



## We Have a New Logo! And a New Website!

We are excited to reveal our new logo. The design reflects our 2020 strategic plan, revised governing bylaws and new website. This new look will represent us as we continue serving New Hampshire’s public water suppliers. Our new website launched on June 16. Check it out and let us know what you think! [www.nhwwa.org](http://www.nhwwa.org)



## Cyber-System and Operation Security for Water & Wastewater Systems

Almost every week we hear of a cyber-security breach of computer systems which spawn massive issues with the safety, privacy, and confidentiality of companies, financial institutions, and ultimately our personal information. Less often, but perhaps more critical and more concerning to our industry, we learn how our municipalities have been affected, either by ransomware, general hacking, or specific process disruptions. These infiltrations cause massive loss of data, carry financial implications, and possibly threaten our customers’ health and life safety.

A high number of the water systems in our region are small, publicly owned, and with limited resources and older technology. As these municipalities look to modernize their control systems many fail to ensure the proper security procedures are in place.

The most common security breaches deal with the lack of securing SCADA applications with strong passwords and remote access, making it easy for a hacker to take control of the operations. This article will cover where threats occur, best practices to mitigate a security breach with application-level security, and how to check for vulnerabilities within a software application.

### Common Threats

Security threats can come from a few different areas and appear different. The important thing is to understand the difference and then minimize the threat within your operations. The three common areas that threats come from are external, internal, or unintentional.

External Threats	Internal Threats	Unintentional Threats
<ul style="list-style-type: none"> <li>Inadvertent, Non-Targeted</li> </ul>	<ul style="list-style-type: none"> <li>Inadvertent Operation</li> </ul>	<ul style="list-style-type: none"> <li>Natural Occurrences</li> </ul>
<ul style="list-style-type: none"> <li>Intentional, Targeted</li> </ul>	<ul style="list-style-type: none"> <li>Malicious Operation</li> </ul>	<ul style="list-style-type: none"> <li>Equipment Failures</li> </ul>
	<ul style="list-style-type: none"> <li>Trusted Advisors</li> </ul>	<ul style="list-style-type: none"> <li>Physical Oddities</li> </ul>

External threats and internal threats are what we have been hearing about in the news. Firewalls and virtual private networks will keep your operations safe from external threats. Best practices and ensuring your SCADA system has proper password control features and secure connections for remote use will keep you safe from internal security breaches.

*(Continued on page 9)*

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## From the Executive Director

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With just over a year at the Association under my belt, I am increasingly impressed by and grateful for the women and men of our sector that dependably provide clean, safe and affordable drinking water. Whether dealing with underfunded infrastructure or adapting to a global pandemic, the professionals protecting the health and economic foundation of our State continually get the job done.

While the worst of COVID appears to be receding, there are lingering effects, from rising construction costs to emotional fatigue to hesitancy for mass vaccinations. We had our second “Fauci Ouchy” about a month ago but are still cautious regarding crowds and enclosed spaces. Thank goodness the warm weather has arrived, so we can gather outdoors!

New Hampshire’s spring 2021 legislative session has been a wild ride, with virtual public hearings and FY2022-2023 budget process adding to the complexity. Our focus has been on the State Aid Grant (SAG) program, which is intended to be a 20 – 30 percent contribution from the State to fund municipal drinking and clean water projects. Remarkably, the legislature has underfunded or denied this commitment since 2008, contrary to the legal promise of the underlying statute (RSA 486). We have worked closely with the NHDES, NH Municipal Association, Granite State Rural Water Association, and NH Water Pollution Control Association to convince key legislators and committees of the value of this program for the economic and physical health of New Hampshire.

In addition, the State has been allocated roughly \$900 billion as part of the American Rescue Plan Act (ARPA).

New Hampshire’s Senate and House Finance Committees and members of the Administration are working to determine how and where to distribute these funds, with rumors of \$100 - \$250 million for drinking and wastewater projects being floated. You can locate your representatives here [www.Gencourt.State.NH.US](http://www.Gencourt.State.NH.US) to ask them about their position on funding the SAG program to its intended level, and to suggest how to best use ARPA funds for the public water sector.

