

# The Benefits of Real-Time Data Mobility

*How Advances in Mobile Technology Have Changed Data Visualization*



This document outlines some of the ways in which mobile devices are making automated work environments safer, more efficient, and more productive.

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# Are We Ready for Mobile Devices in HMI/SCADA Systems?

There is a debate in certain circles about whether or not automation and process control has a place for mobile devices like smartphones and tablets. There are those who have concerns about security. Are mobile devices secure enough to allow them to access sensitive process-related data? And if so, how much access should they have? Read/Write access? Read only? Should they be limited to a certain subset of data? And, if so, how can we control user access to ensure that users only access what they are authorized to see? Will these devices open holes in the network that allow malicious applications access to sensitive controls?

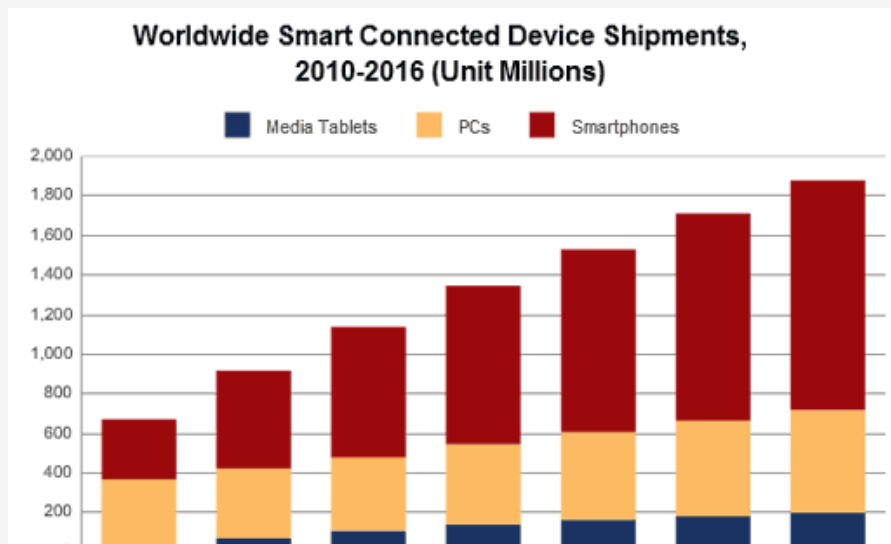
The concerns are justified in large part by the fact that SCADA systems are used to monitor and control some fairly essential processes – distributing electricity and water, mining and drilling for resources, cultivating and processing food, among many others. These are not processes that deal well with disruption or – even worse – catastrophic failure.

While some of the security concerns are certainly valid, the benefits of mobile devices are impossible to overlook, and the truth is that many of the security concerns are not inherent in the devices themselves, but in the way that the HMI/SCADA system and network infrastructure are configured.

Should HMIs and dashboards designed for mobile devices be read-only, or should a certain amount of remote control be permitted? Should personnel be able to use their own personal devices to access company data? And, if not, how can they be prevented? These are questions that will have to be answered if an organization wants to move forward with mobilizing their data visualization in a truly transformative way.

## Mobile is Dominating the World of Connected Devices

Even the most conservative estimates suggest that global consumption of smartphones and tablets is likely to completely reshape the world of connected devices. With mobile devices becoming such a constant component of our daily lives, is it even realistic to think that they won't become an integral part of process control?



# The Many Benefits of Mobile Devices in HMI/SCADA Systems

Anyone who has spent a significant amount of time working in automation and process control could easily think of some scenarios in which having mobile access to live process data could have saved some time or prevented a stoppage or failure of some sort. Consider some of the pains that mobile devices can help eliminate:

- ❖ A field operator must call the control room to ask for the reading on certain piece of equipment (i.e. valve, switch) he/she is looking at or manipulating.
- ❖ A field operator must call the control room to confirm whether a certain piece equipment has truly been shut down for maintenance work because it sounds like it is still running.
- ❖ A field technician unknowingly works on a live line because the control room has shut down the wrong line!
- ❖ A field operator must call the control room to describe equipment schematics because he/she has no access to an HMI or drawings on the floor at that moment.
- ❖ A field operator must call the control room to pull out the manual for a piece of equipment because the panel on the one he/she is looking at is different from the others he/she is used to.
- ❖ A field operator must describe over the radio what he/she is seeing - lights on a panel, leaks, etc.
- ❖ An operator must take a check-list out to the field, return to control room and enter the results into a form or spreadsheet, or into the control HMI.
- ❖ Constant calling back and forth between field and control room when testing or calibrating a measurement or control element.

When properly configured and combined with role-based user access control, a wide array of new possibilities emerge. The time saved in the field can now be used to perform other tasks or implement programs for optimization. A safer, more productive workforce is a very real benefit, and that's not something that business owners or managers will take lightly.

A mobile device can be used to remotely monitor processes and equipment, view drawings or manuals, review an online checklist, enter information into a form, as well as adding value as a tool for remote collaboration.

## Remote Device Monitoring



Mobile devices can be used as portable HMIs to monitor remote equipment in the same way that standard HMIs are used. Field operators can quickly and easily assess the current conditions of a process or piece of equipment without being tied to a workstation.

This can be particularly useful for checking the system-wide effects of repairs or configurations that are made to field equipment, rather than manually visiting each piece of equipment to take measurements or waiting until someone in the control room lets him/her know about

any potential problems or abnormalities.

