WR2QTP: Semantic Translator of WinRunner Scripts to QTP

BACKGROUND

Automatic testing of Graphical User Interfaces (GUI) is critical, as software is increasingly becoming web-based and operated through sophisticated graphical interfaces. WinRunner, a pioneering tool developed by Mercury/HP, has also been the most widely adopted tool for GUI-testing for many years. A WinRunner test-program consists of two main files: a GUI map file and the script file itself. The **GUI map file** contains a description of the various objects that constitute the GUI. The **script file** contains the sequence of actions that constitute the actual test. The scripts are written in TSL (Test Scripting Language) a proprietary script language. TSL is a powerful, Turing-complete programming language, based on programming conventions that were used in the 1980s.

HP has developed a newer tool for GUI testing called Quick Test Pro (QTP). QTP is based on modern, object-oriented programming conventions. HP announced at the beginning of 2008 that WinRunner system will be retired, and stopped bug fix releases mid 2009. No support in any form is provided since January 1st, 2011.

MIGRATING WinRunner SCRIPTS

Numerous HP customers have made significant investments in WinRunner, developed tens of thousands of lines, and sometimes millions of lines of scripting code. Many customers have developed extensive libraries and frameworks to facilitate the testing of their GUI-based systems. Such customers need a solution that will allow them to smoothly transition from WinRunner to the QTP platform.

Interoperate identified this problem and developed a WinRunner to QTP translator, leveraging its world-class know-how in semantic translator technology, based on research done by Prof. Gupta's team at University of Texas at Dallas. By working with Fortune 100 customers in migrating their complex environments, Interoperate has developed expertise in multiple automatic test environments, testing strategies for effective test coverage and a comprehensive migration methodology, to provide a cost-effective, risk-free solution for such migrations.

Any translation process will cover:

- WinRunner GUI map file conversion to QTP object map files
- WinRunner TSL script conversion to QTP's VB Script.

Customers are faced with the following choices:

1. **Remain on WinRunner for the long-term:** As tempting as this might sound, this is not a winning strategy for the long-term for several reasons:
    a. There is no support available from the software vendor. This can be very problematic for mission-critical system testing or for industries with compliance requirements like healthcare and medical devices.
    b. Newer platforms like Windows 7, Internet Explorer version 8 and 9, are not supported by WinRunner. This means that for these platforms the customer either has to test manually, or invest in a second automatic testing tool, creating scripts and expertise in addition to the WinRunner test environment.
    c. As WinRunner has been retired by HP, expertise in developing WinRunner scripts and maintaining existing ones is vanishing at a fast pace.

    These issues already exist, so there are already implicit costs for not migrating to a modern, supported platform for automatic tests. Unfortunately, **these costs are hidden** within the existing work processes, as the employees continue to use the known environment, without noticing how gradually this environment becomes less effective for them. This degradation becomes worse and worse with progression of time so that at a certain point, migration becomes unavoidable.

    Unfortunately, **the longer one waits, the harder it is to migrate** as there are more scripts to translate, more unsupported platforms that have to be tested manually, with less knowledge about the WinRunner scripts. Also, the company has paid the hidden costs for many more years.

    Interoperate has developed a methodology to **identify, quantify and expose those hidden costs**, and provides the highest quality and best price performance for such a migration, This is a great opportunity for Six Sigma initiatives within the Quality Assurance Department, and our consultants will be glad to support you in justifying such an initiative.

2. **Perform the translation manually:** There are many drawbacks to this approach.
    a. This is a costly and error-prone process that can keep your best script programmers busy for a long time, doing non added-value translation work.
    The logic of each TSL script has to be understood (very complicated, if someone else created the scripts), the object map manually recorded and then the QTP scripts constructed and tested again.

b. Our experience with several customers, who tried this approach before migrating with Interoperate shows that at most, an expert script writer will manually translate and validate 40,000 lines of WinRunner code to QTP in one year, provided he:
   i. Understands the Application Under Test (AUT) well
   ii. Knows the original WinRunner scripts well
   iii. Has expertise both in WinRunner and in QTP
   iv. Is full-time dedicated to this task

   As these requirements are usually not easily met, this is a **best case estimate**.
c. The quality of the manual translation is highly dependent on the proficiency of the team doing the manual translation; **results could be inconsistent**, or of poorer quality than the original scripts (especially if the translation team did not develop the original scripts, or the project is outsourced). Since there is no guarantee that the resulting scripts are equivalent to the ones in WinRunner, the manually translated scripts must be regarded as a new set of scripts and will have to be **validated and stabilized over time**, after the manual translation is completed.
d. But the most concerning finding is that most companies greatly under-estimate the effort and complexity of a manual translation. Several data points indicate, that for large sets of scripts (over 100,000 lines of code), **manual translation projects failed and had to be stopped**. Interoperate succeeded in migrating customers who previously tried to manually translate their WinRunner scripts.

