminal servers, but we do not recommend them. We recommend PCs running Rocket wIntegrate terminal emulation software.

Data Move Planning and Execution

- ❖ If your organization requires a very short downtime window during the “Go Live” weekend, we will plan and implement the movement of the data in the fastest, most accurate way possible. Rocket MultiValue Professional Services has developed an exact methodology to ensure the accuracy of the data movement.

Implement Distributed Files for Speed

- ❖ For large files and data sets, Rocket MultiValue Professional Services can implement Distributed Files. Distributed files spread data across a series of files that may be viewed as a single file, or for each individual part. Indexes are created for each part file, thereby making indexes smaller and faster to update. The result is that your application may run considerably faster after Distributed Files are added to your application. There may be some minor modifications to your application to implement SELECTs correctly.



Implement National Language Support (NLS) to Make Your Application Multi-Lingual

- ❖ Migrations are an excellent time to add National Language Support (NLS), to make your application Multi-Lingual. NLS provides the ability to use a MultiByte character set. There will be some application modifications required to ensure the correct working of NLS.

Performance and Load Testing

- ❖ Rocket MultiValue Professional Services can plan for and perform Performance and Load Testing ensuring that the application and data have been migrated and optimized in a manner that will scale for your anticipated load.
- ❖ Rocket MultiValue Professional Services develops scripts that drive the application during load testing. These scripts can be retained and used for regression testing of your application, and future load testing.

Assistance during Acceptance Testing

- ❖ Usually your staff, plus two Rocket programmers, is enough to resolve issues as they arise during “Go Live”.

Optional Items – Security / Compliance / Backups / High Availability

Implement Source Code Control

- ❖ Rocket MultiValue Professional Services recommends implementing source code control that adheres to SOX compliance. Rocket Software will implement source code control before going live.
- ❖ During implementation, the production server will shut off access for any development person.

UNIX Security for UniVerse Data

- ❖ Rocket MultiValue Professional Services can hide your UniVerse data at the UNIX level, so if the Production Server is hacked, the data cannot be seen. If you have us do the UniVerse optimization, this step is included for free.

Implement LDAP logon

- ❖ If your organization is looking for single sign-on, we can implement the LDAP portion of UniVerse for you.



Implement Automated Data Encryption for Sensitive Data (SSN, Credit Card, etc.)

- ❖ Implementing Automatic Data Encryption (ADE) is one of the key steps for moving your organization toward becoming PCI and HIPPA compliant.
- ❖ If your organization has data that must be encrypted at all times, we can implement this during the migration.
- ❖ This is a complete solution where data is encrypted on disk. Your data is safe, even if a data save is stolen.
- ❖ ADE can be implemented without any modification to your application.

Implement Fast Data Backups

- ❖ Rocket MultiValue Professional Services offers seven (7) alternatives for High Availability. The most common High Availability solution is to add a Subscribing Failover Server.
- ❖ Some companies choose to have the failover process be automatic; others choose for it to be a manual process. We can explain the advantages / concerns for each.

Implement High Availability with Subscribing Server(s)

- ❖ Rocket MultiValue Professional Services can hide your UniVerse data at the UNIX level, so if the Production Server is hacked, the data cannot be seen. If you have us do the UniVerse optimization, this step is included for free.

Use the Failover Server as a Report Server

- ❖ We can create the Subscribing Failover Server as a Report Server. Processing would then be spread across the two servers.

Create a Data Warehouse / CorVu Dashboard Server

- ❖ Rocket MultiValue Professional Services can create multiple Subscribing Servers with different purposes. One subscribing server could be set up to build a data warehouse for reporting or CorVu dashboards. Rocket's U2 External Database Access (EDA) is often used for this purpose.



Optional Items – During "Go Live" & Post "Go Live" Support

Additional Staffing during "Go Live" & Post "Go Live"

- ❖ Your whole staff assists with "Go Live".
- ❖ In some cases, it is difficult to meet all of the data migration requirements during the actual "Go Live" with existing staff.
- ❖ We are careful to not burn people out on the "Go Live" weekend, so that they can be effective for support during the first few days after "Go Live".
- ❖ We can add extra staff for this intensive, time-sensitive event.

