INFORS HT

White Paper

Benefits of Web-Based Solutions Applied to eve®

Dr. Tony Allman, Product Manager Fermentation, INFORS HT

1. Introduction

The development of powerful, modern browsers and the proliferation of mobile platforms has altered the way in which programs run and where data are stored. Concepts like a "web-based solution" and "cloud computing" are everyday terms, but their definition is often very difficult to establish. Brief definitions are provided below which offer a framework in which to discuss the benefits of using these concepts for bioprocess software:

"Web-based" refers to software which is accessed over a network connection, locally or remotely (via the internet), and which is run in a web browser. These applications do not have to be installed locally on the user's computer as they run from a computer acting as a server, with the browser acting as the client. Examples in everyday use include webmail (such as Google mail, online banking, etc.) and numerous online games. The size and scope of the program running on the server is not relevant, be it sophisticated bioprocess management or a simple application for a mobile phone.
The look and feel of the software then becomes that of the web browser, which is now very familiar to many users. This provides a universal operating environment that transcends the type of device, its operating system and specific web browser. With internet now accessed more frequently from mobile devices than from desktop computers, a web-based application is more familiar to most people.
Going hand-in-hand with browser-based software is "the Cloud". Cloud computing simply means storing and accessing data and programs over a local network or via the internet instead of from a hard drive on a local computer. Accessing information via a small local network rather than over the internet can still be defined loosely as using a "local cloud", even though nothing is stored remotely on third-party servers. A key advantage for typical users is not having to be concerned about their location when accessing data or with the location of the information in itself.
For bioprocess software, a web-based solution offers rapid access with a simple, familiar user interface for multiple users simultaneously. Many users now want fast, secure access to their bioprocess from their office or from home, and from a range of devices.

2. Description of the benefits

2.1 Available anywhere

Access to real-time data over a network from within the organization or outside via the internet improves efficiency and encourages use of the data being generated.

Unlike traditional applications, web systems are accessible anytime, anywhere and via any device with an internet connection. This puts users in charge of where and when they access their information.

It also opens up exciting, modern possibilities such as global teams, working from home and real-time collaboration. The idea of sitting in front of a single computer and working in a fixed location is a thing of the past with web-based applications.

2.3 Easy scaling for personnel projects

The numbers of people accessing the program can change over time without individual installations of the software for new users, and its scalability allows for larger projects over time and for a move to a "Big Data" approach. This is also a very cost-effective approach.

Both individual users and entire projects can be added to the eve® bioprocess platform software running on a central server. No work is required from users, who have access via a browser as soon as their credentials are established. Users can be flexibly added and suspended according to changing needs. Addition of new hardware is dealt with by a different part of the resource allocation features of eve® and is similarly flexible in terms of numbers and types of devices.

2.4 Available on a range of platforms and devices

Web browsers are available for desktop, tablet and smartphone mobile devices, any of which can be used to access bioprocess data. This is also independent of the operating system used, which allows for diversity and choice of computing platforms.

Once again, by developing the eve® bioprocess platform software to modern web standards, a variety of browsers running on a range of devices can be used to link a user to the eve® bioprocess platform software. This needs no set up or configuration by the user beyond entering an Internet Protocol (IP) address (e.g.169.254.83.180) for access over a local network.

Figure 1. Browsers officially supported by eve®.

2.5 Security features

Web-based solutions are often more modern and have security at their heart. Connections from outside a local network can be restricted and users required follow common practices to reduce the chance of unauthorized access.

A range of additional security features can be added to the eve® core by opting for the User Management & Reporting module. These are especially relevant if remote access via the internet is used and include:

- Strong passwords to systems are more difficult to hack by “brute force” methods
- A limit to the number of attempts to log on before being locked out
- Password ageing to reduce the potential risk of a security breach
- IP address "white lists", so only approved devices can access the software

2.6 Common web and network standards for enhanced interoperability

Using the file types, structures and common protocols of network and internet transmission of bioprocess information makes it easier to link to outside sources of data.