3. **Re-develop the scripts in QTP**: This approach is sometimes used when the automatic testing team wants to re-structure and improve the automatic test suite. The idea is that lessons learned from developing the WinRunner suite will be applied, resulting in a better test suite in QTP. Since the team does not expect the QTP scripts to mimic the behavior of the WinRunner scripts, automatic translation is many times not considered.
   Since this approach is also manual, most drawbacks of manual translation also apply:
   a. Re-development is as costly and error-prone as a new development project.
   b. Expertise level of a script development team required – test engineers who just know the scripts well enough to run them, or slightly modify them as the AUT changes, will find it difficult to re-design and develop a complex test suite on a different platform.

   Interoperate has developed a **value-added Migration Solution** that allows customers to migrate and improve their automatic test environment at the same time. This solution leverages the Semantic Translation technology and expertise in automatic test design,

development and optimization achieved by our engineers in working with Fortune 100 customers.

Our experience shows that even if the customers want improved QTP scripts**, 60 – 70% of the original code is re-usable**. Therefore, starting with an automatic translated QTP script-base will save almost 2/3 of the re-development cost in the re-development process.

If some of the improvements can be described programmatically, it is possible to add rules to the automatic translator, so that improved QTP code is generated. If your company has **coding standards and best practices**, then these can be incorporated into the translator so that the QTP code generated is consistent with your coding standards and best practices.

Our experts can be involved through consulting services in assessing the effectiveness, coverage, quality of the WinRunner code and either suggest improvements, or deliver optimized scripts according to the requirements.

4. **Use a traditional translator:** When Interoperate developed its Semantic Translator WR2QTP, there were already two traditional translators available in the market. Interoperate recognized that traditional translators have inherent limitations, converting only about 80% of the code, which is insufficient for a large-scale migration of complex testing scripts. The remaining part of the conversion has to be completed manually (typically an order of magnitude more manual work, compared to Interoperate's solution).

   This manual conversion step requires deep understanding of the script code, the AUT, etc. Therefore, **hidden complexities show** up in the last phases of such migration projects, creating **significant delays and high project risks**.

   Interoperate succeeded in migrating customers who previously tried to use traditional translators and had to stop those migration projects. One could argue that for complex scripts and large test suites, traditional translators are insufficient, and almost as problematic as manual translation.

INTEROPERATE'S UNIQUE SEMANTIC TRANSLATION TECHNOLOGY

Interoperate has developed a translator that converts WinRunner scripts to QTP (WR2QTP) with nearly 100% automation. Interoperate's WR2QTP translator relies on a breakthrough technology, based on formal semantics and rule-based languages, thus making high-quality translators possible, for the most complex programming languages .

WR2QTP first converts the WinRunner GUI map files to QTP's object repository files. Then it translates the TSL scripts to QTP VBScript respectively.