Migration of Historical Data Backup Tapes

- ❖ All of your historical backup tapes are in the old format. Some organizations must be able access data for the last three, five, or seven years depending upon state and/or federal requirements.
- ❖ Rocket MultiValue Professional Services can provide additional staffing to perform the migration of all historical tapes into a UniVerse format and then save the tapes for potential use in the future.
- ❖ Commonly, organizations have us process their quarterly backups, which is a reasonable balance. Occasionally, we process every month-end backup if desired/required.

Purchase of Three (3) Annual HealthChecks Now

- ❖ Annual HealthChecks keep your system running optimally.
- ❖ Unfortunately, the #2 cause of system failures is human error, when someone does something that causes the system to crash. During the Annual HealthCheck, we externally audit the system, looking for mistakes that have been inadvertently made and recommend corrective action(s).
- ❖ We provide usage information. Each year you will have a quantified external assessment of system usage. These statistics/charts enable you to plan for realistic growth and/r replacement of the server when warranted.
- ❖ Why purchase 3 years of a HealthCheck? Any services contracted for at the time of the installation of the hardware can be capitalized over the duration of the lease. Most companies want to build this into their plan up front as a best business practice.



Optional Items – Financing

Financing

- ❖ Depending on the hardware platform you choose to utilize, the hardware vendor may or may not provide financing.
- ❖ For those who do, Rocket Software will work with you as your advocate, advising you on how to get the best possible interest rate and monthly payment to meet your requirements. We have performed a great deal of migrations and have learned what works and doesn't work to get a low payment.

Lessons Learned

Your Staff's Primary Responsibility – Auditing and Validation

- ❖ We highly recommend that you have Rocket MultiValue Professional Services do the heavy lifting of your migration. Why? Because your staff still need to keep the current environment running until you get completely moved over to the new system.
- ❖ Your staff's best use of time is to perform auditing and validation that the migration has been completed successfully. Our customers most successful, least business impact migrations were performed with Rocket MultiValue Professional Services doing the heavy lifting, while the customer validated the accuracy and performed end to end testing.
- ❖ Rocket MultiValue Professional Services will train your personnel, and show them what changes were made to the application as part of the migration. We will enable your staff to become autonomous.
- ❖ While some companies wish to do a low-cost migration, we believe that the highest cost would be from difficulties during your migration onto a new server that impacted your ability to perform business. Let us help you ensure that your move to UniVerse is a smooth one.

Final Testing of the Application is Your Responsibility

- ❖ Your staff must provide final unit and systems integration testing of the application. Your staff is much better prepared to complete testing as your staff knows both the application and the data.
- ❖ While Rocket MultiValue Professional Services can provide initial testing of the application, we cannot test the application to the degree required.



Caution: Please Do Not Underfund This Project!

- ❖ One of the greatest causes of failure for migrations is underfunding the project. This causes the project to extend excessively, and causes people to get burned out doing two jobs (keeping the current system running and helping to perform the migration) which greatly increases risk. When people get tired of the project, their accuracy suffers greatly. We have seen some migrations take as long as a year, and when they do go live, it is a very bumpy road.

Your Migration Project Can Be Completed With Least Business Impact

- ❖ Rocket MultiValue Professional Services' processes and methodologies have been proven time and time again on numerous migrations. We can minimize the risk to your business during the entire process.
- ❖ As soon as we discover something, Rocket MultiValue Professional Services will notify you of specific areas where we need to shift resources in order for us to attain success.
- ❖ When you work with us, you will see that Rocket MultiValue Professional Services' methodologies are rigorous and sustainable, resulting in as little business impact as possible.
- ❖ Customers comment on how the UniVerse database is so feature rich that it will take many years to step into everything it has to offer.