At the federal level we spoke with members of all four delegations as part of the (virtual) AWWA Fly-In. Everyone understands the importance of infrastructure funding and is working on legislation to rebuild facilities that are near the end of their operational lives. Senate Bill 914 allots ~\$30 billion for drinking water and passed the Senate 89 – 2. Similar legislation is being discussed in the House, and the Administration is proposing even larger funds based on a broader definition of infrastructure. We emphasized New Hampshire’s need for nearly \$3 billion in water infrastructure investment over ten years (see 2013 [SB60 Report](#)), the use of existing programs such as State Revolving Loan funds, and that the commitment had to be dependable and long duration due to the large amount of work required and need for critical resources including materials, operators, contractors and regulators. Everyone involved in these discussions knows the pending federal dollars are a generational opportunity to catch up on decades of water infrastructure underinvestment.

We want to thank the hundreds of operators who adapted to our on-line



training formats required by the COVID pandemic, and to our top-shelf instructors that continue to provide best-in-practice presentations and topics. While we look forward to returning to in-person formats, especially for hands-on training and demonstrations, many of you have appreciated attending an informative session without needing to travel. We expect to continue offering remote-learning options to make it easier for more people to stay current with the changing rules, trends and technologies that are a constant in our industry. Please let us know if you have specific training interests or needs so we can tailor our classes to meet them!

Internally, we are working on ways to better deliver the services that help you succeed. We are acting on all aspects of our [2020 Strategic Plan](#), including workforce development, infrastructure investment, communications and building our ability to deliver on our promises. The Board, staff and consulting partner Tom Burack recently revised our bylaws which were approved by our members at a June 8, 2021 special

*(Continued on page 3)*

# Construction Day & Surface Water Peer Review

August 4, 8:30 AM-12:30 PM and 1:00-4:00 PM

Plan to join us for our first in-person events of the year! For this year's **Construction Day** we will be hosted by Manchester Water Works (MWW) where we will visit two pump stations as well as the site of the future Merrimack River raw water intake and treatment plant.

We'll gather at MWW's existing treatment plant on the banks of Lake Massabesic. MWW staff will provide a system overview while we enjoy coffee and refreshments. Next, we will divide into groups to visit the three locations. We'll meet back up at the treatment plant for lunch and a presentation by Mike Unger of NHDES on Southern NH Regional Water Project updates.

We will hold a **Surface Water Peer Review** training immediately following Construction Day from 1:00-4:00 PM. The afternoon event will focus on the value of watershed management and source water protection and will include presentations by Paul Susca (NHDES) and John O'Neil (MWW). The afternoon will also include a field trip to Tower Hill Pond.

Join us for the morning, afternoon, or all day! Individually, each event is worth 3 TCHs, the full day is worth 6 TCH's.

[Click here to register for Construction Day \[and combined Construction Day and Surface Water Peer Review\].](#)

[Click here to register for Surface Water Peer Review only.](#)



Construction Day in Merrimack 2020.

(EXECUTIVE DIRECTOR Continued from page 2)

meeting.

We are revising our website to make it more informative and easier to register for classes and events, and have created a logo for a fresh new look – we hope you like it!

Thank you for protecting the public health and economic wellbeing of our State. Please consider being an even stronger supporter of the drinking water team by financially [joining the](#)

[Association](#). Please contact me at [BSmith@NHWWA.org](mailto:BSmith@NHWWA.org) if you are interested in underwriting one of our strategic initiatives, or have suggestions or questions.

Boyd Smith, Executive Director

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## Personal News

The NHWWA and New Hampshire’s drinking water community are bidding farewell and “bon chance” to two titans of our industry. Rick Skarinka, PE is retiring at the end of June after more than 30 years’ service with NHDES. Rick has been influential in nearly every aspect of drinking water during his tenure, most recently with large system assessments and holding the reins during the transition from Wade Pelham to Jason Smith in the Operator Certification program. Rick’s collegial, problem-solving, solution-focused approach has helped numerous systems to operate more safely and sustainably. Tom O’Donovan, PE retired from his role directing the Water Division at the end of May. In the short time Tom was here, he created a strong sense of team, encouraged and enhanced inter-agency and organizational cooperation, and modeled public service and leadership. His world-class knowledge of drinking water systems and how to recognize and minimize their vulnerabilities was impressive.

Both Rick and Tom leave with institutional knowledge and experience that is not easily replaced. We hope they will remain part of our drinking water family as they transition into this next phase of their lives!

