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# Sustainable Software Patching: Critical for Solid Security, Reduced Risk, and Meeting Compliance Challenges

Customers, battling with  
growing complexity and  
threat levels, need  
bulletproof support



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# Summary

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## In brief

Increasing investments across many industry sectors in transformational digitalization mean that software is more critical than ever to organizations' fortunes and business reputation. At the same time, factors such as greater complexity around new technology opportunities (including more prevalent digital supply chains), the burgeoning threat landscape, and the competitive environment (which drives more frequent software updates from vendors seeking to introduce new features), accelerate the pace of software adoption and change cycles within user organizations. The resulting software estate is commonly characterized by a significantly larger attack surface, on which malicious actors have increasingly focused, discovering weaknesses and creating attacks to exploit them.

While numerous security solutions can be marshaled to address point elements of protection, timely application of vendor software patches is the indispensable foundation of avoiding the risk arising from the presence of unmitigated security vulnerabilities. Risk management and compliance are brought ever closer to software protection practices by the drive toward digitalization, and threats that remain unaddressed because of unpatched vulnerabilities constitute real business issues as a result.

Omdia believes that many organizations need greater maturity and understanding of the value of proactive management in the patching workload and lifecycle, which requires a commitment to establish a security-patching window within priority scheduled maintenance. Because patching is an increasingly key capability, this need for maturity should be reflected in the context of the organization's IT governance framework, which must include only sourcing patching content from the valid original supplier.

## Omdia view

Customers often go through a rigorous review and due diligence process before investing in enterprise software products, and rightly so, given the scope and cost involved in most projects. It is eternally surprising, however, that some customers do not engage in similar due diligence when it comes to properly securing those software investments through the ongoing software patching and maintenance that is necessary to maintain software's full range of value-delivery potential. The approach to IT governance in any organization must guard very strongly against any tendency to "buy and forget" with respect to any element of the software estate, which can open up holes in enterprise protection and foster risk and compliance problems that lead to serious business issues.

Ensuring regular software patching and maintenance must be an imperative for every enterprise, enforced rigorously through management commitment to the importance of maintenance plans and to the maturity needed within the organizational culture to ensure regular and successful patching. Regular security maintenance allows customers to build a culture of compliance, where they can be confident of keeping up with industry

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regulations and compliance procedures. Failure to perform proper software patching and maintenance means putting a company's bottom line and its reputation as a secure and responsible enterprise at risk. But in addition to reinforcing these key business reasons for a commitment to patching, organizational culture must overcome any fears that patching could potentially be responsible for causing failures. On the contrary, the truth is that failure to keep patching up to date constitutes a far greater risk.

Of course, like any other IT management discipline, patching must be subject to strong control. A key element of a successful patching regime is adherence to the use of high-integrity sources of patching information, not putting faith in poor-quality sources such as ubiquitous web-based advice. Another weakness to be avoided is any engagement of third-party service providers without the assurance that their processes and skills incorporate all necessary rigor in using only creditable sources of patching content. The consequences of poor governance of such relationships are likely to include increased cost to the client organization as well as risk and compliance issues. Furthermore, organizations should not rely on unproven mitigative controls or unverified configuration changes to do away with patching.

## Key messages

- Sustaining software security over its usage lifecycle is a key responsibility.
- Patching is a cornerstone of IT governance and its support of compliance responsibilities.
- Risk is avoided only if patches are acquired from reliable sources.

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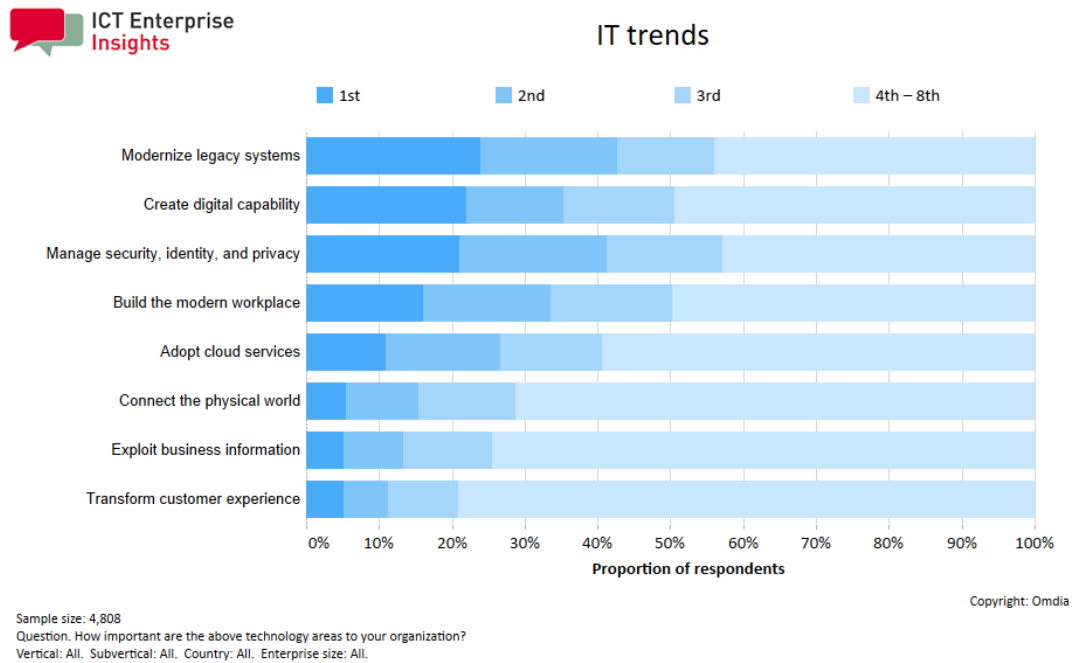
# Sustaining software security over its usage lifecycle is a key responsibility

