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IBM Rational Performance Tester Tips & Tricks

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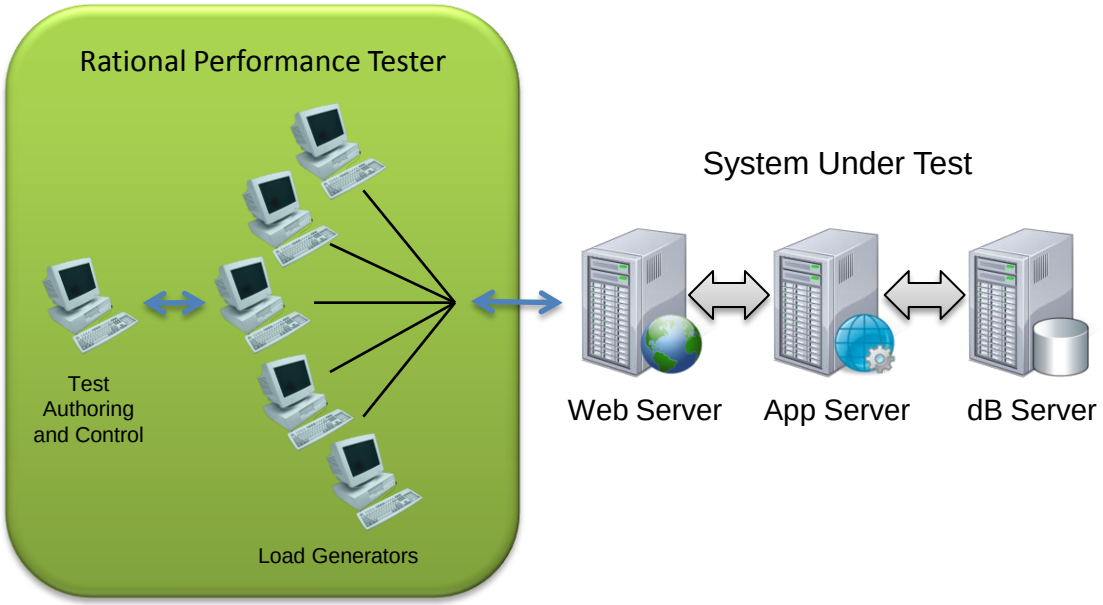
Agenda

- Getting Started
- Recording & Test Generation
- Executing Tests
- Reports
- Troubleshooting

Rational Performance Tester

Comprehensive test planning, authoring, and analysis to identify and manage the risk of application performance failures

1. Capture and track Business SLAs in your test plans
2. Create realistic user workloads that exercise the key business transactions
3. Automatically deploy the environment and schedule execution of your workload
4. Identify the root cause of performance problems
5. Communicate results and areas of non-compliance to the stakeholders



Tip – Take Baby Steps

- Running too many users too soon can mask lots of problems
  - –Login failures
  - –Server failures
  - –Dynamic data failures
  - –Duplicate keys

- The Solution
  - –1 User – is dynamic data handled correctly?
  - –2 Users – data that has to be unique using a datapool?
  - –10 Users – does login need to be staggered?
  - –50 Users – effect on agent & server cpu/memory as you increase users?
  - –100 Users – is your agent sized correctly for target load?

Tip – Performance Test Driven Development

- Performance Test Early & Often
  - Easier to address issues if found right after delivery
  - Less costly to fix than when found late in development

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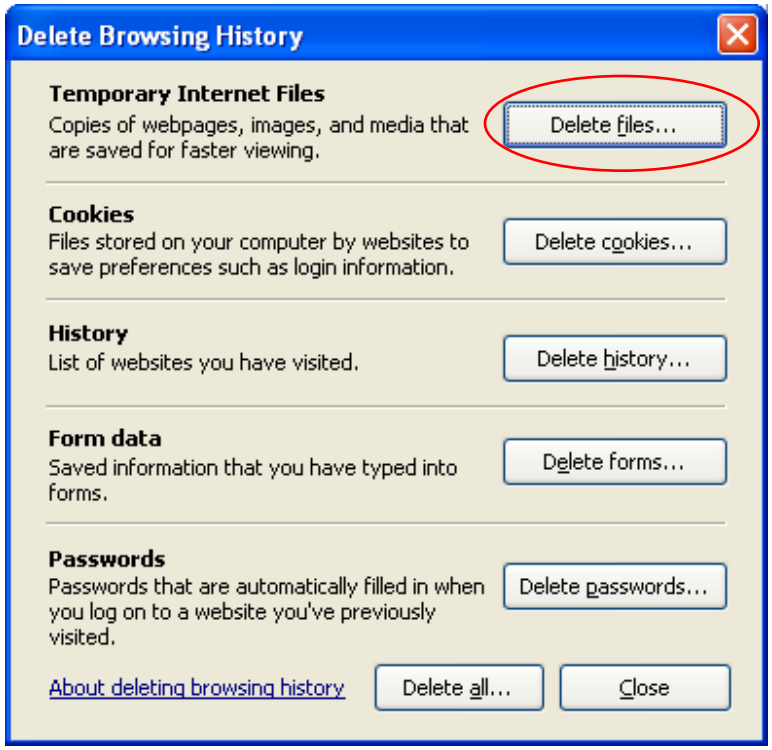
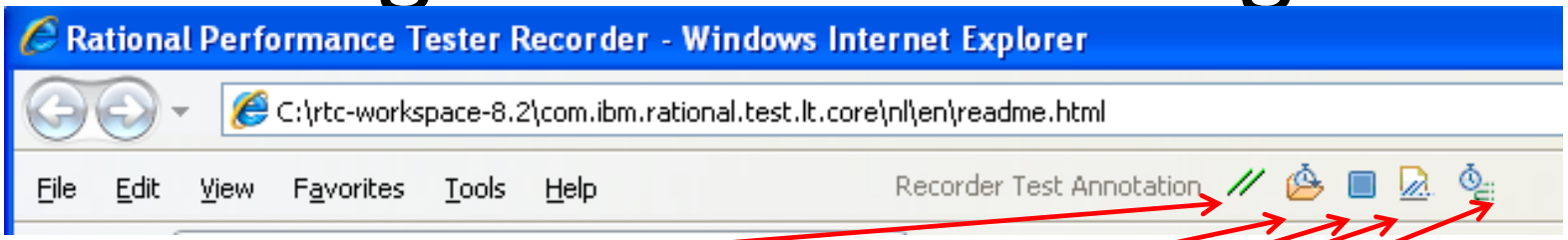
Test Creation Tips

- Clear browser cache & cookies
  - –Browser responds with content, not 304
- Pause between pages (3-5 seconds)
  - –Pages clearly separated in the test
- Mouse hovers
  - –May result in unwanted server activity
  - –Real application users are going to cause this sort of spurious activity



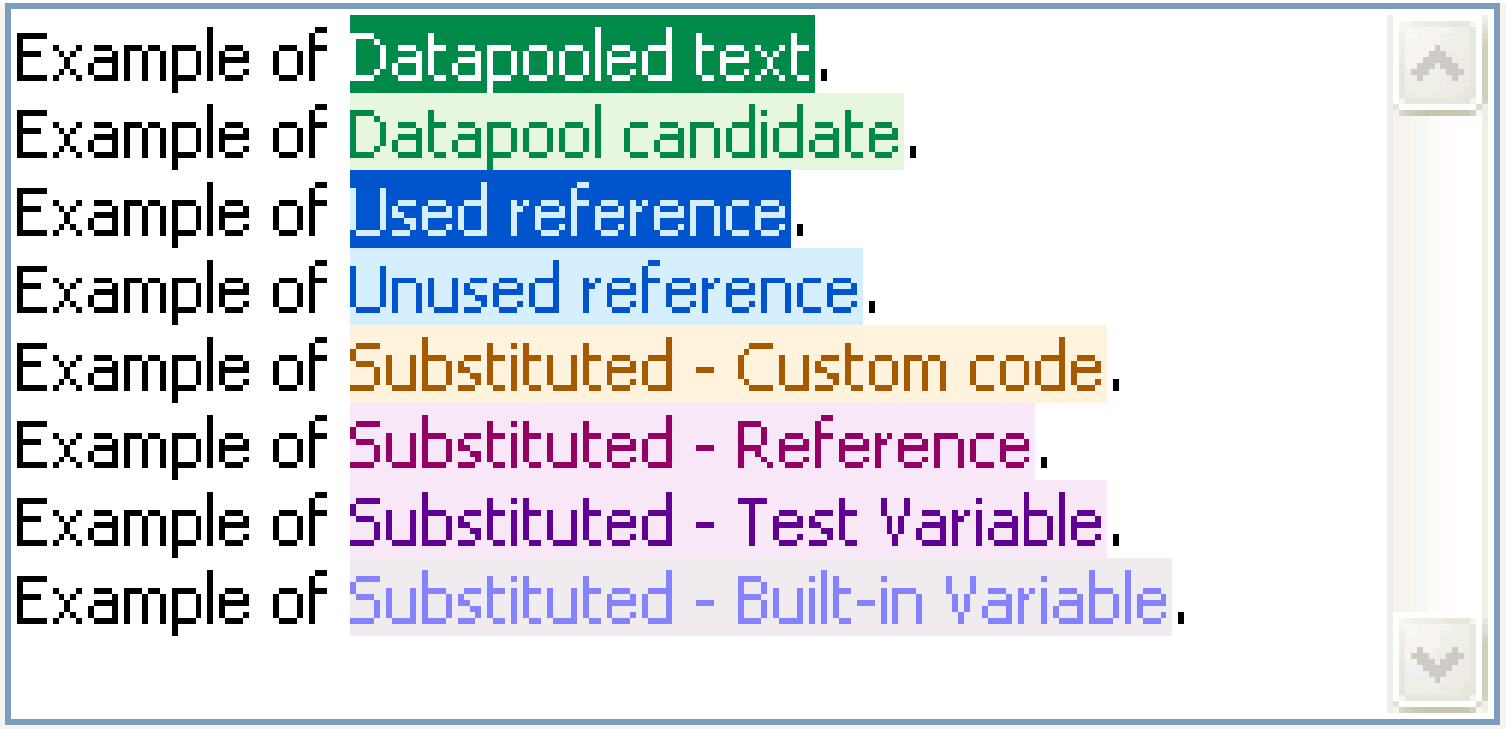
Creating a Test - Recording



- Comments
  - –Add context if page name not clear
- Start Transaction
  - –Groups related actions
- Stop Transaction
- Name pages
  - –Makes the test more readable
- Split test
  - –Modularity for sharing assets
  - –Split login & logout from application work

