

## a p p e n d i x   b

# Test Tool Evaluations

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Anyone who has contemplated the implementation of an automated test tool has quickly realized the wide variety of options on the market in terms of both the kinds of test tools being offered and the number of vendors. The best tool for any particular situation depends on the system engineering environment that applies and the testing methodology that will be used, which in turn will dictate how automation will be invoked to support the process.

This appendix evaluates major tool vendors on their test tool characteristics, test execution capability, tool integration capability, test reporting capability, performance testing and analysis, and vendor qualification. The following tool vendors evaluated are Compuware, Empirix/RSW, Mercury, Rational, and Segue.

**Table B.1 Test Tool Characteristics:  
Capture/Playback and Script Creation**

Criterion/Feature	Compuware	Empirix/RSW
<b>Ease of Use</b>		
Intuitive and easy to use for users new to automated testing tools	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Uses Visual Scripts which require no programming.
Intuitive and easy to use for users new to this particular tool but who have used others	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Maintainable Visual Scripts, fully extensible programming
Easy to install; tool may not be used if difficult to install	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes No proxy servers or special configurations
Tasks can be accomplished quickly, assuming basic user proficiency	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
Easy to maintain automated tests with a central repository whereby users can separate GUI object definitions from the script	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Use of shared workspace, VBA code shared between scripts
Can vary how designs and documents are viewed (zooming, multipage diagrams easily supported, multiple concurrent views up at the same time); basic windowing	NA	eTest Suite—Yes View test results/data in MDI windows, and switch between
<b>Tool Customization</b>		
Fully customizable toolbars to reflect any commonly used tool capabilities	Performance Edition—Yes	eTest Suite—Not customizable, but common tool capabilities in the toolbar
Tool customizable: fields added, deleted	NA	NA

Mercury	Rational	Segue
<b>Ease of Use</b>		
Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes GUI interface, popup icon bars, tool tips and on-line help.	SilkTest—Yes
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes SQA Robot used for both GUI functional & performance tests.	SilkTest—Yes
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes An administrator should be assigned to help set up test asset datastore & license server.	SilkTest—Yes
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Scripts are maintained in a central datastore.	SilkTest—Set up so that by default, object declarations are in separate <code>include</code> file so script can have minimum code and intuitive steps inside the test cases.
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Dockable windows, toolbars and other attributes allow interface customization.	SilkTest—Uses format similar to Word's outlining. Can zoom in and out of scoping by clicking on pluses and minuses. Can view many documents.
<b>Tool Customization</b>		
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio—Yes Toolbars, menu bars and icon bars are customizable.	SilkTest—No
Astra QuickTest—Yes WinRunner—Yes TestDirector—Yes	Rational Suite TestStudio—Yes Three custom fields used to elaborate on any test asset.	Silk Test—Yes Features are customizable, but not the GUI.

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**Table B.1 Test Tool Characteristics: Capture/Playback and Script Creation (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Tool Customization</b>		
Fully customized editor with formats and colors for better readability	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Code editor fully customizable
Tool support for required test procedure naming convention	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
<b>Platform Support</b>		
Multiple platform support: UNIX, XWindows, Windows CE, Win3.1, Win95, Win98, NT, Win2000, WinME	QACenter—Supports various Windows versions. Performance Edition supports Unix and various Windows. Can also test servers serving content for mobile devices.	Supports Unix and various Windows.
Browser support: all versions of Netscape, Internet Explorer	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
Cross-browser testing (record on IE, replay on NS, or vice versa) capability	NA	eTest Suite—Yes
Technology support for one or more of HTML, DHTML, JavaScript, XML, Java applications and applets, MFC (C/C++), Visual Basic, PowerBuilder, Delphi, Terminal Emulator, Oracle, SAP, PeopleSoft, Siebel	QACenter—Yes Performance Edition—Yes Supports Java apps and applets in a customer's JVM. Supports HTML, DHTML, JavaScript, XML, SAP, Oracle, PeopleSoft, Siebel	eTest Suite—Yes Supports Java apps and applets w/in Microsoft JVM/Sun JVM. HTML, DHTML, JavaScript, XML, MFC, Visual Basic, Oracle, SAP, Delphi, Terminal Emulator, PowerBuilder, Oracle, PeopleSoft

Mercury	Rational	Segue
<b>Tool Customization</b>		
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Robot editor is color-coded. Reserved words highlighted—blue, comments—green.	SilkTest—Good editor
Astra QuickTest—Yes WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Names up to 40 characters. Dashes / Numeric okay.	SilkTest—Yes Alphanumeric with no space.
<b>Platform Support</b>		
WinRunner—various Windows Astra QuickTest—supports various Windows. Astra LoadTest—NT XRunner—HP, IBM, Sun LoadRunner—NT, Unix	Rational Suite TestStudio, Rational Robot—Yes Supports UNIX and various Windows	Supports UNIX and various Windows
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes Presently not Netscape 6.0	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes
WinRunner—Yes HTML, DHTML, JavaScript, VBScript, XML, Java applets, ActiveX, Visual Basic, PowerBuilder, Delphi, Terminal Emulator, Oracle, SAP, PeopleSoft, Siebel Astra QuickTest—HTML, DHTML, JavaScript, VBScript, XML, Java applets, ActiveX	Rational Suite TestStudio, Rational Robot—Yes HTML, Dynamic HTML, JavaScript, VBScript, ActiveX, Java apps, Java applets	SilkTest: Yes—HTML, DHTML, JavaScript, XML, Java apps and applets, MFC, Visual Basic, Oracle, PowerBuilder, Delphi, SAP

