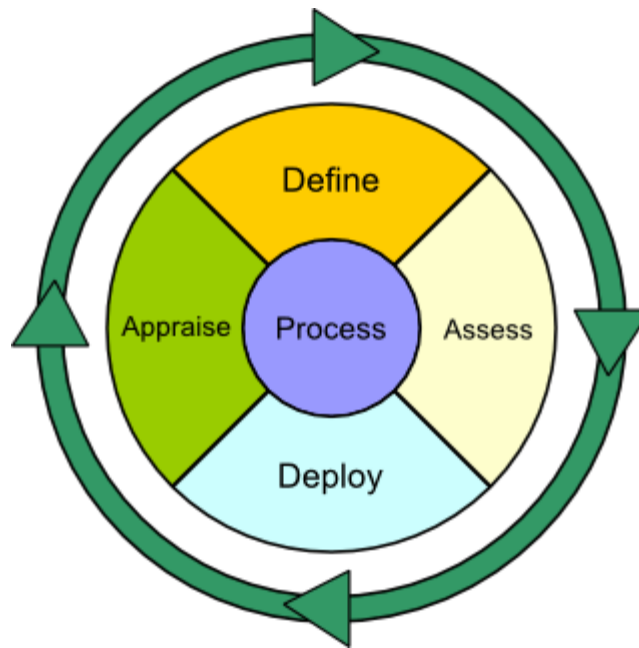Alterion, Inc. White Paper
Power Performance Benchmark
In Consultation with NASA and GCN

Abstract

If a machine is faster but burns more power, does it cost more to perform a specific activity? In other words, is it more effective to use a greater amount of power for a short duration (faster system), or a smaller amount of power for a longer duration (slower system)?

Alterion, in consultation with NASA and GCN, has developed a series of Power Performance Benchmarks to address this question. This white paper details the strategy, environment, and testing conditions of the Power Performance Benchmarks.

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1 Overview

Alterion, in consultation with NASA and GCN, has developed a series of Power Performance Benchmarks. These benchmarks measure the amount of power a computer consumes while executing small but significant and common tasks.

1.1 Test Environment

The basic measurement test bed consists of a WattsUp Pro power meter from Electronic Educational Devices (www.doubleed.com), the test computer system, and a monitoring system. The power cord of the test system plugs directly into the WattsUp meter, which measures power consumption while providing electricity to the test system. The monitoring system connects to the WattsUp meter via serial cable, allowing it to record power consumption measurements at a rate of once per second.

1.2 Testing Methodology

Individual test applications are executed on the test and monitoring systems. The test system repeatedly executes small and well-defined tasks from the Alterion ALP suite, while the monitoring system records power consumption. Each test runs for a fixed duration. Afterwards, the total power consumed is divided by the number of tasks completed. The results represent the power consumption required to perform the test activities, measured in watt-seconds.

We test this way to answer a critical question: If a machine is faster but burns more power, does it cost more to perform a specific activity? In other words, is it more effective to use a greater amount of power for a short duration (faster system), or a smaller amount of power for a longer duration (slower system)?

The current Power Measurement Test Set consists of five subtests: No activity, Excel chart drawing, Zip file compression, Photoshop filtering, and Application loading. The first test measures the power consumed when the system is idle. By most estimates, a system will be idle almost all of the time. The remaining tests measure small and fast activities such as chart redrawing (5000 points, which typically takes a second or two to redraw) and compressing 5 MB of data. Each of these tests uses system components in a fashion that differs from the other tests. For example, the Excel chart test makes greater use of the graphics controller in combination with data access and CPU utilization, while the compression test balances CPU utilization and memory access with disk I/O.

1.3 Power Performance Benchmark

This test suite is part of the continuing Alterion ALP benchmarking program. Alterion (www.alterion.com) is widely known for its work in systems integration support and testing efforts for U.S. Government agencies such as NASA and the Departments of State, Justice, and Defense. Alterion is based in Conshohocken, PA.

For more information concerning Alterion's Power Performance Benchmark, please contact Matthew Shapiro at (610) 832-9450 x207 or by email at m_shapiro@alterion.com.

About Alterion

Alterion was founded in March, 2000 with the goal of becoming a premier provider of IT Program IV&V Management and Support services. Headquartered in suburban Philadelphia, Alterion has since been successfully involved in numerous programs for corporate and government organizations.

Alterion provides a complete set of Independent Verification and Validation services through its proprietary SharpThought™ methodology. As a cost-effective method for assuring successful IT system acquisition and deployment, SharpThought minimizes risk during all phases of an engagement by identifying problems, and their corresponding corrective actions, when they can be mitigated at the lowest cost to a program.

Through SharpThought Services™, Alterion delivers IV&V expertise in areas such as Quality Management, Risk Mitigation, Requirements Analysis, Process Improvement, Performance Testing, and IT Consulting. Alterion's capabilities are further augmented by its rich network of industry partners, enabling Alterion to provide comprehensive and distinct services.
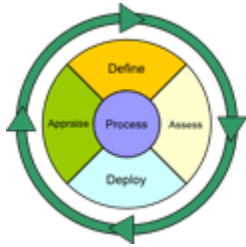
Alterion falls under the classification of a Small Business, as defined by the United States Government. For more information visit Alterion's website at www.alterion.com.

Contact Alterion

Please send general inquiries to info@alterion.com, or send sales inquires to sales@alterion.com.

Alterion, Inc.	Toll-free: (800) 550-8879
555 E. North Lane	Local: (610) 832-9450
Suite 6101	Fax: (610) 832-8399
Conshohocken, PA 19428	

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About Alterion SharpThought™

The Alterion SharpThought™ methodology is a cost-effective method of assuring successful IT system acquisition and deployment through the verification of requirements and the minimization of risks. SharpThought minimizes risk during all phases of a program's life cycle by identifying problems early, allowing corrective actions to be taken at the lowest cost to the program.

SharpThought encompasses a product's full life cycle, from initial concept to retirement, including:

- Requirements Analysis
- Risk Mitigation
- Architectural Assessment
- Systems Integration Testing
- Deployment Assessment
- Post-Release User Surveys

- Quality Management
- Process Improvement
- Performance Testing
- Systems Acceptance Testing
- Defect Tracking and Management
- Contract Award Support

About SharpThought Services™

Backed by over 20 years of experience, and made possible by our unique expertise in process management and contemporary technologies, Alterion delivers an unprecedented level of IV&V services to commercial and government enterprises.

Aligning the core management tools of Process Improvement, Quality Management, Risk Mitigation and Technical Expertise to a varied spectrum of business activities, Alterion has constructed the SharpThought™ methodology for bringing repeatable control mechanisms to bear on complex and demanding projects. With a steady history of diverse and challenging engagements, Alterion has created a methodology that can improve all phases of an organization's business activities.

Contact Alterion to learn more about SharpThought IV&V and how it can fulfill the business execution needs of your organization.