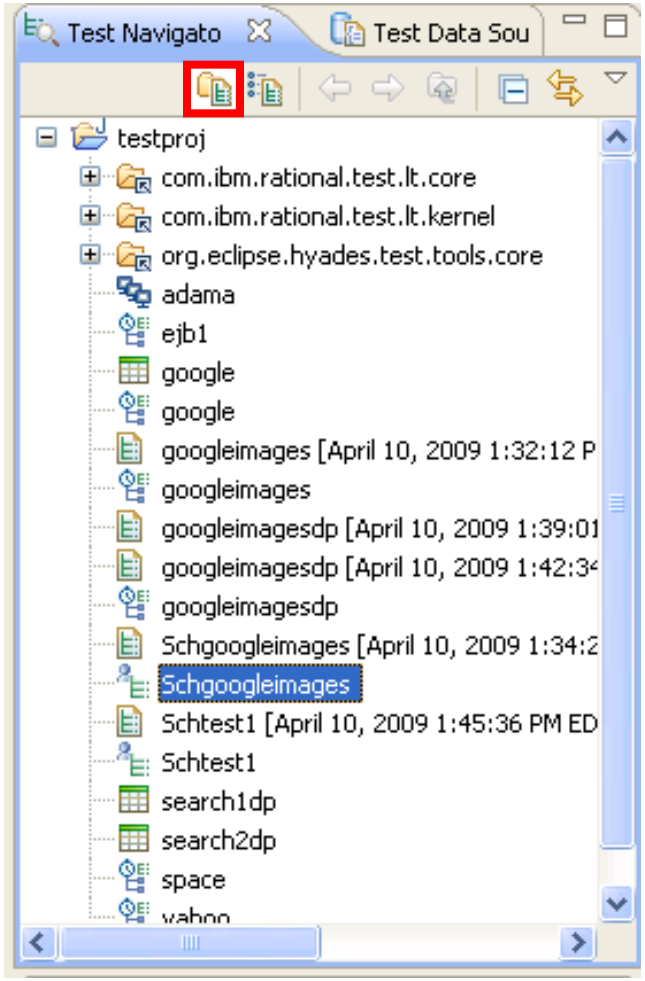
Color

- Window > Preferences > Test > Test Editor

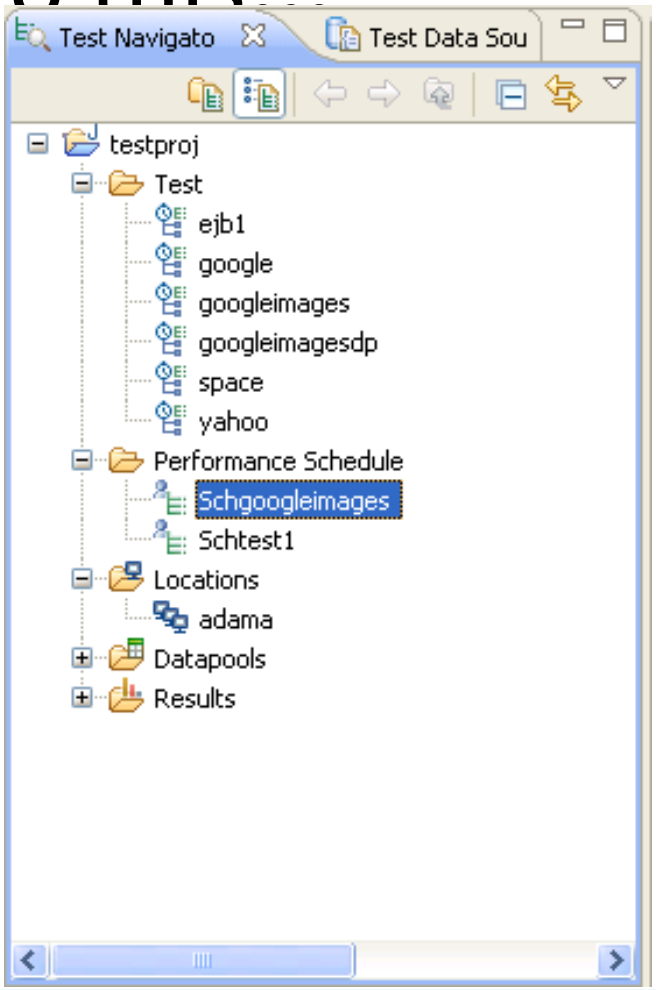


Logical Test Navigator

- From this…

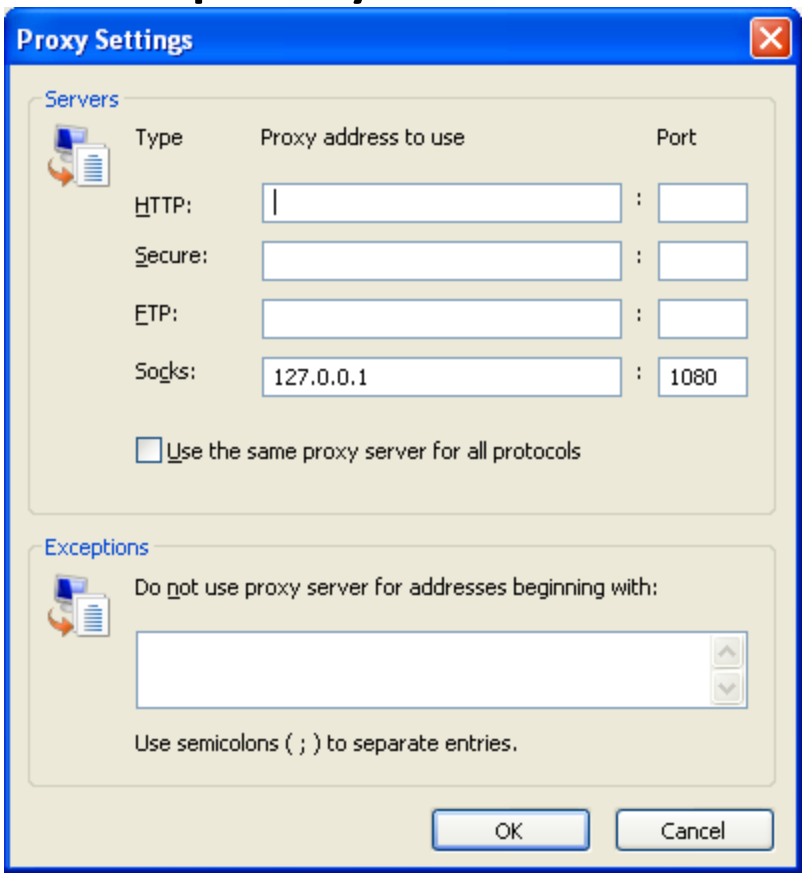


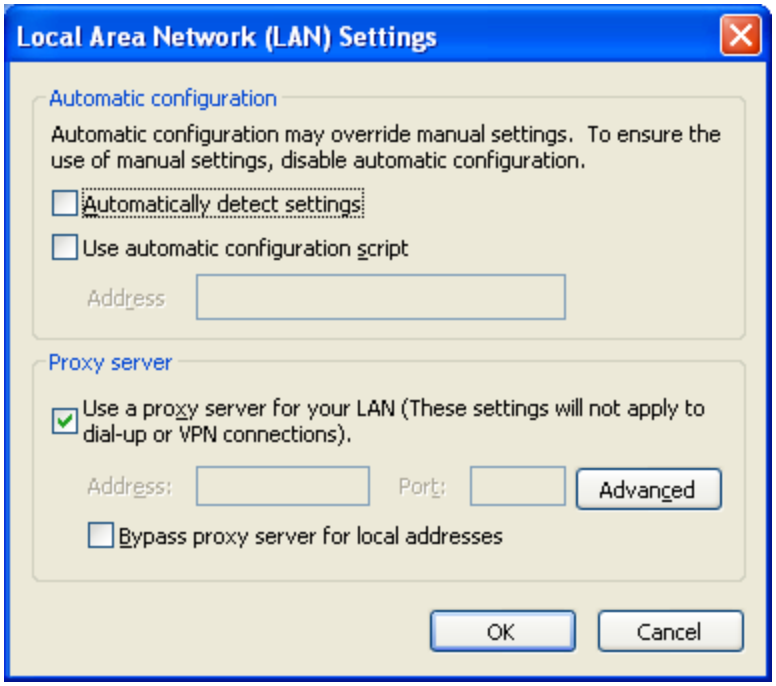
- To this…



How RPT Recording Works

- SOCKS proxy recorder





Recorder Missing Some or All Data

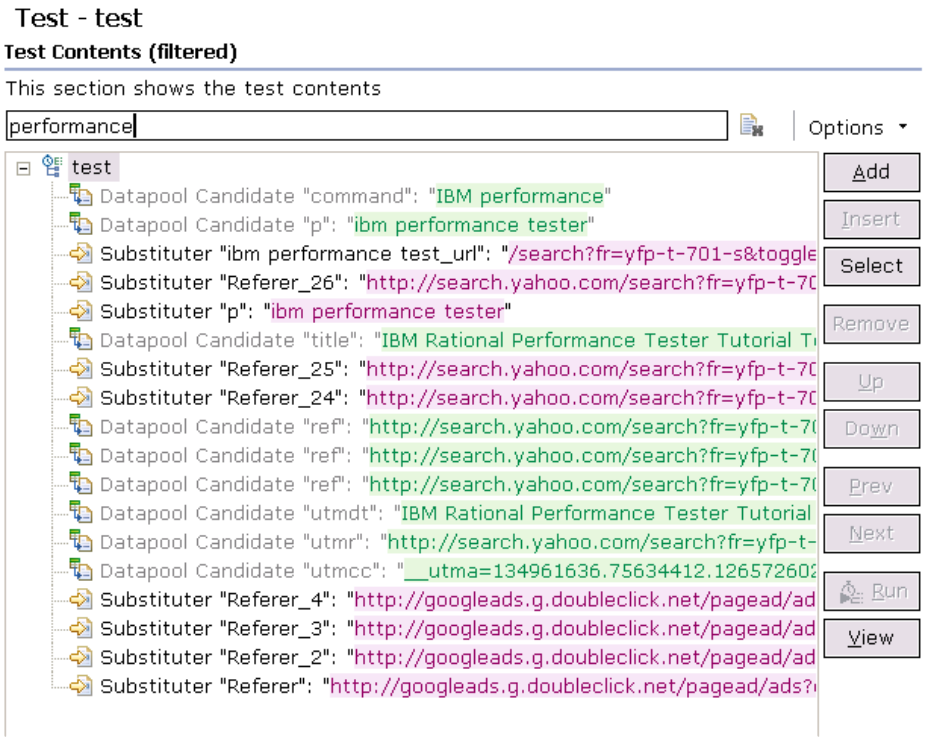
- Check registry settings
  - –Tools > Internet Options > Connections > LAN Settings > Advanced
  - –Socks proxy should be chosen, port 1080
- Some portion of the application, like an applet, does not use the browser's connection settings
  - –Try to configure the applet to use the proxy server
  - –May be able to verify with wireshark
  - –RPT socket recording may be an alternative

Best Practices for Sharing Test Assets

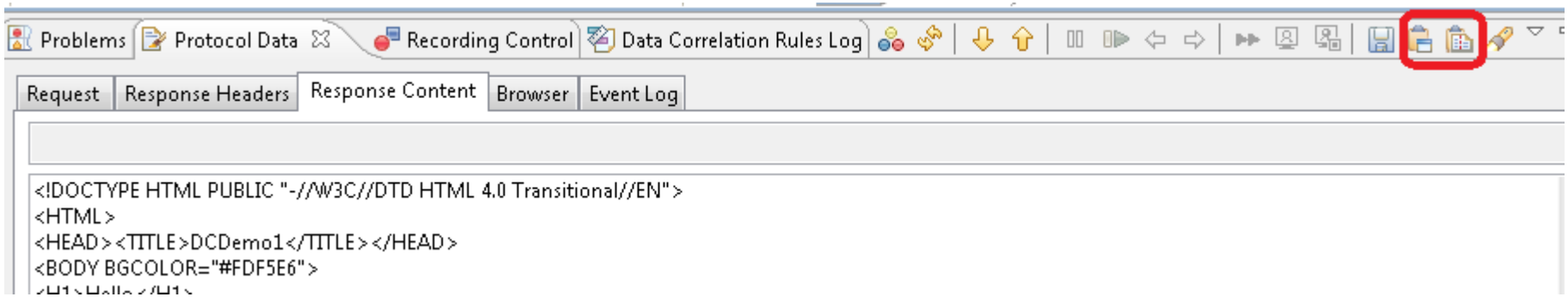
- A workspace and project cannot be shared directly with others for read/write
- Users with their own workspace can import a shared project for read-only usage such as test execution