There may also be situations in which a problem can be diagnosed and corrected without even visiting the site. By giving field operators and technicians the ability to access real-time data from wherever they may be, it may be possible to eliminate any travel time or expense, freeing the operator or technician to work on other tasks. This may also eliminate the need for the technician to call back to the control room for updated information. This means the control room operator now has more time as well.

## Viewing Documents and Other Media

In addition to monitoring and controlling processes and equipment, mobile devices can also serve as a sort of repository for useful information, providing a handy reference for materials that would ordinarily fill several books and would be nearly impossible to carry around over the course of a work day.

New workers can reference training materials like manuals, pictures and videos. Use tablets and smartphones to access safety guidelines or troubleshooting procedures. View schematics and diagrams. Review incident reports or outstanding work orders.

If you think of mobile devices as nothing more than a portable library of relevant media, this use alone is enough to justify the investment.



## Filling out Forms or Checklists



Operators and technicians frequently have a need to add information to a database regarding certain tasks performed – or simply as part of their day-to-day responsibilities. Whether performing inspections, completing service orders, updating personnel files, or any number of other tasks, mobile devices can save employees a tremendous amount of time by allowing them to perform these tasks from anywhere at any time.

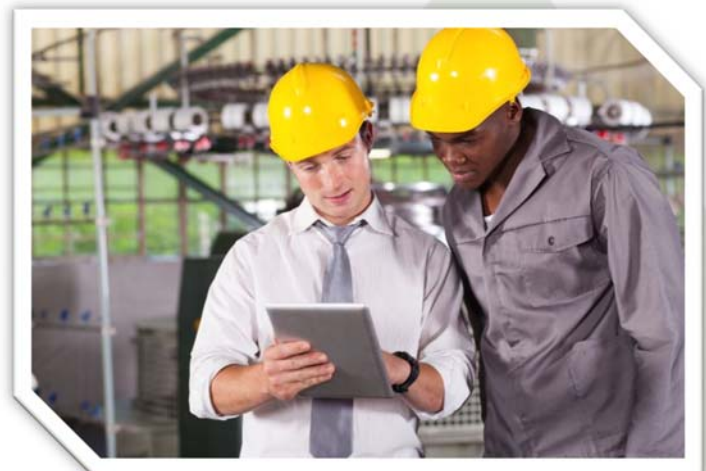
Field technicians can update the control system instantaneously from the field – without having to return to the control room to fill out a form or deliver the results to a control room operator over the phone. It's not hard to imagine a scenario where a technician in the field, several miles from any control room, can use a single device to read a procedural document, review a checklist, enter relevant information into a form, then check to confirm that the information was entered completely and accurately – without any unnecessary travel time or phone calls.

## Collaborating

One of the most profound applications of mobile devices is as a tool for instant collaboration. By allowing continuous access to live process data, personnel from different departments can collaborate and make decisions with up-to-date and accurate information at their fingertips.

Mobile devices can be used to document best practices by uploading pictures or videos of particular procedures and allowing these items to be reviewed by workers at other locations in other facilities.

Smartphones and tablets allow personnel to access rich media at any time as a means of conveying a certain set of information to relevant parties. Use displays of real time and historical data in meetings or presentations. Mobile devices allow off-site personnel to participate in real-time activities with on-site personnel. A wide array of possibilities are introduced by mobile technology.



## How is it Done?

Today, there are two primary ways in which data visualization software is made compatible with mobile devices. One method is Java; the other is HTML5. By comparing and contrasting these two languages, it should be clear which method will work best for your application.

Feature	Java	HTML5
Native Compatibility with iOS Devices		X
Native Compatibility with Android Devices	X	X
Native Compatibility with Windows Devices	X	X
Native Compatibility with Web Browsers without add-ons or plug-ins		X

As the table above indicates, there are some advantages to using HTML5 instead of Java. The one limitation of Java that most people notice right away is that Apple devices do not support Java. That means running a Java application on your iPad or iPhone will require the use of a third-party tool that converts the visualization to be rendered as HTML5 or some other compatible language. That means that running a Java application on your iOS device will require installing another application that will typically have an embedded Java Virtual Machine (required to run any Java application), and will actually convert the data into HTML5 so it can be rendered for viewing. That's two additional applications, plus the additional processing, just to view your data – which is ultimately rendered in HTML5 anyway.

In fact, even on Android or Windows devices that support Java, you cannot simply view your Java application in a web browser. Java requires its own runtime environment, which runs as a plug-in in your web browser. Again, that's another application taking up space and consuming resources on your device.

In contrast, HTML is the native language of web browsers, and HTML5 will render and run in any modern web browser without any plug-ins or third-party applications. Your data visualization is rendered as a standard web page. That means you can access your data in any browser on virtually any device.

## The Future of Mobility

Mobile devices are clearly not a passing phase. In the short time the technology has existed, many of our daily lives have already been transformed. As we enter a new industrial era of interconnectivity and open communication, it is a virtual certainty that mobile devices will play a major role in the way work is done. In most cases, mobile devices will probably be introduced as a supplement to a legacy system, and mimics or dashboards will be designed specifically for mobile devices and/or web browsers.

As time goes on – or right now in some cases – new control systems will be implemented, and mobile devices will be a part of the original system architecture. They will aid in asset management and maintenance. They will aid in training. They will be given to contractors to keep them involved in operations and to hold them accountable. In some cases, they will even serve as the primary means of operation.

Mobile devices are here to stay, and they are positioned perfectly in the current world of machine-to-machine communication and the Internet of Things. If you haven't yet included mobile devices in your HMI/SCADA system, there has never been a better time than now.



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