

USING LABVIEW NXG WEBVIs FOR UBIQUITOUS DATA ACCESS

Providing instant access to critical test data has always been a challenge. Today's workforce is more mobile than ever, and the technology culture has advanced the expectation that information should be available immediately. Whether that information is critical test data, production line status, or historical performance trends, accessibility enables productivity. Currently web browsers are the most ubiquitous platform for data communication, from the workstation to the mobile phone. For decades National Instruments has provided first-class tools for developing test applications, but those tools were limited to creating applications that needed to be installed on a device. G Systems was able to overcome this limitation by taking advantage of WebVIs in the new LabVIEW NXG Web Module.

I. THE TRADITIONAL LABVIEW APPROACH

Many successful test, measurement, automation, and control systems have been created using LabVIEW and TestStand software tools. Whether it's a monitoring, control, or automated test application, they perform their functions and record important information in logs, reports, or databases.

Reviewing this data outside of the test system typically requires a data viewing utility. LabVIEW developers usually accomplish this by creating a utility with their familiar tools and distributing this as an installer. The utility is installed on a Windows computer, along with an additional installation of the LabVIEW run-time engine. To provide a mobile data interface without software installations would require the developer to learn additional programming skills for the web, or to find someone with this knowledge and competency.

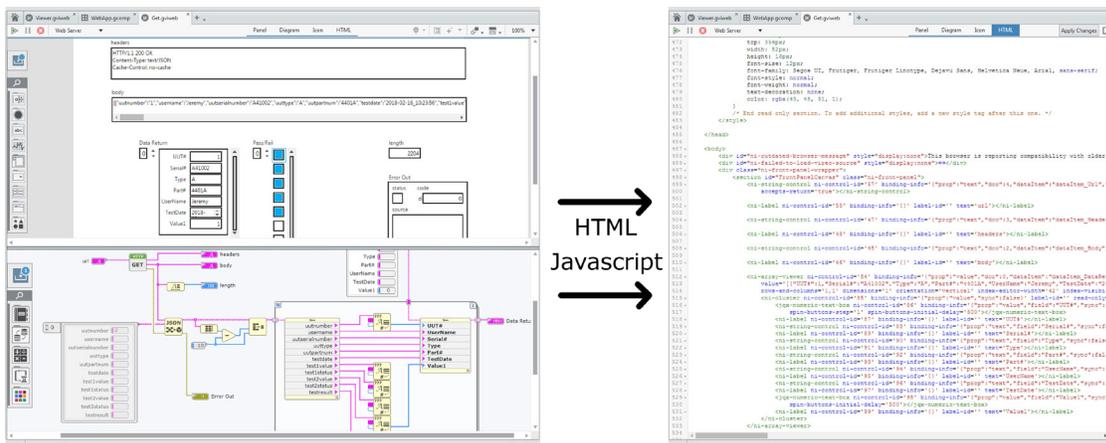


Figure 1: A LabVIEW NXG WebVI front panel, block diagram, and the resulting HTML code

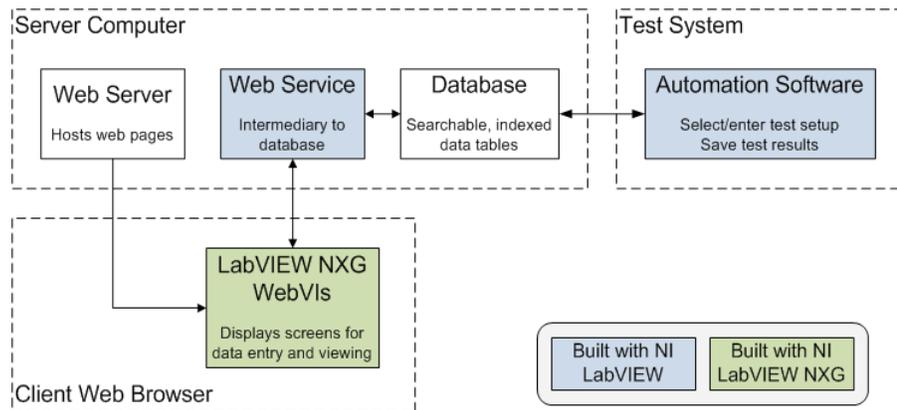


Figure 2: Integration of WebVIs into the data

II. INTRODUCTION TO LABVIEW NXG WEBVIS

WebVIs are created directly in the LabVIEW NXG development environment. LabVIEW developers can use the familiar environment with panel and diagram, wiring and dataflow. No additional knowledge or skills in web technologies are required. However, the WebVI generates standard HTML, CSS, and Javascript, which are open to customization and adding components from other sources.