- Projects can be versioned and shared through integration with Rational Team Concert
  http://www.ibm.com/developerworks/rational/library/09/integraterationalteamconcertandrationalperformancetester/index.html?ca=drs-
- Provide a copy of test assets using File > Export > Test > Test Asset with Dependencies. Import likewise.

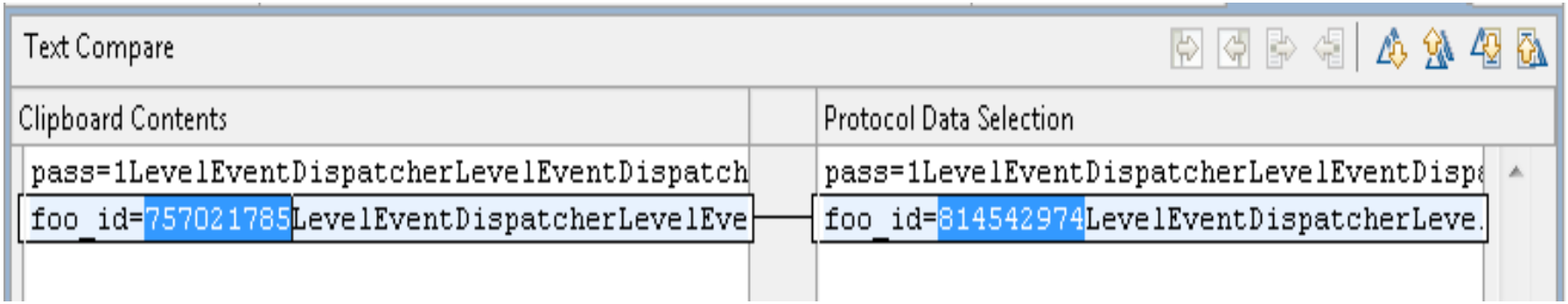
Data-Correlation View Mode

- Editor tree shows only substitutions and datapool candidates
- Use with Quick Filter to easily locate interesting data
- Substitute and remove/modify substitution on one or more locations
- Find where a data-source is used
- Switch to Data-Correlation Mode and back to Full Test Contents Mode:
  - Context menu
  - “View” button



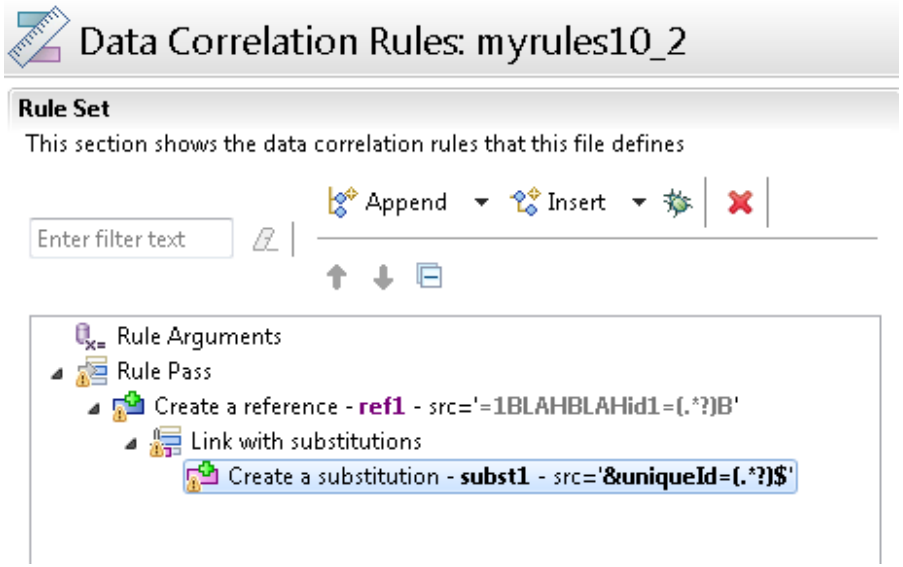
Tip – Compare Test Data with Playback Data





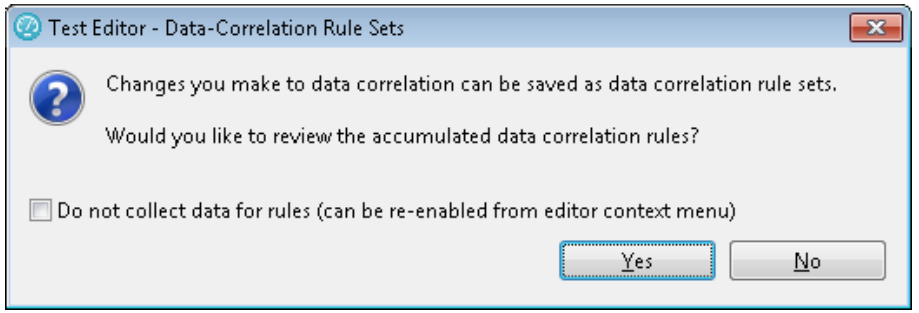
Data Correlation Rules

- Organize related test changes
- Respond more rapidly to frequently changing applications
- Reduce test editing