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**Table B.1 Test Tool Characteristics: Capture/  
Playback and Script Creation (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Language Features</b>		
Allows add-ins/extensions compatible with third-party controls	TestPartner—Yes	eTest Suite—Yes
Does not involve additional cost for add-ins and extensions	NA	eTest Suite—Yes
Test editor/debugger feature	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Extensive debugger
Test scripting language flexible yet robust; allows for modular script development	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Visual Scripts do not require a programming language, but can be extended by using VB. Can use script libraries.
Scripting language not too complex	TestPartner uses VBA for scripting language. Performance Edition uses C, a common language. QARun has its own scripting language.	VB—a common language
Scripting language allows for variable declaration and use and for parameters to be passed between functions	QACenter—Yes Performance Edition—Yes Language also supports COM testing	eTest Suite—Yes
A test script compiler or an interpreter used	QARun and TestPartner use an interpreter. Performance Edition—Scripts are compiled for performance benefits.	eTest Suite—Yes Scripts are compiled for performance benefits.

Mercury	Rational	Segue
<b>Test Language Features</b>		
WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Supported via following utilities/functions: object mapping, object data test, definition, Java Proxy API, Custom Control API.	SilkTest—Yes Accomplished via object mapping, dll calls, or by adding an extension via our Extension Kit.
WinRunner—Additional costs for some environments	Rational Suite TestStudio, Rational Robot—No additional costs.	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes Color-coded editor and debugger to include a compile option, debug run mode, go until cursor mode, step mode, breakpoints and a watch variables window.	SilkTest—Yes
WinRunner—Yes uses TSL (Test Script Language) developed for testing. Astra QuickTest uses VBScript.	Rational Suite TestStudio, Rational Robot—Yes Two scripting languages, both robust and extensible. Users can write functions, create libraries & call external API's. Robot can also be utilized using Visual Basic and Java.	SilkTest—Yes
WinRunner TSL is easy to use, English-like interpreted, procedural language. Astra QuickTest uses VBScript also interpreted language.	Rational Suite TestStudio, Rational Robot—SQABasic is a VB-like language. VU is C-like language used for performance testing.	SilkTest—Not complex. Object Oriented language structure with ability to use functions. Very much like C++, not as rigid as Java.
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes Strong feature of SilkTest.
Mercury Interactive tools use interpreted languages.	Rational Suite TestStudio, Rational Robot—Yes SQABasic scripts compiled and then interpreted at runtime. VU scripts are compiled to an executable format.	SilkTest—Yes Compiler used for performance, manipulate the actual objects, and exercise actual AUT code.

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**Table B.1 Test Tool Characteristics: Capture/Playback and Script (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Language Features</b>		
Interactive test debugging: allows viewing variable values, steps through the code, integrates test procedures, or jumps to other external procedures	QARun—Limited TestPartner—VBA full debugger Performance Edition—Limited	eTest Suite—Yes VBA debugger combined with Visual Script debugger.
Allows recording at the widget level (object recognition level)	NA	eTest Suite—Yes Objects are recognized at the DOM level.
Allows for interfacing and testing of external .dll and .exe files	TestPartner—Yes Performance Edition—Yes	eTest Suite—Yes Interface to call any external program or .dll
Published APIs: Language Interface Capabilities	TestPartner—Yes	eTest Suite—Yes Capability is called e-PI
Tool is not intrusive: source code of application needs to be expanded by inserting additional statements or DLLs for the application to be compatible with the tool	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
Allows for data-driven testing	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Wizard driven
Allows for automatic data generation	QACenter—Yes Performance Edition—Yes	eTest Suite—No
Allows for adding timers for timing transaction start and end	Performance Edition—Yes QACenter—Yes QALoad—Yes	eTest Suite—Yes



Mercury	Rational	Segue
<b>Test Language Features</b>		
Mercury Interactive tools offer full debugging capabilities.	Rational Suite TestStudio, Rational Robot—Yes Debugging to include a compile option, debug run mode, go until cursor mode, step mode, breakpoints and a watch variables window.	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes Object recognition is available and customizable.	SilkTest—Yes Strong feature of SilkTest.
Mercury Interactive tools— Yes	Rational Suite TestStudio, Rational Robot—Yes External dll and exe files can be called from within test scripts. Also a GUI script can detect if a dll or exe is loaded. Also has file existence and file compare verification.	SilkTest—Yes
Mercury Interactive tools— Yes Published APIs.	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes	SilkTest—Yes Extension Kit allows direct communication with app.
Mercury Interactive tools do not require any modification of the application under test.	Rational Suite TestStudio, Rational Robot—Yes Specific environments like Delphi require code insertion (running the Enabler utility) to achieve object recognition.	SilkTest—Yes Tool is not invasive.
Mercury Interactive tools— Yes	Rational Suite TestStudio, Rational Robot—Yes Both GUI and VU scripts can be augmented to handle data variation.	SilkTest—Yes Object oriented feature implemented to support data driven testing.
Mercury Interactive tools— Do not support data generation but allow for automatic retrieval and import of real test data.	Rational Suite TestStudio, Rational Robot—Yes Datapools can be created for use with GUI or VU scripts.	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes

*(continued)*

**Table B.1 Test Tool Characteristics: Capture/  
Playback and Script Creation (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Language Features</b>		
Allows for adding comments during recording	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
Allows for automatic or specified synchronization between client and server	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
Allows for verification of object properties Allows for object data extraction and verification	TestPartner—Yes	eTest Suite—Yes All properties of DOM objects
Allows for database verification	Performance Edition—Yes	eTest Suite—Yes Via ODBC functions in VB.
Allows for text (alphanumeric) verification	QACenter—Yes	eTest Suite—Yes
Allows for wrappers (shells) whereby multiple procedures can be linked and called from one procedure	QACenter—Yes	eTest Suite—Yes
Allows for automatic data retrieval from any data source—RDBMS, legacy system, spreadsheet—for data-driven testing	TestPartner—Yes	eTest Suite—Yes Via ODBC in scripts or dump to .csv file format to populate a databank
Allows for use of common spreadsheet for data-driven testing	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Supports .csv format

Mercury	Rational	Segue
<b>Test Language Features</b>		
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes Comments may be added during recording.	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes Wait States for GUI playback For VU scripts, synchronization is automatic.	SilkTest—Yes Can automatically connect to a particular agent, or use a script to connect. Can change from one particular agent to another.
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes
WinRunner—Yes Via ODBC and native database connectivity. Astra QuickTest—Yes via VBScript functions.	Rational Suite TestStudio, Rational Robot—Yes Via ODBC functions in SQABasic	SilkTest—Yes Via database Tester 4Test functions.
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes Uses either shell scripts (Robot), LoadTest v2000 schedules, TestManager v2001 Suites.	SilkTest—Yes
WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Via ODBC in scripts or dump to <code>.csv</code> file format. SQABasic can also read <code>.csv</code> files directly. Also can use <code>.csv</code> files to create datapool source data.	SilkTest—Yes Database Tester functions used to supply an ODBC hookup, or can script parsing for any files.
WinRunner—Yes Astra QuickTest—Yes Both support Excel format.	Rational Suite TestStudio, Rational Robot—Yes Uses <code>.csv</code> format	SilkTest—Yes. Scripts can access and manipulate content within all common spreadsheets.

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**Table B.1 Test Tool Characteristics: Capture/  
Playback and Script Creation (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Language Features</b>		
Ease of maintaining script when application changes	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes Automatic update of scripts, no recoding required.
<b>Test Tool Database</b>		
Tool database scalability when test repository grows	NA	eTest Suite—Yes Supports MS Access, MS SQL Server, and Oracle
Network-based test repository, necessary when multiple access to repository required	QACenter—Yes	eTest Suite—Yes Shared workspaces
Supports ANSI SQL execution	TestPartner—Yes Performance Edition—Yes	eTest Suite—Yes SQL execution can be done through VB.

Mercury	Rational	Segue
<b>Test Language Features</b>		
WinRunner—Yes Astra QuickTest—Yes Via GUI map or object repository	Rational Suite TestStudio, Rational TeamTest, Rational Robot—Yes Robot editor and debug tools enable easy maintenance.	SilkTest—Yes. Include file can be updated whenever objects change in name or nature.
<b>Test Tool Database</b>		
WinRunner & Astra QuickTest do not use a database. TestDirector support for all major database vendors.	Rational Suite TestStudio—Yes For v2001—database repository replaced with an XML—based datastore. Within the datastore, Access database used for queries and reports.	SilkTest—Yes. Doesn't have limitations or slowdowns based on the sheer volume of test code.
TestDirector—Yes	Rational Suite TestStudio—Yes	SilkTest—Yes. Files can be placed anywhere, provided there is network directory access to test code.
WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Via SQL commands in SQABasic.	SilkTest—Yes

**Table B.2 Test Execution Capability**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Control Features</b>		
Ability to kick off scripts at a specified time; scripts can be scheduled and run unattended	QACenter—Yes Performance Edition—Yes QADirector allows scheduling for specific dates/times and /or regular time periods.	eTest Suite—Yes Schedules Visual Scripts or sets of scripts to run unattended.
Has a complete graphical palette to design and to schedule test runs based on dates and time, or logic between tests	PE/ QADirector do not have graphical palette.	eTest Suite—Yes
Stateless playback: Application does not have to be in a preset state before script playback	Inclusion of File—AID/CS allows PE to test application DBMS states. QADirector allows for setup, execution and restore	eTest Suite—Yes
Centralized execution and control	QADirector supports access, execution, review of results from a central location.	eTest Suite—Yes e-Test console provides centralized monitoring of all application activity.
Standalone test execution automation	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
<b>Distributed Test Execution</b>		
Distributed test control, synchronization, execution	QACenter—Yes QADirector supports distributed execution where app is tested as it runs in production Performance Edition—Yes	eTest Suite—Yes
Execution of manual or automated tests via a browser for anywhere/anytime test execution, with Web-based test management	Manual test execution is web-based. Web interface is underway for other features.	eTest Suite—No
Supports synchronization of multitest threads	For QADirector tests can be parallel or singular Performance Edition—Yes	eTest Suite—Yes