WebVIs are maintained in LabVIEW NXG’s project workspace. Built WebVIs can be hosted with the new NI Web Server, or any common web hosting tool such as Window’s Internet Information Service (IIS).

III. AN EXAMPLE PRODUCTION TEST SYSTEM WITH REMOTE CONFIGURATION AND MONITORING

G Systems created an automated test system, which uses a database to store information about the creation of test articles, test parameters, and test results. Several interfaces to the database were needed to support test management by different functional roles in the test process. After a test article is produced, the details of its composition

and construction are used by the automated tester. Test managers need to define and adjust the test parameters for families of test articles. Production managers need to see recent test history to ensure consistent operation. WebVIs were chosen as the solution to allow for remote access of all these interfaces.

The major components of the system and the data flow between them are illustrated in Figure 2. A server computer with a MySQL database is used as the data store and that runs the NI Web Server. The automated test system retrieves information about the test article and the parameters defining how it should be tested from the database, and after testing is complete it saves the test results to the database. Any modern web browser can display the built WebVIs as remote interfaces to the system.

Although WebVIs can communicate directly with the database using Javascript, G Systems chose to include a REST web service built in LabVIEW to act as an intermediary between the WebVIs and the database. This software engineering convenience is a separately maintained module which constructs database queries from the parameters sent from the WebVIs. This allows changes on the back end without requiring a rebuild of the WebVIs, and the database connection and structure details can be obscured from remote users.

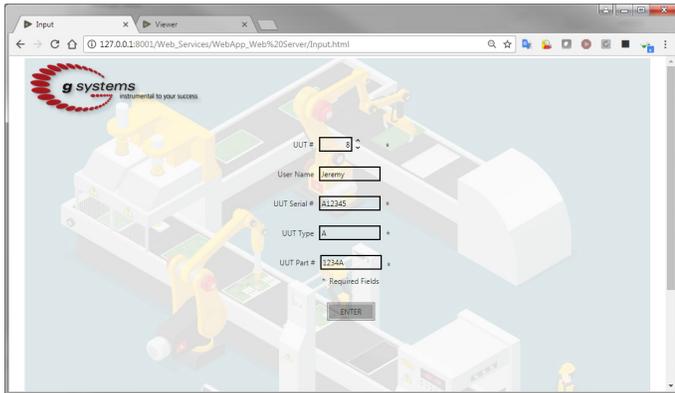


Figure 3: Example test article data entry page

When a test article is fabricated, its details are entered into the database from any convenient computer using the provided WebVI, an example of which is shown in Figure 3. At the test system, the operator selects the test article from the choices retrieved from the database and runs a test. The test system uses G Systems' LabVIEW-based test sequencer and the Database Connectivity Toolkit to get the test parameters and save the results back to the database.

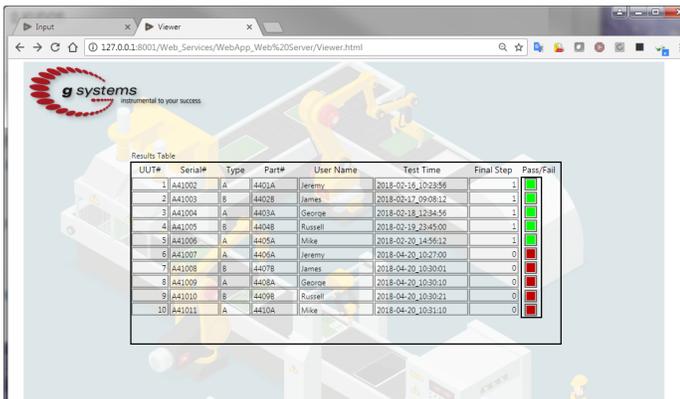


Figure 4: Example view of recent test results

Recent test results can be monitored from any web browser using another WebVI, as shown in Figure 4. The WebVI could also be used to display the status of testers, or to calculate production line yield directly in the browser. Pages can also be access controlled, requiring user credentials before being displayed. As needs grow additional WebVIs can be created, all from the LabVIEW NXG development environment.

IV. PRODUCTIVITY ACHIEVEMENT

Using WebVIs enables a core LabVIEW developer to deliver data visualization on the web without requiring traditional web development skills. Interfaces built in LabVIEW can be viewed anywhere without application installations. Test article information can be entered from any computer in the fabrication area, test parameters and limits can be adjusted by quality managers on the test floor with a tablet, production managers can check tester status or production yield from their mobile phone, and engineers can get instant answers during review meetings without going to the test system.

Contact us to learn more about how developers at G Systems can create web interfaces using LabVIEW NXG WebVIs for your next test system.



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