Tip – Auto Generated Rules

- Performance Tester monitors your manual test edits



- Rules can be viewed when you save your test

- Great way to begin with rules if you don't know how to get started

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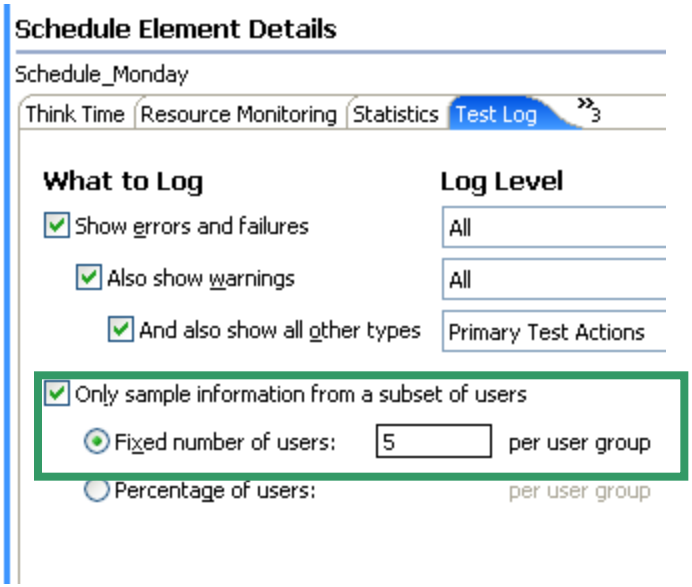
Execution – Workbench and Agent Setup with a Firewall

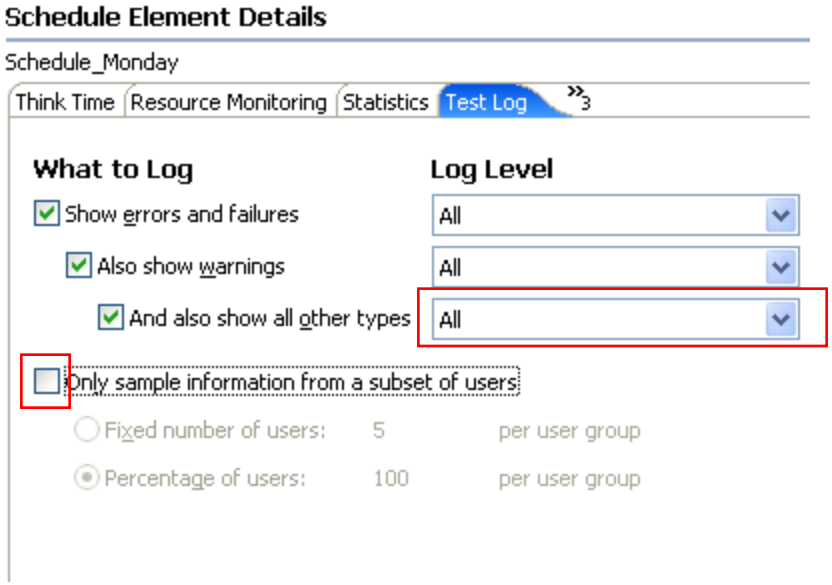
- Firewalls on the workbench and agents must be configured to:
  - –Allow ephemeral ports on the workbench to connect to ports 10002 and 10005 on the agent
  - –Allow ephemeral ports on the agent to connect to a range on the workbench
    - •Windows > Preferences > Agent Controller > Firewall Settings
    - •Specify a starting point for the range of ephemeral ports
  - –Allow the agent to reach the server you are testing (ports 80 or 443 typically)

Test Log

- **Best Practice in Production**
  - –Large numbers of users
  - –Best performance

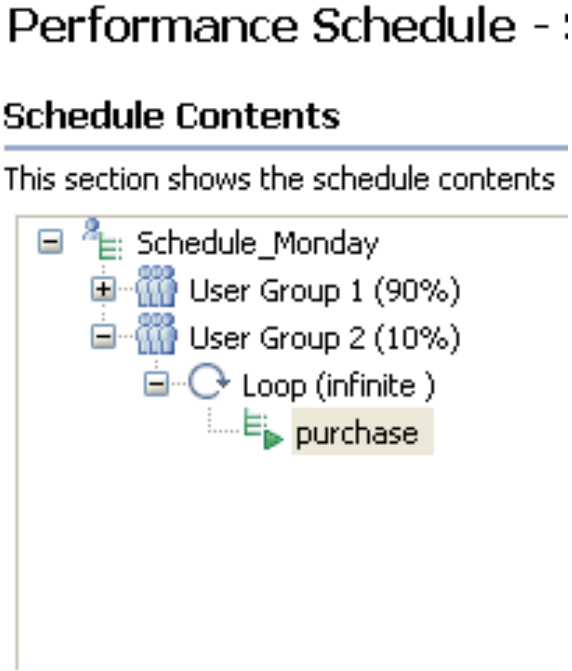
- **For Debug Only**
  - –Very small number of users
  - –Great detail



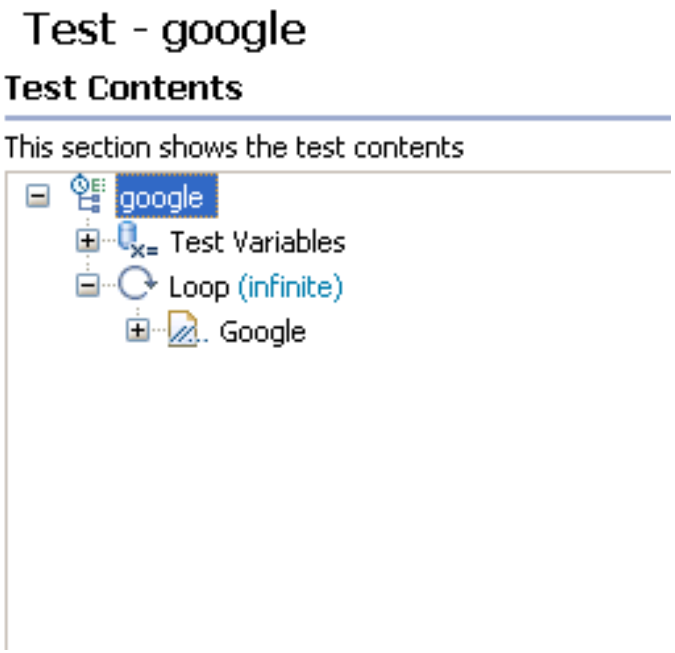


Loops

- Schedule
  - –Start new connections on each iteration
  - –Increased server workload