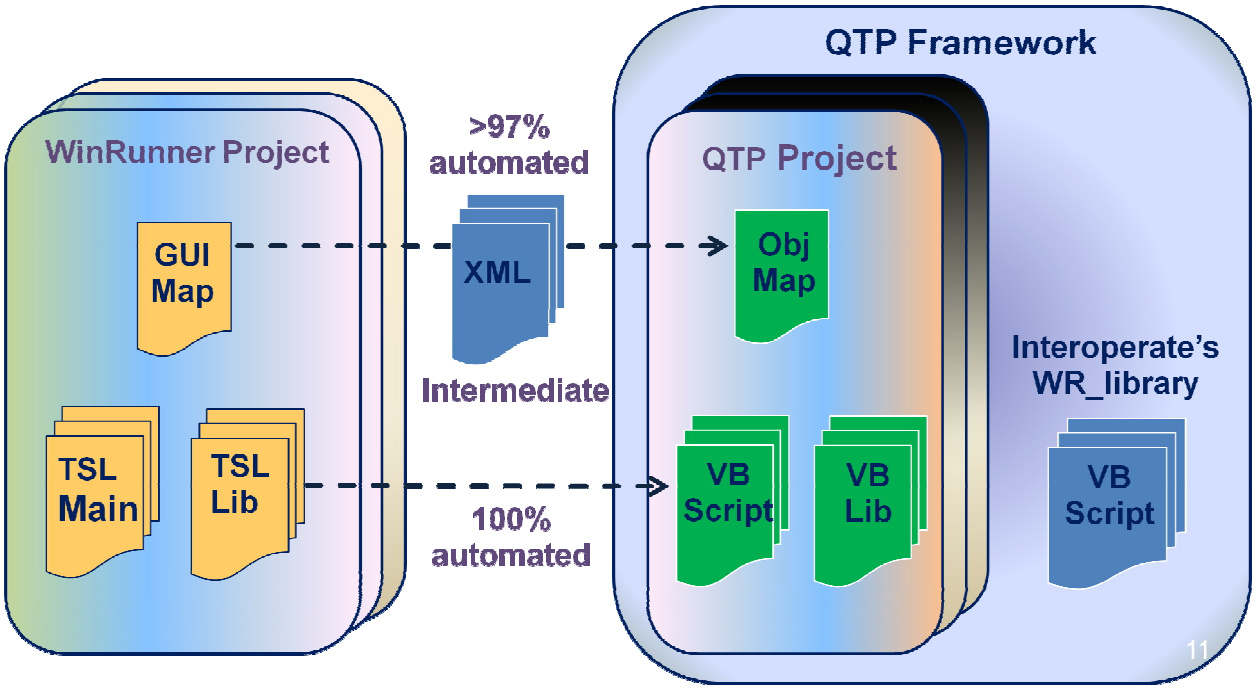

Figure 1 - WinRunner to QTP Workflow

There is only one part that still requires minor manual intervention: since in WinRunner the object hierarchy has only two levels, while QTP offers a complete object-oriented hierarchy for the GUI-objects, some manual adjustments are required to define the GUI hierarchy in QTP and map the WinRunner objects to it. These modifications are obvious to anyone who is conversant with the QTP tool. Interoperate also offers utilities to shorten this part.
The scripts are re-translated with the corrected object map file to obtain the final scripts. Note that with Interoperate's Semantic Translation technology, the scripts are never touched, (i.e., script translation is completely automatic), and therefore no mistakes creep into the script logic.

WR2QTP translator can handle all domains including:

1. Web-based GUIs
2. Windows-based GUIs
3. Oracle apps
4. Java-based GUIs
5. PowerBuilder
6. Terminal Emulation
7. Microsoft .Net
8. ActiveX

OTHER BENEFITS OF SEMANTIC TRANSLATION

For several types of applications, for example Oracle applications, the translator rarely needs any manual intervention, as the entire object map can be automatically generated. This holds true for other types of applications also.

The scripts generated by the Semantic Translator are highly readable; a tester can further enhance/modify them as the GUI and its testing evolves.

With WR2QTP migration projects can reach high productivity - thousands of lines of WinRunner scripts can be translated to QTP and validated to per day. The translator is as close to a push-button translation technology as one can get: a test engineer who is conversant with QTP can be trained to use it with relative ease.

Interoperate provides full migration services, or can train the customer to use the translator and complete the GUI mapping and validation of the QTP scripts.

Interoperate's WR2QTP automated translator has the following salient features:

1. Translated QTP scripts work exactly as original WR scripts
2. Covers all major domains: Windows, Web, Java, Oracle-Forms. .NET. ActiveX, TE, PB
3. Handles descriptive programming
4. Supports complex framework driven architectures
5. Efficiently handles arrays (regular and associative)
6. Efficiently handles file and data-driven scripts.
7. Covers total of over600 WR primitives and reserved words
8. Preserves Function boundaries/APIs so that the code is maintainable
9. Supports loading of DLLs and HP CSO library
10. Supports run time error handling

CUSTOMER SUCCESSS

All Interoperate customers have achieved great success in using WR2QTP for migration.

"*Our initial attempts to manually migrate to QTP did not work out. None of the other vendors could help us, as their translation tool could not handle the level of complexity that our code possessed.*" says the QA manager of a large Gas Energy company. "*Interoperate came to our rescue. Their sophisticated translator allowed us to migrate in record time… I think Interoperate has the best solution for migrating WinRunner to QTP.*"

These successes have been reported in client case studies (see http://interoperate.biz/client.php).

We helped Fortune 100 companies, with significant investments in automated testing, migrate their scripts. Therefore, we are the only company that can guarantee 100% migration project success.

Aside from WinRunner code migration, Interoperate has deep expertise in the whole testing process as well as in various commercial and open-source testing tools. We offer consulting services to establish an efficient migration strategy, added-value migration and optimization projects, etc. Interoperate also has expertise in testing of mobile applications on iOS and Android.

For more information, please contact:

Ms. Deepa Gopal
Email: info@interoperate.biz/
deepa@interoperate.biz
Phone: 214-641-8065 /
972-883-7111