The eve® bioprocess platform software uses web standards to ensure familiarity and a shallow learning curve for new users. Also, the use of standard file types makes manipulation of data inside a browser simpler. A NoSQL database is at the heart of eve® and this is key to having all bioprocess information in one place. Many tools already exist for accessing data of this type via common web protocols and standards, e.g. the Rest API or OPC communication standards (including the latest OPC UA protocol for added security).

Figure 4 shows the relevant parts of eve® interactions which benefit from a web-based approach.

3. Summary

The eve® bioprocess software represents the next generation in terms of using modern web and network protocol standards for linking both users and equipment in a flexible, secure way. The way the data is structured opens the path for "Big Data Analytics" to be applied to bioprocess data. In future, this will aid understanding and modelling for real-time control based on the whole process. The fact that this big data concept is often linked with "the Cloud" simply reflects the notion that storage of such data requires a lot of server capability and will be accessed by users regardless of geography or scale considerations. In reality, many “Cloud” solutions for the pharmaceutical industry may never reside outside an organization and will be accessed from local networks.

This brings up the second key element of this white paper – the significance of web-based solutions as applied to bioprocess software. The simplest definition is the most widely applicable in

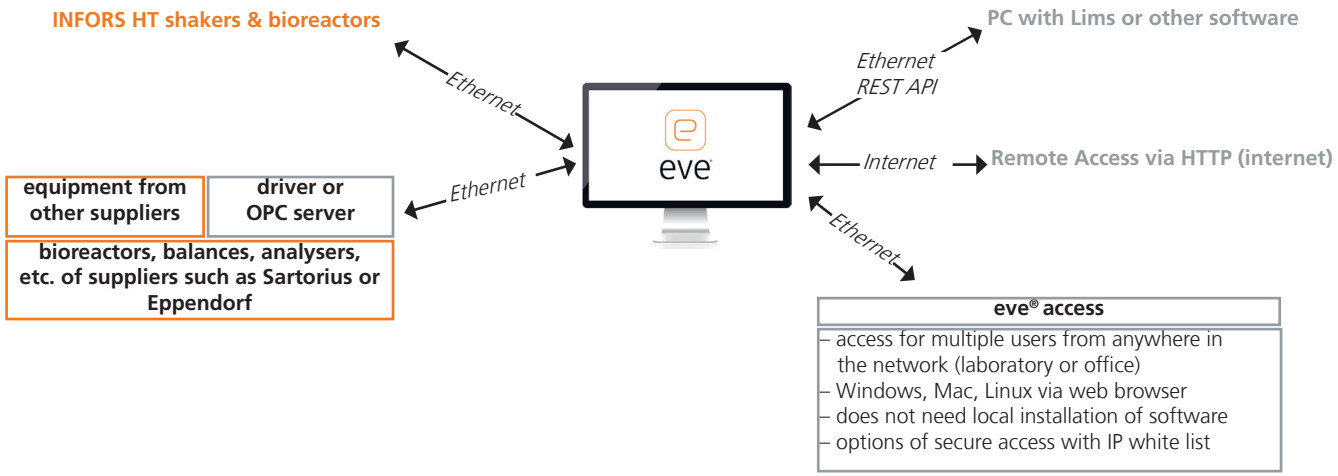

Figure 2. Benefits of a web-based approach to the eve® bioprocess platform software

that it is the user interface (UI) which is based on web standards and runs within a browser. The eve® bioprocess platform software only needs to be installed once on a central server. The key components of this approach are cost-effective, scalable and "easy-to-understand" methods of accessing **all bioprocess data – rapidly and from any location** – rather than the limited data values available from most Supervisory Control and Data Acquisition (SCADA) packages.

The eve® bioprocess platform software can be used by a single user with a single piece of equipment or a large organization with multiple instruments and users. The point is that the software is the same and only the scale differs – the benefits apply equally. The benefits of modern web standards and protocols are part of what drives these very different ways of utilizing the one software package.

Infors AG
Rittergasse 27
CH-4103 Bottmingen
www.infors-ht.com
info@infors-ht.com