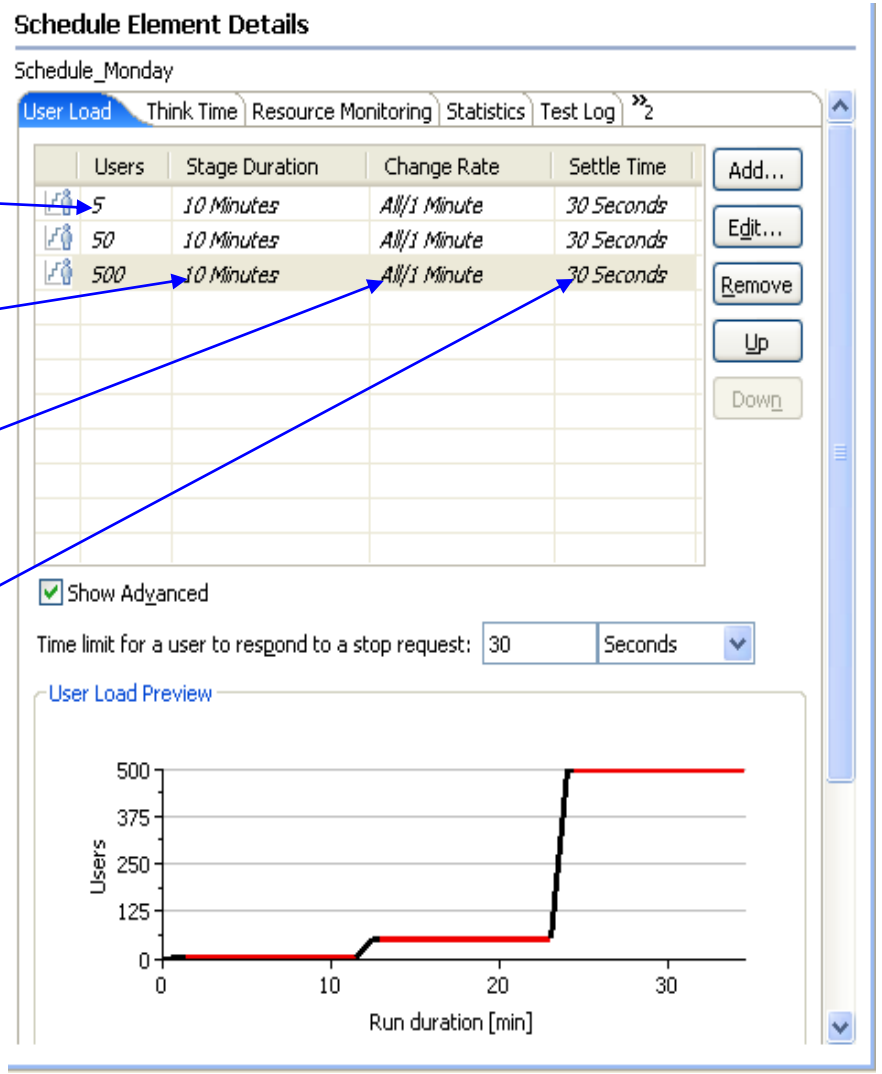


- Tests
  - –Re-use connections on each iteration

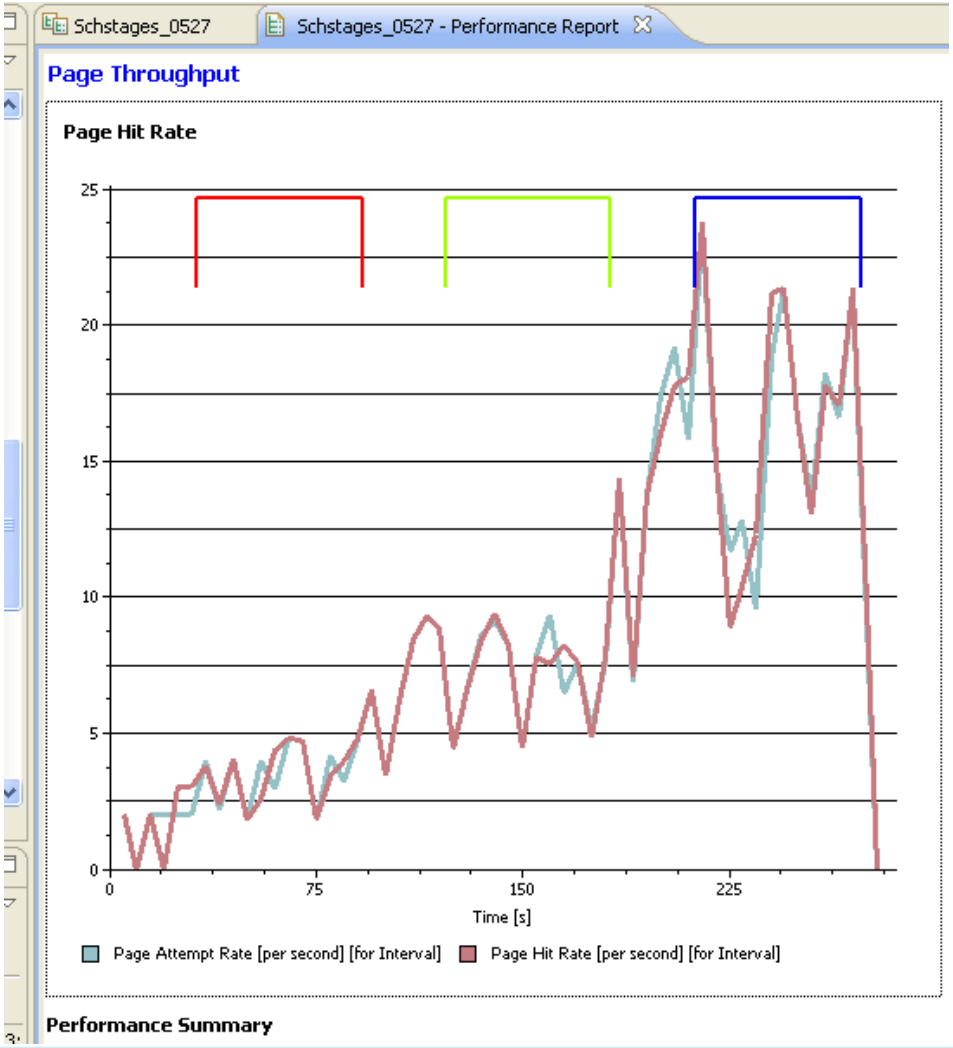


SmartLoad

- Stage
  - Time period with specified number of users
- Users
  - How many users should run at the same time during the stage
  - It is not how many users to add or subtract
- Stage Duration
  - How long the stage should last
  - It is not the time at which the stage should begin
  - It begins AFTER all users have been started for the stage and AFTER any Settle Time
- Change Rate
  - How quickly users should start
  - Default is to start all users as fast as possible
  - All / 1 Minute means users for the stage are added or removed in a random uniform fashion over 1 minute
- Settle Time
  - How long to delay before beginning Stage Duration
  - Affects when the time range for the stage is created
  - Allows the System Under Test to “settle” after the disruption of changing the number of users running

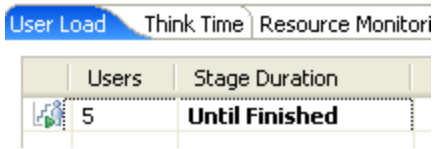


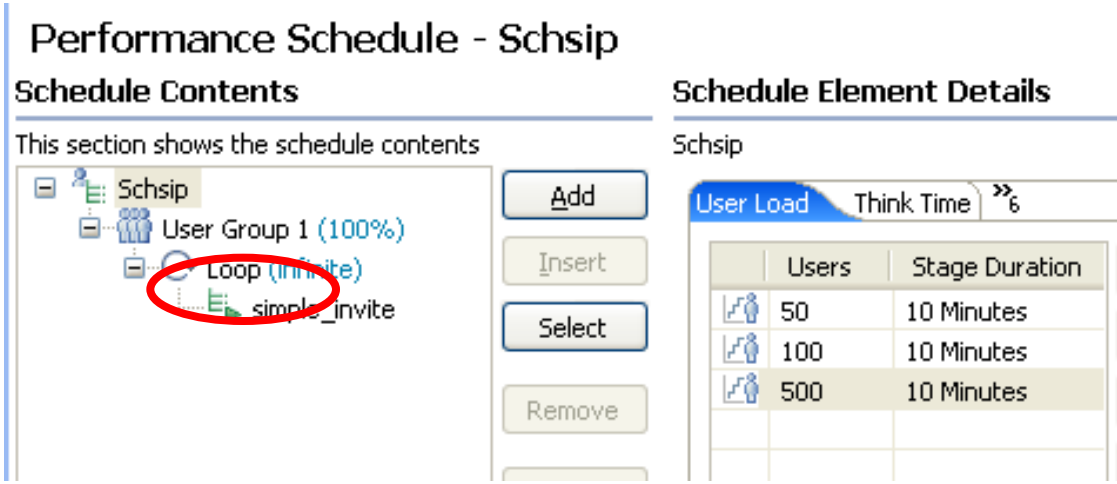
Schedule Stages Example Report



Schedule Stages Best Practices

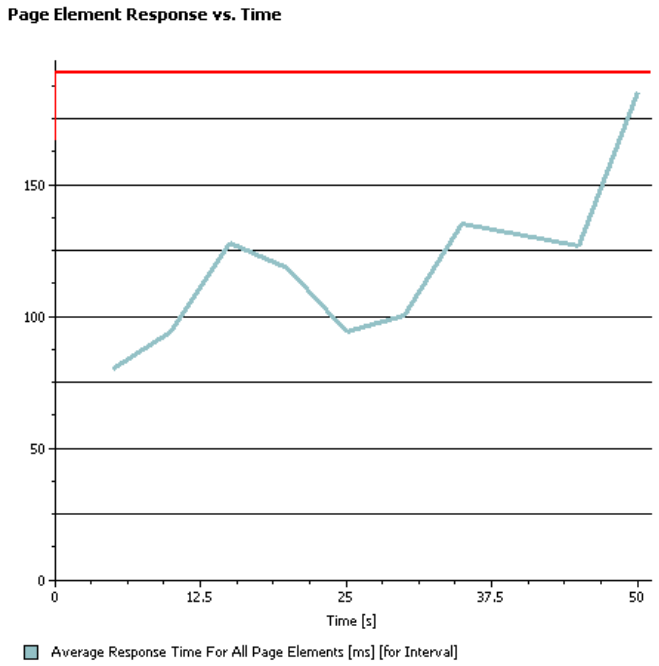
- More than one stage?
  - –Designed to compare steady state behavior at multiple user load levels
  - –Loop required – you do not want users to finish workload
  - –Loop infinite – use time (duration) to control when the run ends
- Run Until Finished
  - –Only if there is one stage





Tips for Top Performance

- Never drive load from the RPT User Interface workbench machine
- Stay below 1200m workbench heap
  - –Default is half physical memory up to 1024m
  - –Set in eclipse.ini with maximum 1200m
  - –Exceeding can ironically introduce out of mem
- Agent computer maximum heap
  - –Up to 1500m Windows
  - –Up to 3000m Linux
  - –Set using RPT_VMARGS general property in th editor
- Increase Linux per process file lim
  - –Default is 1024. Increase to 10,000 – 30,000.



Windows XP & 2003 TCP/IP Tuning Recommendations

- Make sure you have sufficient # of TCP/IP ports
  - –On Windows drivers the limit is typically 5000
  - –Use the netstat -a command to observe port usage during run
  - –If the largest number you see is 5000 then you have a problem!
    - You can increase it by adding a registry entry (need to reboot for it to take effect!)