Mercury	Rational	Segue
<b>Test Control Features</b>		
TestDirector—allows scheduling. LoadRunner has built-in schedulers for load scenarios.	Rational Suite TestStudio, Rational Robot—Yes Robot script checks the time, LoadTest v2000 & TestManager v2001 scheduled to run at a specific time.	SilkTest—Yes No separate tool required
TestDirector—Yes	Rational Suite TestStudio, Rational Robot—Yes Suite creation in TestManager v2001 is all graphical.	SilkTest—No
WinRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes Robot GUI scripts can locate any window, by using window set context to locate a window to begin script playback. VU scripts are completely stateless.	SilkTest—Yes Any script can be run at any time
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes	SilkTest—Yes
<b>Distributed Test Execution</b>		
TestDirector—allows for local or remote test execution control via networks.	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes. All parts of TestDirector can be accessed via a browser.	Rational Suite TestStudio—Not currently	SilkTest—No No web front end at present. One could be created, since tool can run from the command line.
WinRunner—Yes	Rational Suite TestStudio—Yes	SilkTest—Yes

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**Table B.2 Test Execution Capability (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Distributed Test Execution</b>		
Headless back-end server testing	Performance Edition—Yes QADirector tests can be routed to any server or workstation attached to the network.	eTest Suite—Yes
Allows for test execution across LANs and WANs	Performance Edition—Yes QADirector supports a central repository that can be accessed via the network.	eTest Suite—Yes
Test results analysis: automatic creation of test results log	QACenter—Yes QADirector supports both pass/fail as well as drill down. Performance Edition—Yes	eTest Suite—Yes
Multiplatform testing support	Performance Edition—Yes QADirector supports Unix, Windows and OS/390	eTest Suite—Yes Supports Unix and various Windows.
<b>Test Suite Recovery Logic</b>		
Unexpected error recovery: Can handle error recovery and unexpected active windows, logs the discrepancy, and continues playback (automatic recovery from errors)	QACenter—Yes Performance Edition—Yes	eTest Suite—Yes
Can restore the application to its initial state or provides ways for the application to be restored	QACenter—Yes Performance Edition—Yes QADirector—Yes	eTest Suite—Yes



Mercury	Rational	Segue
<b>Distributed Test Execution</b>		
WinRunner—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes Network connectivity needed to the particular machine with the SilkTest agent.
WinRunner—Yes Astra QuickTest—Yes Visually displayed for ease of scanning.	Rational Suite TestStudio, Rational TestManager—Yes Test results are viewed from TestManager. Defects and enhancements may be reported directly from the Test Log via ClearQuest integration.	SilkTest—Yes
Mercury Interactive tools provide support for over 28 different platforms.	Rational Suite TestStudio, Rational TestManager—Yes Supports Unix and various Windows	SilkTest—Yes
<b>Test Suite Recovery Logic</b>		
WinRunner—Yes Astra QuickTest—Yes Via exception handler.	Rational Suite TestStudio, Rational Robot—Yes Error recovery for script failures and verification point failure. Also unexpected active window handler can be set. When fatal error is encountered, trap feature can be used to obtain a stack trace, module lists, restart Windows or run a procedure.	SilkTest—Yes
WinRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkTest—Yes

(continued)

**Table B.2 Test Execution Capability (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Management</b>		
Supports test execution management	QACenter—Yes Performance Edition—Yes QADirector—Yes	eTest Suite—Yes Through e-Manager
Supports industry standards in testing process (SEI/CMM, ATLM, ISO)	QACenter—Yes Performance Edition—Yes QADirector—Yes	eTest Suite—Yes
Application requirements management support integrated with the test management tool	QADirector—Integrates with Reconcile/DOORS for RM Performance Edition—NA	eTest Suite—No
Requirements management capability supports the trace of requirements to test plans to provide requirement coverage metrics	QADirector Integrated with Reconcile—Yes	eTest Suite—No
Test plans can be imported automatically into test management repository from standard text files	QADirector—Yes Performance Edition—NA	eTest Suite—No
Tool can be customized to organization's test process	QADirector supports various testing methodologies. Performance Edition—NA	eTest Suite—Yes
Supports planning, managing, and analyzing testing efforts; can reference test plans, matrices, product specifications, in order to create traceability	QADirector—plan and report test activity. Performance Edition—NA	eTest Suite—Yes e-Manager and d-Tracker provide the ability to track and manage the testing process
Supports manual testing	QADirector—provides manual test creation. Performance Edition—NA	eTest Suite—Yes
Supports the migration from manual to automated scripts	QADirector—can replace manual tests with automated testing scripts Performance Edition—NA	eTest Suite—No