NHWWA Calendar		
When	What	Where (est.TCHs)
July 13, 15, 20, 22, 2021	Grade 1A Small System Water Operator Course	Zoom Platform (10)
August 4, 2021	Construction Field Day (AM) Surface Water Peer Review (PM)	Manchester (3) Manchester (3)
October	Advanced Distribution - Part B In-person class	TBD (3)
Sept. 14, 16, 21 & 23, 2021	Grade 1A Small System Water Operator Course - September	TBD (10)
Sept. 24, Oct. 1, 8 & 15, 2021	Basic Water Works Math—Fall	TBD (12)
October 20, 2021	NH Drinking Water Expo & Trade Show	Grappone Center Concord, NH (5)
October-November	Fall Basics Course	TBD/Hybrid (30)
Nov. 2, 4, 9 & 11, 2021	Small System Roundtables (evenings)	TBD (2.5)
November 18, 2021	Technical Meeting	Concord (3)
Nov. 2, 4, 9 & 11, 2021	Exam Prep Course (mornings)	TBD (12)
Mid-December	Operator Training	TBD (3-5)

Events and trainings will be posted on our website at [www.nhwwa.org](http://www.nhwwa.org) and email notices will go out via Constant Contact. Be sure to allow our emails access

# Systems Needs Assessment Survey for Federal Funding

## Virtual Training June 23, 9:00 AM

By Johanna McKenna, NHDES

Every four years EPA conducts an assessment of the nation's public water systems' infrastructure needs and uses the findings to allocate DWSRF capitalization grants to states. Your participation is critical to the success of the survey and of the drinking water program in your state and EPA Region.

There are 27 medium systems in NH that need to participate in the 2021 Drinking Water Infrastructure Needs Survey and Assessment (DWINSA). While medium systems in partial-participation states do not report 20-year infrastructure needs for the DWINSA they are asked to provide lead service line inventory information and responses to questions on water system operator workforce concerns. For the DWINSA, medium systems serve from 3,301 to 100,000 persons, including their consecutive populations.

The 7th DWINSA includes for the first time a set of supplemental questions regarding your current knowledge of the presence of leaded components in your system's inventory of service lines. There is also a set of questions about the current status of your operator workforce and concerns you may have for its viability over the coming years. Both issues are of significant national concern and the purpose of adding these questions is to derive critical information that can better inform state and national decisions related to possible future initiatives for infrastructure

investment, economic stimulus, and workforce development and sustainability. For each of these supplement question sets, more detailed explanation of the purpose and considerations are provided in the instructions. More information about the national Drinking Water Needs Survey is available at the [EPA website](#).

In order to help you complete these forms the Drinking Water and Groundwater Bureau will be hosting a training on **Wednesday, June 23<sup>rd</sup> from 9:00 AM – 11:00 AM** I have attached one of the pre-populated forms for you to review before the training.

### Draft Agenda

*9:00-9:20 (Johanna) Welcome, Background & Purpose*

*9:20-9:40 (Jason Smith) Workforce Questions*

*9:40-9:50 Break*

*9:50-10:30 (Cindy Klevens) LSL worksheet, how it connects with L&C inventory requirements*

*10:30-11:00 Sample walk through, Q&A and next steps*

Below is the information needed to join the meeting on June 23<sup>rd</sup>. There is no need to register. If your system will not be able to have a representative at this training please let me know.

*EPA Drinking Water Needs Survey - Medium Systems Training  
Wed, Jun 23, 2021 9:00 AM - 11:00 AM (EDT)*

*Please join my meeting from your computer, tablet or smartphone.*

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Please reach out with any questions. Hope to see you on June 23<sup>rd</sup>.

### Johanna McKenna

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**Thank you to our contributing authors who made this newsletter much more useful!**