    HKEY_LOCAL_MACHINE > SYSTEM > CurrentControlSet > Services > Tcpip > Parameters > MaxUserPort

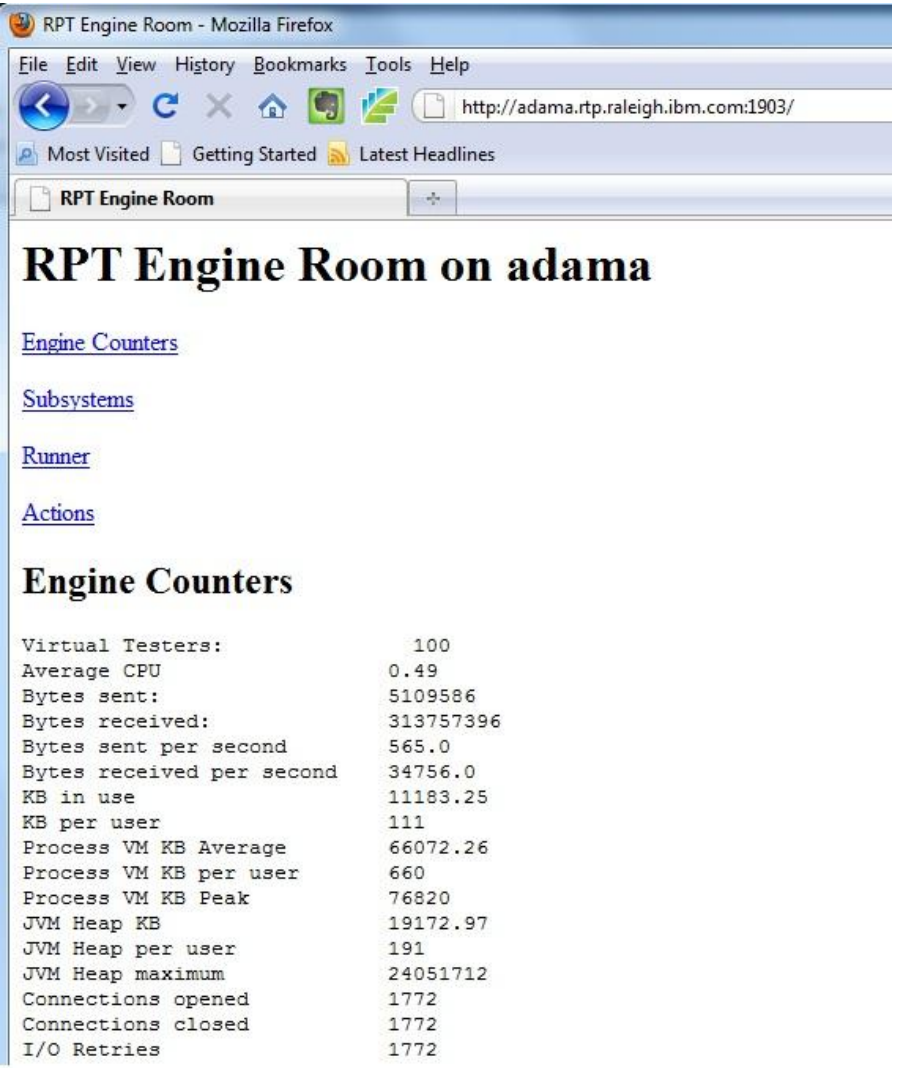
    (dword, default is 5000, max is 65534)

Trick: Multiple engines on one box

- How can I take advantage of a hot box with lots of memory?
- RPT can run more then one engine as long as the *hostname* is different
- Create another location for that box using the IP address for the hostname
- Example (scooby IP is 9.42.117.101)
  - Name: scooby1 Name: scooby2
  - Hostname: scooby.rtp.ibm.com Hostname: 9.42.117.101
- Use hosts file for more than two engines

Engine Room – Unsupported Trick

Point browser to port 1903




```
Action queue size            0
Actions per second           192
```

Subsystems

```
Engine Status
Time in test:  635594
Wait subsystem:  Thread[Kernel Wait,5,main]: WORKING, current: Executing A1DE659AF
I/O subsystem:
1: Thread[Kernel NIO 0,5,main]: OK, current: select(10000) keys=1, last: Process r
2: Thread[Kernel NIO 1,5,main]: OK, current: select(10000) keys=1, last: Process r
3: Thread[Kernel NIO 2,5,main]: OK, current: select(10000) keys=1, last: Process r

Other subsystems:
Thread[SyncPointSubsystem,5,main]: OK, current: Waiting for arrivals., last: Waiti

Brotherhood of RPT Engine Workers:  10 brothers are gainfully employed
Thread[Brother-9,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb9.jpg
Thread[Brother-10,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb12.gif
Thread[Brother-8,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb7.jpg
Thread[Brother-7,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb10.jpg
Thread[Brother-6,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb12.gif
Thread[Brother-5,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb8.jpg
Thread[Brother-4,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb11.jpg
Thread[Brother-3,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb11.jpg
Thread[Brother-2,5,Engine]: OK, current: Idle, last: 10.1.1.1/perseus/20kb9.jpg
Thread[Brother-1,5,Engine]: OK, current: Idle, last: PacedLoop Iteration Delay
```

Runner

Actions

```
test.Schbenchwin7491348258849741272_Schedule_DC55DF7858937DB505EBA3509F3A11DB chil
   User Group 1 childCount=100 childrenFinished=0 stopReq=false
      [User Group 1][000001] childCount=2 childrenFinished=1 stopReq=false
         Default Scenario childCount=2 childrenFinished=0 stopReq=false
            Loop loopIteration=12 childCount=2 childrenFinished=0 stopReq=false
               PacedLoop Iteration Delay state Sleeping started=true finishStarted
```

Custom Code

- Execute your Java code during the test
- Manage loops (break, continue)
- Perform processing on response from the server and return results as references for future use
- Run programs

```
public String exec(ITestExecutionServices tes, String[] args) {
    int idexpected1 = -1;
    int idexpected2 = -1;
    StringBuffer response = new StringBuffer();
    Random rand = new Random();
    String pass = args[0];
    if (pass.equalsIgnoreCase("1")) {
        idexpected1 = rand.nextInt();
        response.append("SC_OK");
    } else if (pass.equalsIgnoreCase("2")) {
        String id = "12345";
        int num = Integer.parseInt(id);
        if (num == idexpected1) {
            idexpected2 = rand.nextInt();
        } else {
            response.append("SC_BAD_REQUEST " + idexpected2);
        }
    }
    return null;
```

Stop test & Stop user

```
// Stop the user
throw new RPTStopUserEvent("User Stopped");
```

```
// Stop the test
RPTStopTestEvent stopTest =
    new RPTStopTestEvent("Test Stopped");
// Default is ERROR
stopTest.setSeverity(MessageEvent.WARNING);
// No stack trace in the test log
stopTest.setShowStackTrace(false);
throw stopTest;
```

DEMO

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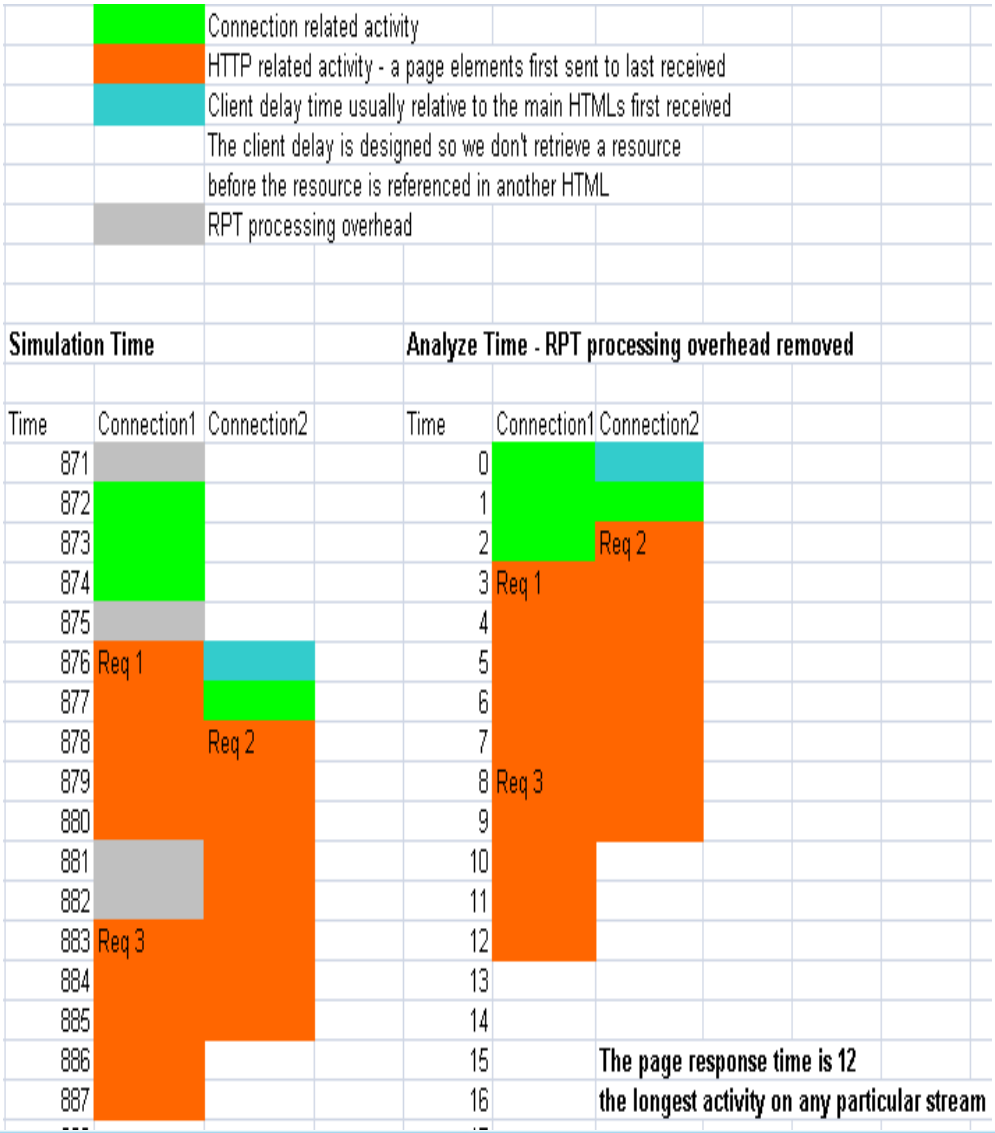
HTTP Page Response Time