*B.2 Test Execution Capability*

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Mercury	Rational	Segue
<b>Test Management</b>		
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes	Rational Suite TestStudio, Rational TeamTest, Rational TestManager, Rational Unified Process—Yes	SilkTest—Yes
TestDirector—has built-in requirements management. Also integrates with 3rd party RM tools like TBI Caliber, DOORS and RequisitePro	Rational Suite TestStudio, Rational Robot—Yes TestManager can utilize RequisitePro or Rational Rose. Other RM tools used via the creation of Test Input Adapters using TestManager's open API.	SilkTest—No
TestDirector—Yes	Rational Suite TestStudio, Rational Robot—Yes Requirements can be traced to Test Cases within a Test Plan in TestManager.	SilkTest—No
TestDirector—Yes	Rational Suite TestStudio—Yes Via RequisitePro integration.	SilkTest—Yes
TestDirector—Yes	Rational Suite TestStudio, Rational TeamTest, Rational TestManager, Rational Unified Process—Yes	SilkTest—Yes Built-in test plan functionality can be customized to process.
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes Via use of extensive results files with collapsability features and through using test plans.
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes Specify manual tests via a test plan or using <code>Agent.Display()</code> method within a script.
TestDirector—Yes Generates commented script for ease of recording business processes.	Rational Suite TestStudio—No	SilkTest—Yes Can replace manual tests with scripts to perform steps for you.

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**Table B.2 Test Execution Capability (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Test Management</b>		
Can track the traceability of tests to test requirements	QADirector—Integrates with Reconcile/DOORS for RM Performance Edition—NA	eTest Suite—No
Has built-in test requirements modules	Reconcile provides full RM Performance Edition—NA	eTest Suite—No
Tool can check for duplicate defects before logging newly found defects	QADirector—Yes Performance Edition—NA	eTest Suite—Yes
Allows for measuring test progress	QADirector—Yes Performance Edition—NA	eTest Suite—Yes
Allows for various reporting activities	QADirector—Yes Also supports 3rd party report generators & reports to the web Performance Edition—NA	eTest Suite—Yes
Allows for tracking of manual and automated test cases	QADirector—Yes Also provides file/data mgmt Performance Edition—NA	eTest Suite—No

Mercury	Rational	Segue
<b>Test Management</b>		
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes viaTestManager coverage reports.	SilkTest—Yes
TestDirector—Yes Also integrates with 3 <sup>rd</sup> party RM tools	Rational Suite TestStudio, Rational TestManager—Yes Via RequisitePro	SilkTest—No
TestDirector—Yes	Rational Suite TestStudio, Rational ClearQuest—Yes	SilkTest —NA Does not support defect tracking.
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes	Rational Suite TestStudio, Rational TeamTest, Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes TestManager is 100% test case centric to allow for manual & automated implementation.	SilkTest—Yes

**Table B.3 Tool Integration Capability**

Criterion/Feature	Compuware	Empirix/RSW
Interface to software architecture/modeling tool	Does not have direct integration	Does not have direct integration
Integration to unit testing tools	QADirector—Yes With TestPartner, TrueTime, ActiveAnalysis, TrueCoverage, BoundsChecker.	eTest Suite—Supports unit testing of Middleware Objects.
Interface to test management tool	QADirector—Yes With Reconcile & TrackRecord	eTest Suite—Yes
Interface to requirements management tool	QADirector—Yes With Reconcile & DOORS	eTest Suite—No
Interface to defect tracking tool	QADirector—Yes With TrackRecord	eTest Suite—Yes
Interface to configuration management tool	QADirector—Yes Version control tests within CM tool of choice	eTest Suite—No

*B.3 Tool Integration Capability*

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<b>Mercury</b>	<b>Rational</b>	<b>Segue</b>
Mercury Interactive tools— Yes	Rational Suite Enterprise, Rational Suite DevelopmentStudio, Rational Suite TestStudio, Rational TestManager—Yes Rational Rose model elements can be used as test inputs using TestManager v2001. Can generate scripts from UML models in Rose.	SilkTest—No
Mercury Interactive tools— Yes Such as McCabe tools.	Rational Suite Enterprise, Rational Suite DevelopmentStudio—Yes Rational Quality Architect v2001 (EJB & COM)	SilkTest—Unit testing supported by SilkTest.
Mercury Interactive tools— Yes WinRunner, LoadRunner, Astra QuickTest and Astra LoadTest integrate with TestDirector.	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes Integrates with 3 <sup>rd</sup> party RM tools	Rational Suite TestStudio, Rational TestManager—Yes TestManager fully integrates with RequisitePro and Rational Rose. Other RM tools integrated via the Test Input Adapter API.	SilkTest—No
Mercury Interactive tools— Yes Built-in defect management tool. Also integrate with ClearQuest and PVCS Tracker	Rational Suite TestStudio, Rational TestManager—Yes Test Log is integrated with ClearQuest	SilkTest—Yes
TestDirector—Yes Built-in interface to MS Sourcesafe, PVCS Version Manager and ClearCase	Rational Suite TestStudio—Yes ClearCase LT shipping with testing products v2001 and beyond	SilkTest—Yes