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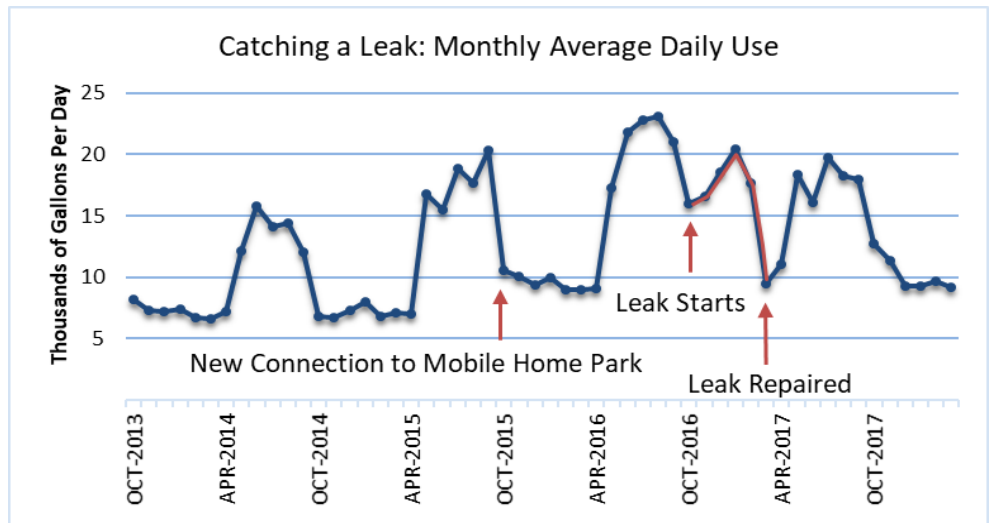
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## Leaks: All Water Systems Have Them and All Water Systems Can Control Them

By Stacey Herbold, NHDES Water Conservation and Water Use Registration and Reporting Program

While all water distribution systems have unavoidable, background leakage that is inherent with a network of connected pipes and appurtenances, all systems also have or at some point will have leakage that can be detected and managed. The benefits of managing leakage are abundant:

- Reducing leakage is key to establishing resilient water supplies. Despite the northeast being wetter as a result of climate change, drought remains common and is expected to increase in frequency, punctuating the need for water systems to boost resiliency efforts.
- Controlling leaks involves catching leaks early before they become an emergency, which can provide time to plan and schedule the appropriate repair. Fixing it right the first time saves time later and prevents additional interruptions to service.



*A leak springs in October 2016, during the height of the 2016 drought. Why did it take 5 months to fix it? No one knew about it. Pay attention to your water use data!*

*(Continued on page 8)*

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# NHWWA Young Professionals Committee Happenings

April showers have brought not only May flowers, but also Young Professionals (YPs) who are ready to reconnect after a year of social distancing!

In March, the YPs hosted another virtual successful treatment plant tour with the City of Portsmouth! Al Pratt, PE, the Water Resource Manager for the City of Portsmouth, virtually toured attendees through the Madbury water treatment plant and the rest of the Portsmouth water system. The tour hosted 40+ attendees consisting of YPs and YPs-at-heart, making it one of our



most successful tours yet! NHWWA YPs are excited to

announce our next virtual tour with.....



**the University of New Hampshire/Durham Water**

**Treatment Plant!** We encourage all folks interested – YPs and experienced professionals alike – to join us for this exciting, free tour on Thursday, **June 24<sup>th</sup> at 3pm EST.** [Click here to register.](#) Earn 1 TCH for logging in!

We are looking forward to hosting our first in-person, post-COVID event – baseball, BBQ, and networking at the **New Hampshire Fisher Cats!** Join us on **August 5, 5:30 PM** at the **Northeast Delta Dental Stadium** in **Manchester** for a great night in the ballpark. More details on this exciting event to come. Follow the YPs on [Facebook](#), [LinkedIn](#), [Instagram](#), and [Twitter](#) for updates on how to register.

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Wesley East, Maine Water

Abby Thompson Fopiano, Edgewater Strategies

Sarah Smith, Wright-Pierce

### Associate Member

Kevin Brassard, Coyne Chemical

### Small System Members

Hollis Village Marketplace Association

Ladd Hill Cooperative, Inc.

Northpointe Water Association

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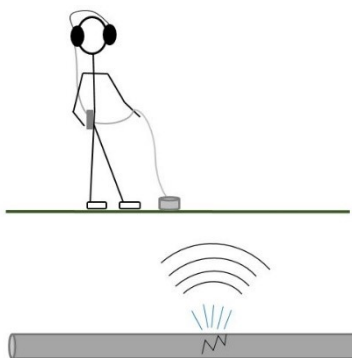


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- Monetary savings from controlling leaks can come in many forms, from the savings in the reduced pumping and treatment costs to the delay of developing additional sources to meet demand.

The layers and sophistication of a leak detection program can vary based on the size of the system, condition of the system's infrastructure and available resources. Below are examples of common methods of leak detection for a variety of system sizes.