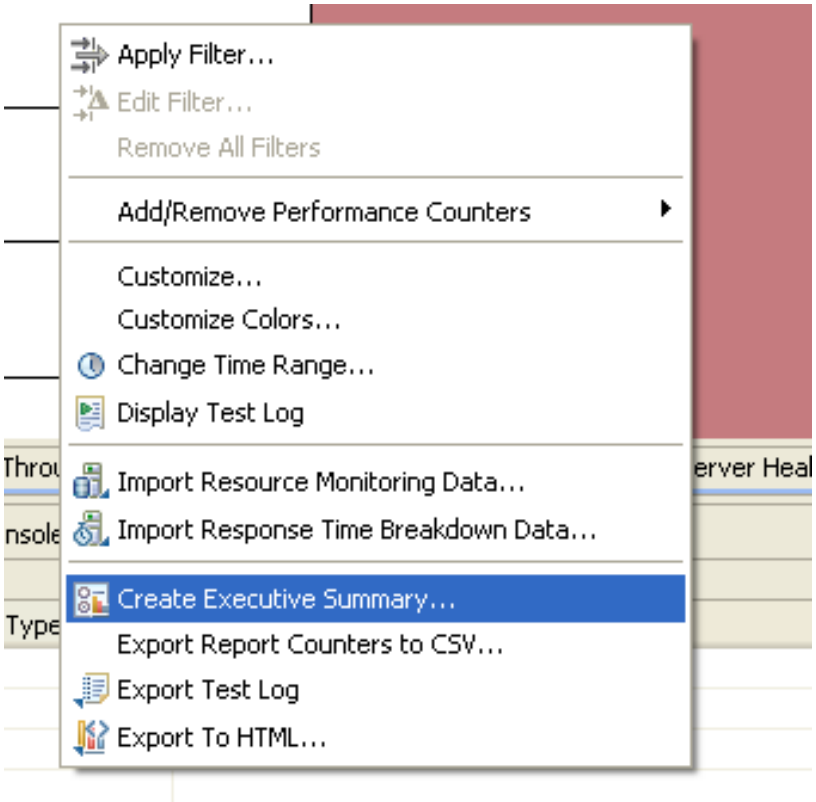
- A page consists of several connection streams executing page elements in parallel
- A page element is one part of the page such as an image or client-side script
- For each page element RPT issues an HTTP request which has a corresponding response from the server
- Page element response time is the time from first byte sent to last byte received
- The response time for a page connection stream is the total of all of its page element response times plus any additional time establishing connections, if any
- Page response time is the maximum response time of all page connection streams
- Processing overhead time is excluded
  - Data correlation harvesting
  - Action scheduling delays (under stress)
  - Custom Code processing
  - HTTP processing

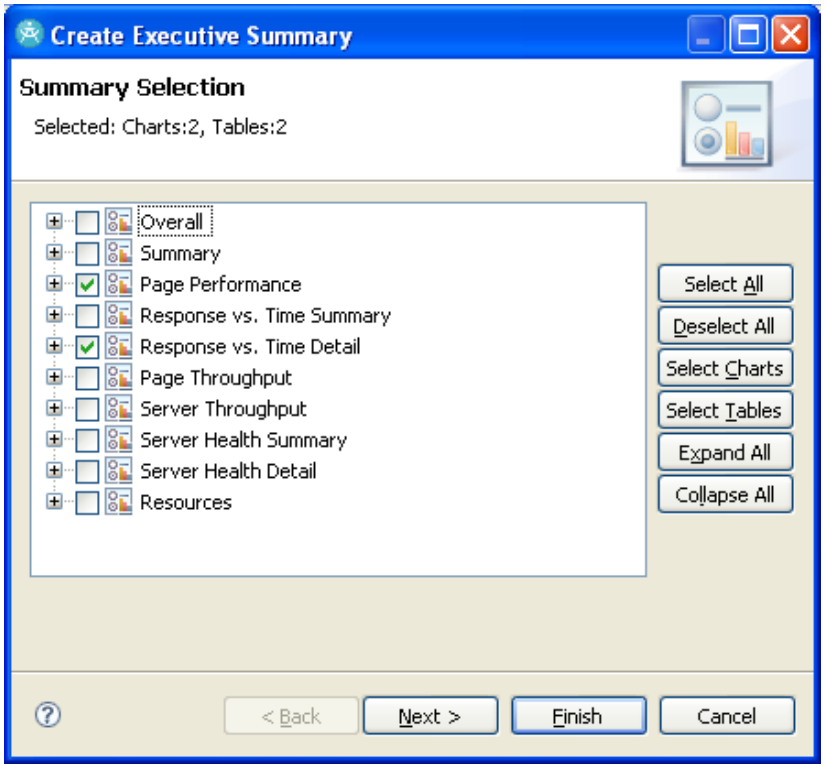
HTTP Page Response Time Example



Executive View

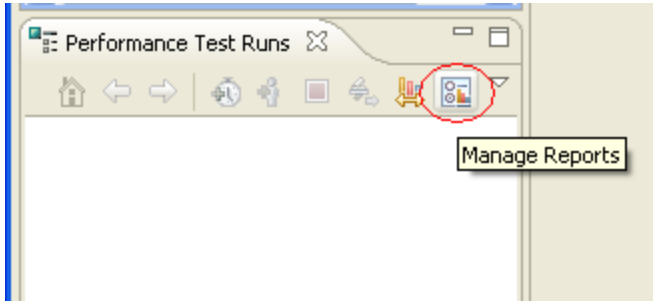
- All report data in one RTF





Customizing Reports

- Customize an existing report
  - –Manage Reports > Expand HTTP Reports > Select Report > Edit
- Create a custom report
  - –Manage Reports > Create
- Make your custom report the default report
  - –Window > Preferences > Test > Performance Test Reports > Default Report



DEMO

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Troubleshooting

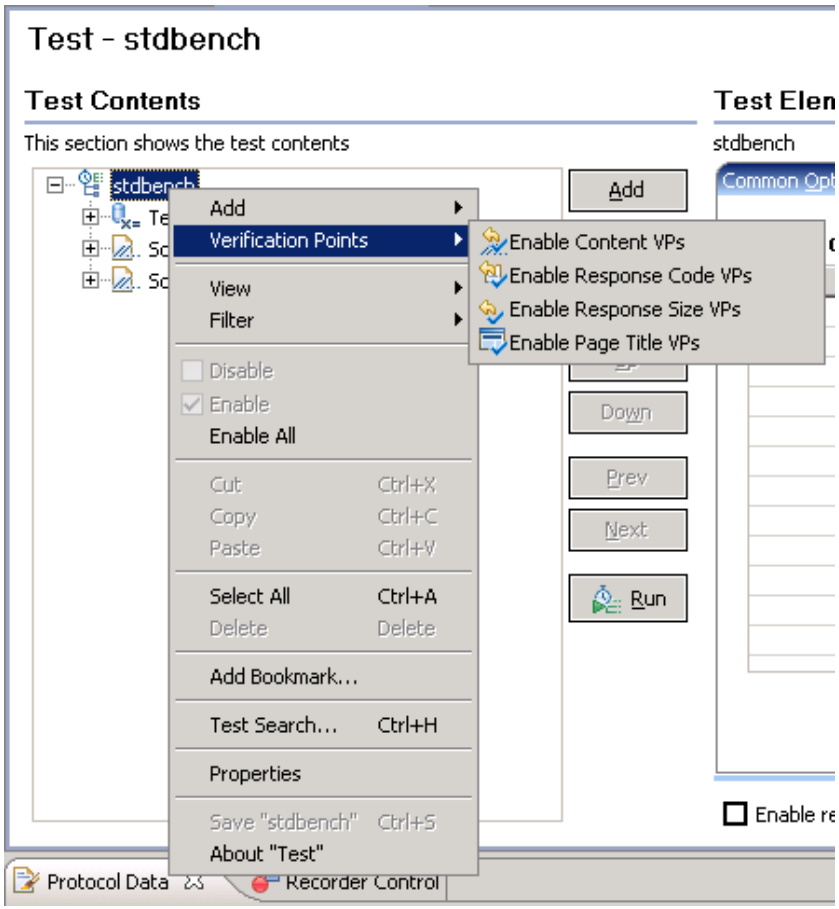
- Attempts versus Hits
- Enable Verification Points
  - –Look for 100% pass rate