**Table B.4 Test Reporting Capability**

Criterion/Feature	Compuware	Empirix/RSW
<b>Summary-Level Reporting</b>		
Error filtering and review features	Performance Edition—Yes	eTest Suite—Yes
Metric collection and metric analysis visualization	Performance Edition—Yes Metric collection & reporting	eTest Suite—Yes
<b>Test Report Presentation</b>		
Predefined reports can be modified and new reports created	Performance Edition—Yes Reports modified & created	eTest Suite—Yes
Most widely used views can be created and made public for others to view at their leisure with automatically updated information	Performance Edition—Yes Fields & views customizable	eTest Suite—Yes HTML output to web. Complete flexibility with Web Reporter.
Generate graphs and reports from test results	Performance Edition—Yes Library of graphs/reports	eTest Suite—Yes
Graphs and reports fully customizable, supporting more than just limited modification, such as allowing choice of axis labels	Performance Edition—Yes	eTest Suite—Yes
Reports are exportable to HTML, .csv, or .txt files	Performance Edition Outputs to HTML format	eTest Suite—Yes



*B.4 Tool Reporting Capability*

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Mercury	Rational	Segue
<b>Summary-Level Reporting</b>		
TestDirector—Yes	Rational TestManager—Yes Users create Test Log filters and sort the log items	SilkTest—Yes
TestDirector—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkTest—Yes
<b>Test Report Presentation</b>		
TestDirector—Yes Document Generator provides full customization of reports.	Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes	Rational TestManager—Yes	SilkTest—Yes Ability to view work of others and can control write-ability through use of permissions.
TestDirector—Yes	Rational TestManager—Yes	SilkTest—Yes
TestDirector—Yes	Rational TestManager—Yes	SilkTest—No
TestDirector—Yes LoadRunner—Yes Automatic HTML report generation setting	Rational TestManager—Yes	SilkTest—Yes

**Table B.5 Performance Testing and Analysis Capability**

Criterion/Feature	Compuware	Empirix/RSW
<b>Load and Stress Test Features</b>		
All users can be queued to execute a specified action at the same time	Performance Edition—Yes	eTest Suite—Yes
Automatic generation of summary load testing analysis reports	Performance Edition—Yes	eTest Suite—Yes
Ability to change recording of different protocols in the middle of load-recording session	Performance Edition—Yes Can record multiple middleware and protocols during same recording session.	eTest Suite—Yes Can change protocols as long as within the web transaction and can be recorded.
Actions in a script can be iterated any specified number of times without programming or rerecording of the script	Performance Edition—Yes	eTest Suite—Yes With or without variable data.
Different modem connection speeds and browser types can be applied to a script without any rerecording	Performance Edition—Yes	eTest Suite—Yes
Load runs and groups of users within load runs can be scheduled to execute at different times	Performance Edition—Yes	eTest Suite—Yes
Automatic load scenario generation based on load testing goals: hits/second, number of concurrent users before specified performance degradation, and so on	Performance Edition—Yes	eTest Suite—No
Cookies and sessions IDs automatically correlated during recording and playback for dynamically changing Web environments	Performance Edition—Yes	eTest Suite—Yes Never requires programming, entirely automatic

Mercury	Rational	Segue
<b>Load and Stress Test Features</b>		
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes Via sync points	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes for some protocols.	Rational Suite TestStudio, Rational Robot—Yes All protocols can be captured during a single recording session, so “changing” protocols is not necessary. After recording, the multiple protocols can be put into a single script, or, filtering could be used to put a single, or a combination of multiple protocols into a single script.	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes A simple runtime setting.	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes Most other tools require that all user actions be put in a single script— Rational Robot allows a user session to be split into multiple scripts, each of which can be iterated any number of times via the graphical scheduling mechanism in TestManager.	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes A simple runtime setting.	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes	SiteLoad, Rational Suite TestStudio— Yes (in TestManager via Transactors)	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes Does not require programming, entirely automatic.	Rational Suite TestStudio, Rational TestManager, Rational Robot—Yes	SilkPerformer—Yes

(continued)

**Table B.5 Performance Testing and Analysis Capability (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Load and Stress Test Features</b>		
Allows for variable access methods and ability to mix access methods in a single scenario: modem simulation or various line speed simulation	Performance Edition—Yes	eTest Suite—Yes
Ability to have data-driven scripts that can use a stored pool of data	Performance Edition—Yes	eTest Suite—Yes with DataBank Wizard
Allows for throttle control for dynamic load generation	Performance Edition—Yes	eTest Suite—Yes
Allows for automatic service-level violation (boundary value) checks	Performance Edition—Yes	eTest Suite—Yes
Allows for variable recording levels (network, Web, API, and so on)	Performance Edition—Yes	eTest Suite—No
Allows for transaction breakdown/drill-down capabilities for integrity verification at the per client, per session, and per instance level for virtual users	Performance Edition—Yes Offers integrated load testing and server monitoring.	eTest Suite—Yes
Allows for Web application server integration: ColdFusion, NetDynamics, Dynamo, and so on	Performance Edition—Yes	eTest Suite—Yes
Supports workload, resource, and/or performance modeling	Performance Edition—Yes	eTest Suite—Yes
Can run tests on various hardware and software configurations	Performance Edition—Yes	eTest Suite—Yes

