USING THE VAADIN WEB FRAMEWORK FOR DEVELOPING RICH ACCELERATOR CONTROLS USER INTERFACES

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Keep Control System Under Control Anywhere Anytime

The continuous progression of network science and high speed wireless technology makes it possible to develop web based controls applications for accelerator control systems that work on many platforms (e.g. iOS, android, tablets, desktops, etc.). This makes it feasible for users to have access to controls system from anywhere at anytime. Many web frameworks are available for developers to choose for developing these types of applications for an accelerator controls system. The choice of which web frame work is best is very subjective.

Vaadin }> A Favorable Choice for Control Applications

"*Vaadin Framework is a Java web application development framework that is designed to make creation and maintenance of high quality web-based user interfaces easy*"[1]. The Vaadin framework has an advantage over other web development technologies because it uses the Java programming language which is more familiar to the application development community.

- A large set of ready to use UI components, controls, and widgets;
- Over 550 add-ons (and this number is growing);
- Supports all major browsers and mobile touch devices;
- Support all standard non-UI JDK/JavaEE APIs;
- Support many third-part Java APIs;
- Support HTML5 and has build-in push
- Support major IDEs (Eclipse, Netbeans, IntelliJ, etc.)

Key Factors for Successful Control UI application Development

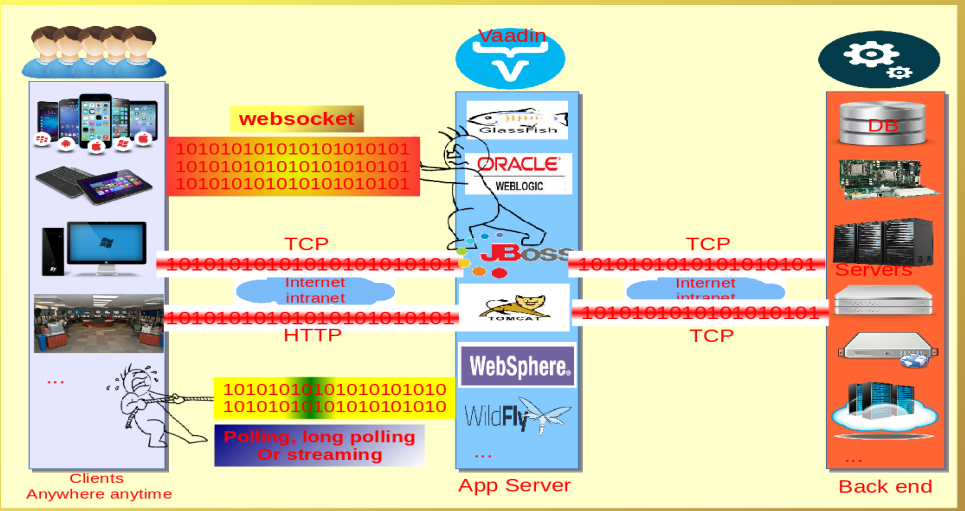
- Reliable synchronized bi-directional IO communication between server side (program logic) and client side (UIs);
- Requires fast UI and interactive responsiveness;
- Rich UI for control data visualization for single or multiple GUIs;

}> Test It Out }>

For web based controls applications, the most important key factor is that the applications are able to communicate with the back end controls system just as reliably as console level UI applications. Therefore, our tests focused on the synchronized IO data communication between web application and the back end controls systems. We tested the following three cases:

- A single page web application with data **polling** only;
- A single page web application with **long polling**;
- A single page web application with **websockets;**

The results show that Vaadin web applications can effectively realize all functions and features of the C++ version of the control applications. Depending on the requirements of individual applications each IO communication method has its own best fit cases. Both long polling and websockets work well for controls applications. The long polling works for most existing systems while the websockets are more reliable. We do see some issues such as how high frequency IO data is handled and how large numbers of UI components affect UI performance, etc.



}> Keep Control System Under Control with Vaadin }>

The Vaadin web application framework offers web application developers rich sets of UI components, add-ons, UI controls, and APIs. It makes the accelerator control web application development process easier for Java developers without explicit HTML and Javascript knowledge. The built-in push in Vaadin makes IO communication between UIs and back end controls systems very reliable. The test accelerator control web applications developed with Vaadin technology shows that it is easy to convert controls UI applications to HTML5 supported web applications. The Vaadin web framework aids in making web based accelerator controls application development easy, powerful and more convenient to end users.