- Track average daily usage (ADU) and compare to recent daily usage and historical records for that same time period to identify any upward trends. Some water systems may have the technology in place to capture daily usage and can even access the data remotely. However, many small systems may rely solely on the monthly meter readings by the operator. These systems can use the monthly readings to calculate the monthly ADU in order to track upward trends, which may indicate a leak. For larger systems, tracking ADU may help to detect a very large leak, but it should be noted that there are many variables that can impact the water use trends of a water system of this size.
- Conduct a yearly water audit. The American Water Works Association (AWWA) has free water audit software available on its website that compares system input volume to metered and unmetered uses. By completing the tool, systems can drill down into the data and estimate how much water is potentially being lost to leaks, along with the equivalent monetary loss.
- Track night flows in the early morning hours when water usage is at its lowest to identify any unusual trends. For very small systems, install a meter after treatment and storage that measures water being directly distributed into the system and can log meter readings or the flow rate in gallons per minute (gpm). If the expense is too great for a meter that has logging capabilities, mount a video device that runs on batteries to record the readings that can later be transcribed. For large systems, install zone meters with advanced metering infrastructure (AMI) to track and remotely access real-time flows in specific zones of the system.
- Conduct an acoustic leak detection survey. For very small systems, tracking ADU trends and conducting a night flow analysis may be enough to verify that a leak has emerged. After that, acoustic leak detection equipment can be used to pinpoint the location of the leak. [Granite State Rural Water Association](#) may be able to help pinpoint the leak, as well as any of the consultants in this [list of leak detection firms](#). For larger systems, regularly conducting system-wide acoustic leak detection surveys is the most effective way to get ears on the entire system and to discover leaks of all sizes. The system may hire a leak detection consultant or choose to purchase equipment and train staff to use the equipment. Also, many systems rely on the yearly NHDES Leak Detection Grant Program. On June 15, 2021, the grant round for the [NHDES Leak Detection Survey Grant Program](#) will open for surveys to be conducted during the 2022 field season.



### NHDES 2021/2022 Leak Detection Survey Grant Round Opens June 15<sup>th</sup>

NHDES offers grants for free leak detection surveys, which are conducted by a skilled consultant contracted by the department. On June 15, 2021, the grant round for the NHDES Leak Detection Survey Grant Program will open for surveys to be conducted during the 2022 field season. All community water systems are eligible to receive a survey; however, they must meet certain conditions, including having a plan showing the location of water mains, curb stops, valves, hydrants, and any other appurtenances. To date, the program has funded surveys totaling over 5,500 miles of water main, resulting in 700 leaks discovered and 6,500 gpm of leak losses recovered. [Apply soon!](#)