Mercury	Rational	Segue
<b>Load and Stress Test Features</b>		
LoadRunner—Yes Astra LoadTest—Yes	Rational TestManager Suite—Yes Any combination of tests is possible.	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager, Rational Robot—Yes Via Datapools.	SilkPerformer—Yes
LoadRunner—Yes	Rational Suite TestStudio, Rational TestManager—Yes With Transactors (graphical point and click creation) or Shared Variables (hand coded)	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Scripts can be deployed to support these checks.
LoadRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkPerformer—Yes Allows variable levels and mixing of protocols for a script, user or transaction.
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes Including ability to record and replay against the applications, and monitor the app server performance during load test.	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes

*(continued)*

**Table B.5 Performance Testing and Analysis Capability (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Load and Stress Test Features</b>		
Support headless virtual user testing feature	Performance Edition—Yes	eTest Suite—Yes
Requires low overhead for virtual user feature (Web, database, other?)	Performance Edition—Yes Exceptionally low overhead	eTest Suite—Yes Small footprint per Virtual User
Scales to 500–1,000 virtual users	Performance Edition—Yes	eTest Suite—Yes
Simulated IP addresses for virtual users	Performance Edition—Yes	eTest Suite—Yes
Thread-based virtual user simulation	Performance Edition—Yes	eTest Suite—Yes Default and most efficient mode of testing
Process-based virtual user simulation	Performance Edition—Yes	eTest Suite—Yes Optional
Centralized load test controller	Performance Edition—Yes	eTest Suite—Yes
Allows for reusing scripts from functional test suite	Performance Edition—Yes Functional/load test scripts can be created at same time. Two use different languages.	eTest Suite—Yes Visual Scripts created during functional testing reused for load testing and monitoring
Support for WAP protocol testing against WAP Gateway or Web server	Performance Edition—Yes	eTest Suite Yes for the web server
Compatible with SSL recording	Performance Edition—Yes	eTest Suite—Yes

Mercury	Rational	Segue
<b>Load and Stress Test Features</b>		
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Very high scalability ratings using TurboLoad technology.	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Largest load recorded to date generated more than 1.35M concurrent connections. Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes Both use IPSpoof feature.	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Included since some apps require it for accuracy.	Rational Suite TestStudio, Rational TestManager—Yes Each virtual user has its own process space and unimpeded access to all resources within a process. Multi-threaded model supported when needed.	SilkPerformer—Yes Can set any number of virtual users as a universal default parameter or set number within a script.
LoadRunner—Yes Astra LoadTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
Astra QuickTest—Yes WinRunner scripts used as GUI Users in LoadRunner.	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkPerformer—Yes

(continued)

**Table B.5 Performance Testing and Analysis Capability (continued)**

Criterion/Feature	Compuware	Empirix/RSW
<b>Load and Stress Test Features</b>		
Compatible with one or more of the relevant technologies: streaming media, COM, EJB, RMI, CORBA, Siebel, Oracle, SAP	Performance Edition—Yes	eTest Suite—Yes
Compatible with one or more of the relevant technologies: Linux, UNIX, NT, XWindows, Windows CE, Win3.1, Win95, Win98, Win2000, WinME	Performance Edition—Yes	eTest Suite—Yes
<b>Performance Monitor Test Features</b>		
Monitors various tiers: Web server, database server, and app server separately	Performance Edition—Yes	eTest Suite—Yes
Supports monitoring for one or more of ColdFusion, Broadvision, BEA WebLogic, Silverstream, ATG Dynamo, Apache, IBM Websphere, Oracle RDBMS, MS SQL Server, Real Media Server, IIS, Netscape Web Server	Performance Edition—Yes	eTest Suite—Yes
Supports monitoring for one or more of the relevant technologies: Linux, NT, UNIX, XWindows, Windows CE, Win3.1, Win95/98, Win2000	Performance Edition—Yes	eTest Suite—Yes
Monitors network segments	Performance Edition—Yes With EcoSystems and Application Expert	eTest Suite—Yes
Supports resource monitoring	Performance Edition—Yes	eTest Suite—Yes
Synchronization ability in order to determine locking, deadlock conditions, and concurrency control problems	Performance Edition—Yes	eTest Suite—Yes
Ability to correlate any metrics from all monitors to identify performance bottlenecks	Performance Edition—Yes	eTest Suite—Yes