Page Summary

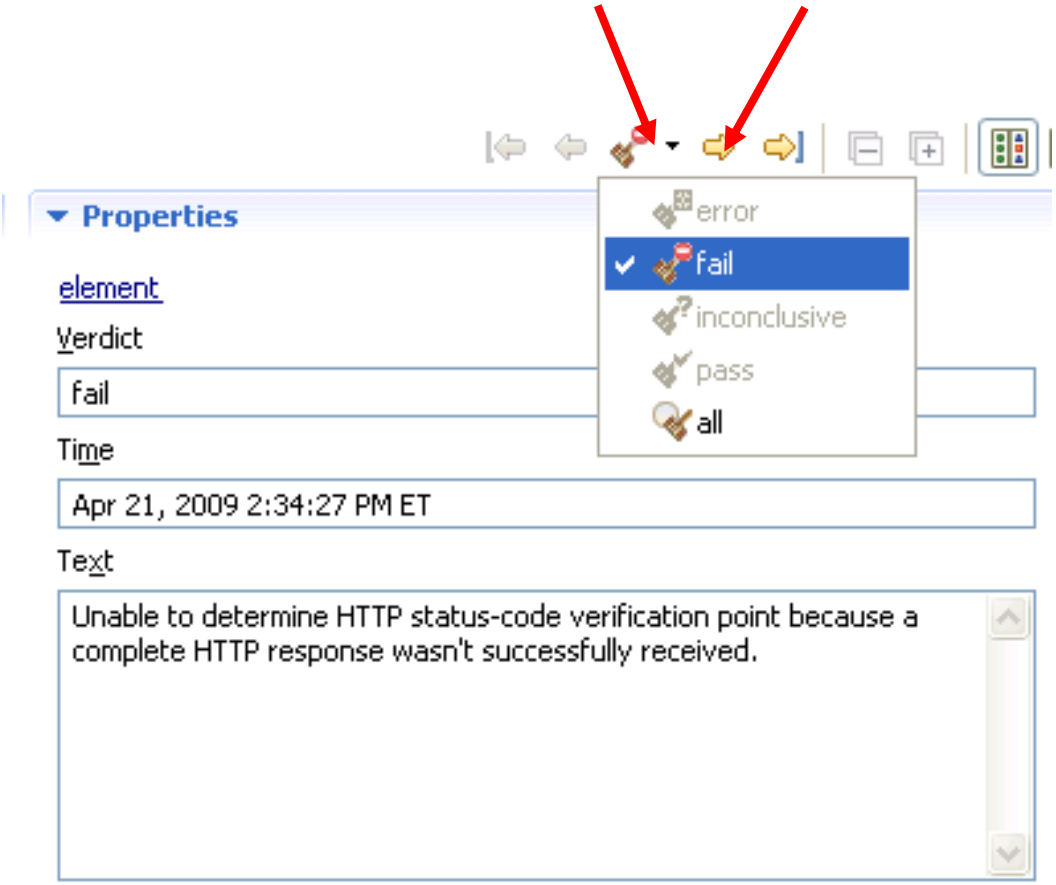
Total Page Attempts [for Run]	1,190
Total Page Hits [for Run]	1,190

Page Element Summary

Total Page Element VPs Passed [for Run]	35
Percent Page Element VPs Passed [for Run]	100



Troubleshooting



Out of Memory – Workbench Tips

- Default schedule setting
- Max heap – Windows
  - –More is not necessarily better
  - –Default recommended is 1200m
  - –Limit could be lower (eg 1024m)
- Max heap – Trick for Windows 64-bit
  - – For max heap up to 1900m change in eclipse.ini

    -vm

    D:\Program Files\IBM\SDP821\jdk\jre\bin\j9vm\jvm.dll

    to

    -vm

    D:\Program Files\IBM\SDP83\jdk\jre\bin\javaw.exe
- Longer statistics interval

Out of Memory – Agent

- See javacore file for hints
- Measure to determine memory requirement
  - –10, 100, 500, 1000, … users
- Multiple engine on one agent trick

Recovery From Catastrophic Failure Without Reboot

- Workbench
  - Stop and restart RPT
  - End stray processes: java, ACServer
    - Use Process Explorer and look at command line to identify process so you stop RPT related processes:

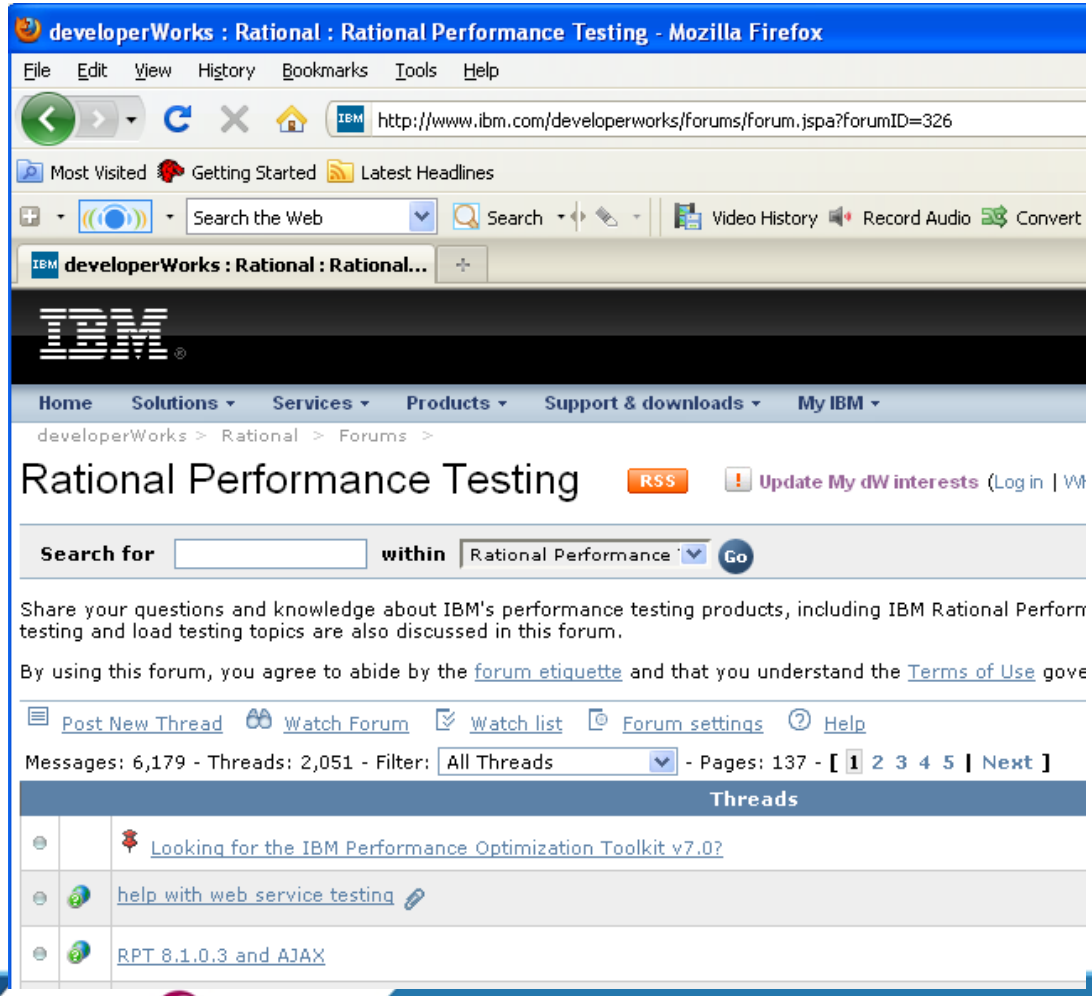
      http://technet.microsoft.com/en-us/sysinternals/bb896653.aspx
- Agent
  - End stray processes: java, vmstat
  - Stop and restart all Agent Controllers
    - Linux uses RAStop.sh and RAStart.sh
    - Control Panel on Windows
    - Windows command line:

      –Windows stop command is **net stop "ibm rational agent controller"**

      –Windows start command is **net start "ibm rational agent controller"**

Forum

- http://www.ibm.com/developerworks/forums/forum.jspa?forumID=326



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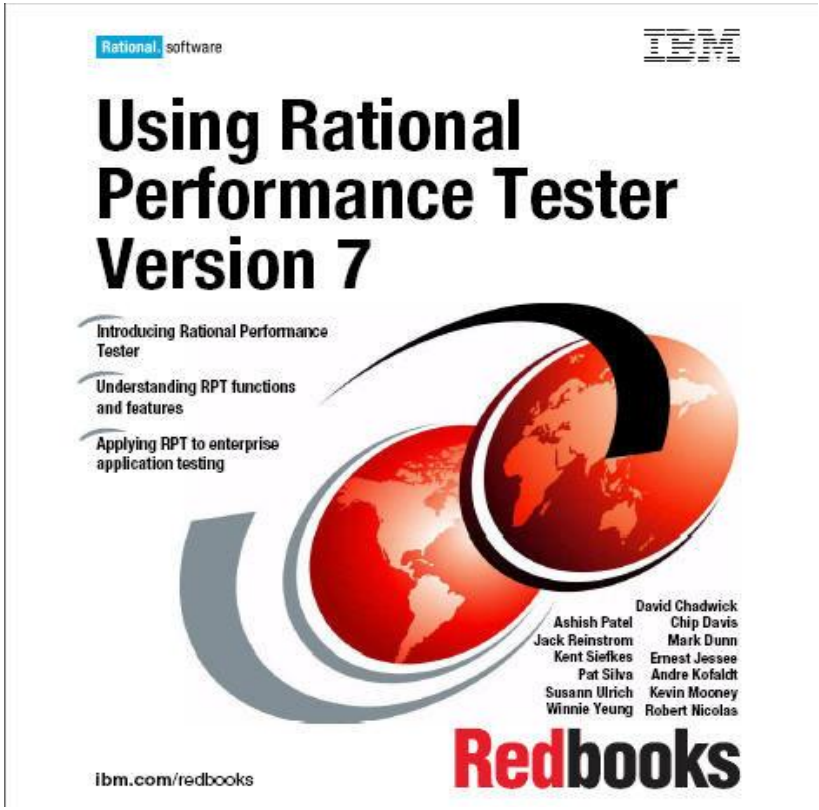

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