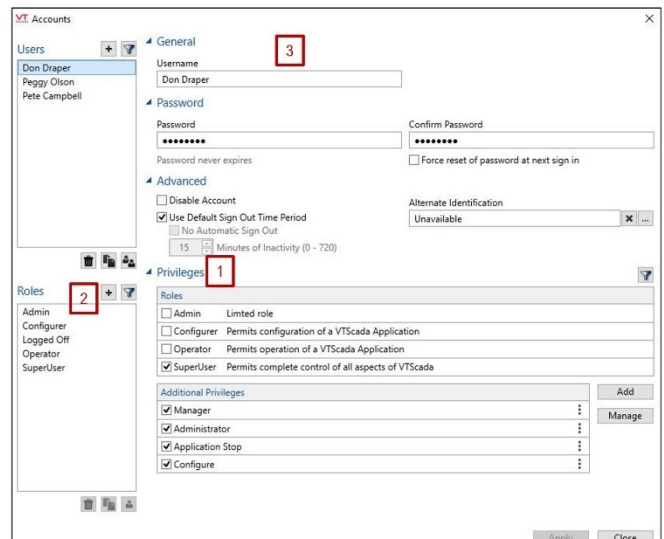


## Best Practices for Security

- **Do not assume your site is too small to be a target.** All SCADA systems are targeted by hackers. If you are running a SCADA system, your site is a target.
- **Enforce strong passwords.** Use the available options to enforce strong passwords (minimum length, combination of letters, numbers, and other characters). Advise operators against re-using passwords for multiple applications.
- **Always download and install security updates.** Typically, vulnerabilities are published a short time after a security update is distributed. Hackers will immediately seek to exploit that vulnerability on sites that have failed to protect themselves by applying the update.
- **Limit applications running on control servers.** Only allow programs that are needed for the control of your operations to be installed on the control servers. Block users from having the ability to install a program.
- **Design SCADA pages with security in mind.** Create a well-organized set of roles and corresponding rule scopes when designing a new application or enhancing an existing application requiring new screens or pages.
- **Protect control objects and pop-up pages.** By placing controls on a pop-up page, you reduce the chances of an operator accidentally issuing a control action. Also, because access to a pop-up page can be restricted via a security privilege, it is possible to restrict access to many output tags with one privilege on one page rather than many privileges on many tags.
- **Use caution when using Internet client access.** Internet clients transmit the user credentials using basic authentication, which is a simple non-encrypted Base 64 encoding of "username: password", and which is easily decoded by capturing network traffic. It is essential that you use an X509 certificate (commonly referred to as an SSL certificate) to secure the communications from packet sniffing software connected to a local machine or switch. When selecting a Scada platform it is best to use that vendor's built-in remote client connection software to minimize a security breach. When you rely on a third-party remote access package that adds another avenue for a breach and another license to manage. Less is more being the key here.
- **Two-Factor or Multi-Factor Authentication.** When selecting a SCADA package ensure it allows configuration for two-factor authentication such as OpenID Connect, a standard for user authentication.
- **Consider running your Scada application as a Windows™ service.** This provides maximum control over the choice of account under which your SCADA application runs, its permissions, and user access to applications.

## Application-Level Security

Most SCADA systems allow for the configuration or privileges, roles, and accounts for users of the system and the ability to optionally control the accounts via Windows active directory. When using Windows Security Integration, accounts (users) are managed in Windows. The privileges that are related to SCADA functionality are managed within the SCADA security manager, via assignment to roles. Windows accounts are linked to SCADA roles using Active Directory Groups. The advantage of using Windows active directory is having a centralized place for accounts across multiple systems and the operating system. It is important to understand the three basic components of application-level security for SCADA systems and what they do.

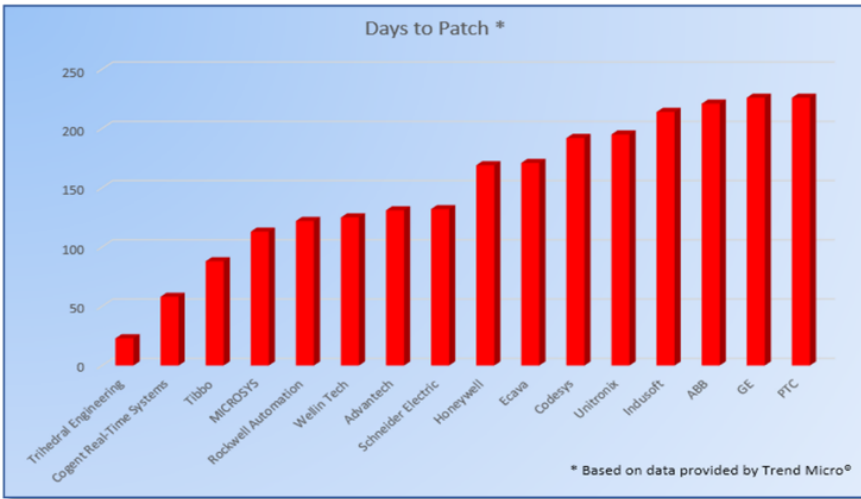


(Continued on page 10)

1. **Privileges** are specific tasks (acknowledge alarms, close application, control actions) that a user can and cannot do).
2. **Roles** are a set of privileges.
3. **Accounts** are specific to a user. Accounts are assigned Roles and/or Privileges.

**Vulnerabilities from Vendors**

Software vendors regularly release new versions and features, and this ensures that security gaps will most likely appear over time. The Industrial Control Systems Cyber Emergency Response Team (ICS-CERT) regularly conducts vulnerability analysis on products used in critical infrastructure. When they identify a potential security exploit, they contact the vendor who then has time to patch the vulnerability and distribute the solution.



Days to Patch Security Issues Following Notification by ICS-CERT

This graph, from data published by Trend Micro, shows the number of days for common SCADA software vendors to patch security issues once notified by ICS-CERT. Dependency on third-party components increases the length of time to find a solution to these issues. When looking at upgrading your SCADA system, look for vendors with a quick response time and those who do not rely on third-party components.

We hope this helps you protect your SCADA application or what to look for when selecting a new SCADA system or upgrading an older system. The authors of this article are happy to help guide you in securing your application.

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