Mercury	Rational	Segue
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Load and Stress Test Features		
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LoadRunner—Yes	Rational Suite TestStudio, Rational Robot—Yes	SilkPerformer—Yes
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes	SilkPerformer—Yes
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Performance Monitor Test Features		
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational Robot, Rational TestManager—Yes	SilkPerformer—Yes
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkVision—Yes SilkVision component provides monitoring capability.
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkVision—Yes SilkVision component provides monitoring capability.
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkVision—Yes SilkVision component provides monitoring capability.
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
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LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
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**Table B.5 Performance Testing and Analysis Capability** *(continued)*

Criterion/Feature	Compuware	Empirix/RSW
<b>Performance Monitor Test Features</b>		
Ability to detect when events have completed in a reliable fashion	Performance Edition—Yes	eTest Suite—Yes
Ability to provide client-to-server response times	Performance Edition—Yes	eTest Suite—Yes
Ability to provide graphical results and export them to common formats	Performance Edition—Yes	eTest Suite—Yes
Ability to provide performance measurements of data loading	Performance Edition—Yes	eTest Suite—Yes

Mercury	Rational	Segue
<b>Performance Monitor Test Features</b>		
LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes
LoadRunner—Yes Astra QuickTest—Yes	Rational Suite TestStudio, Rational TestManager—Yes Results can be exported to .csv.	SilkPerformer—Yes
LoadRunner—Yes	Rational Suite TestStudio, Rational TestManager—Yes	SilkPerformer—Yes

**Table B.6 Vendor Qualifications**

Criterion/Feature	Compuware	Empirix/RSW
<b>Consulting Requirements</b>		
Maturity of vendor	On the market since 1996	On the market since 1996
Market share of vendor	Growing market share	Growing market share
<b>Vendor Qualifications</b>		
Financial stability of vendor	Profitable company	Former subsidiary of Teradyne. Formed by the combination of Hammer Technologies and RSW Software and funded by Matrix Partners.
Time existed	Since 1973	Since 1996
<b>Vendor Support</b>		
Software patches provided, if so deemed necessary	Yes	Yes
Upgrades provided on a regular basis	Yes Major releases once per year, point releases once per quarter, bug fixes as necessary.	Yes Major releases once per year, point releases once per quarter, bug fixes as necessary.
Upgrades backward compatible: scripts from previous version can be reused with later version	Yes	Yes
Training available	Yes Onsite and public training.	Yes Onsite and public training.
Help feature available; tool well documented	Yes	Yes
Tech support reputation throughout industry	Highly rated technical support.	Highly rated technical support from customer service surveys.

*B.6 Vendor Qualifications*

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<b>Mercury</b>	<b>Rational</b>	<b>Segue</b>
<b>Consulting Requirements</b>		
Tools have been supporting industry since early 1990s.	Various testing products have been on the market since early 1980s.	SilkTest/QA Partner products on the market since early 1990s.
Considerable market share	Sustaining market share	Sustaining market share
<b>Vendor Qualifications</b>		
Continued/consistent growth pattern over last several years.	Stable/profitable company	Stable/profitable company
Company incorporated in 1989	Since early 1980s	Since early 1990s
<b>Vendor Support</b>		
Yes	Yes	Yes
Yes Built-in updater in the product to check for new patches and features via the Internet.	Yes Every six months.	Yes
Yes	Yes Upgrade and conversion utilities are always provided.	Yes Always within major version releases.
Onsite and public training. Public training facilities around the world.	Yes Rational University Onsite and public training.	Yes
Yes	Yes	Yes
Given prestigious SSPA STAR award last two years for excellence in support.	Yes Service has received many awards	Good Tech support.

*(continued)*

**Table B.6 Vendor Qualifications**

Criterion/Feature	Compuware	Empirix/RSW
<b>Vendor Support</b>		
No consulting needed	Consulting not needed	Consulting not needed
Availability of and access to tool user groups	Several discussion forums	Several discussion forums
<b>Licensing</b>		
Allows for floating license	Floating and node-locked licenses.	Floating and node-locked licenses.
Allows for node-locked license	Yes	Yes
Licensing used	Yes	Yes
Licensing rigid	Flexibility is available.	Flexibility is available and is a commercial decision
<b>Pricing</b>		
Price consistent within estimated price range	NA	NA
Price consistent with comparable vendor products	Yes	Yes

*B.6 Vendor Qualifications*

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<b>Mercury</b>	<b>Rational</b>	<b>Segue</b>
<b>Vendor Support</b>		
Consulting not needed for Astra QuickTest or Astra LoadTest. A QuickStart is recommended for others to obtain maximum return on tool investment.	Consulting generally not needed. Depends on type of testing to be performed.	None needed. Jump start programs available and recommended for teams with tight time constraint.
Complete network of local users groups throughout world.	Several discussion forums	User Groups exist.
<b>Licensing</b>		
Completely flexible licensing from pay-per-use to engagement based to perpetual pricing	Floating and node-locked licenses.	Floating and node-locked licenses.
Yes	Yes	Yes
Yes	Yes	Yes
Completely flexible licensing	Yes	No. Licensing can be based on most need-based models for customers.
<b>Pricing</b>		
NA	NA	NA
Yes	Yes	Yes