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Many enterprise customers are attempting to transform their IT in order to keep up with the accelerated pace of change within their markets and business by leveraging technology opportunities such as cloud, mobility, and analytics. Commonly, there is an ongoing balancing act between investing in digital transformation initiatives (taking advantage of new and enhanced applications and business processes) and needing to ensure that the changing live environment is operating reliably with bulletproof security. The range of components of the IT infrastructure that must be secured is extending, not only encompassing the traditional "stack" from operating systems to hardware to databases, middleware, and applications but also including cloud-based and other third-party services. Outside the traditional IT boundaries, any enterprise presence in the consumer mobile environments must incorporate built-in security protection, because intentionally or otherwise, mobile users are prone to take actions that may open the device to compromise from threats.

Any lack of protection within the extended IT infrastructure can result in downtime that can impact the entire business and, in some circumstances, in security breaches that can cause violations of industry regulations and compliance procedures. Unsurprisingly in this context, responses to Omdia's most recent annual survey showed that managing security, identity, and privacy featured in organizations' choice of the top three most important IT trends more than any other category (see Figure 1).

Figure 1: Managing security, identity, and privacy is identified as the most important top-three trend



Source: Omdia ICT Enterprise Insights 2019/20

With the IT industry itself becoming increasingly interconnected (e.g., via technology partnerships) to support digitalization, the cadence of software releases is now a lot faster than customers have historically been accustomed to. While customers benefit from vendors competing more keenly than ever with new features and functionality, their IT estate represents a broader attack surface that can be subject to a greater range of threats from malicious actors. Leading vendors are increasing their commitment to respond to threats by issuing patches for known cybersecurity vulnerabilities, and an organization keeping its estate up to date with vendor-supplied patches is the primary and timeliest means of protecting against software-related threats. New releases and patches may also require customers to retro-patch elements of their "stack" (e.g., middleware, OS, or database) to fulfill support conditions, and the chain of protection-related dependencies between stack components requires ongoing focus. For example, particular firmware updates from Intel have been known to require corresponding patches to OS and virtualization layers, and for older processor types, mitigation of processor issues does require disabling certain features (hyperthreading) if running untrusted workloads.

It is not hard to understand why security is an urgent issue among enterprises of all types, given what a security incident or breach can mean for an organization's business and reputation. News stories of security leaks and hacks at multinational corporations are more frequent than ever, with reports of stolen credit card data, personal information, health records, and more (e.g., incidents involving Equifax and CapitalOne). There have already been examples of compliance-related penalties being increased because of inadequate patching procedures, and this could happen again as regulations and

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legislation become more severe (e.g., 4% of global turnover for breach-related noncompliance under GDPR). Beyond the direct financial impacts, these events typically lead to lost revenue and a sullied reputation for the affected enterprise, with potential losses in business and customer loyalty that are difficult to recover from. Most enterprises recognize the need to protect themselves as much as possible from potential cybersecurity threats, but they must also realize that those threats can come not only from external hackers but from failing to maintain up-to-date internal security protection throughout the IT stack.

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# Patching is a cornerstone of IT governance and its support of compliance responsibilities

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Companies today simply cannot afford to bypass having a rigorous software security and maintenance program, especially since external threats are ongoing and becoming increasingly sophisticated, requiring ongoing vigilance and maintenance. To have a rigorous security profile, companies should be working closely with their software vendors, because they have the most experience and expertise when it comes to patching, supporting, and securing their own products.

Companies of all sizes and in all industries need to partner with a trusted provider to put procedures in place to keep their software security current and to address potential vulnerabilities. Unmitigated software vulnerabilities can allow malicious hackers or unauthorized personnel to bypass security controls, which can directly result in theft, fraud, and immediate financial loss, not to mention the tarnishing of a company's brand. Beyond those losses, companies that fail to keep up with software security face potential fines for violating government or industry regulations and compliance procedures, and those consequences are becoming more costly as security incidents increase in frequency and severity.

In the US, government regulators have taken to levying heavy fines following security and data breaches, costing companies in various industries millions of dollars. In fact, security breaches and their outcomes have become so frequent that the Federal Trade Commission (FTC) has issued extensive guidance on how corporations should approach IT security throughout the entire IT stack. To cite one example, the FTC published *Start with Security: A Guide for Business*, a compilation of the top 10 lessons that can be learned from the fines and settlements they have enacted in cases of past violations, as shown in Table 1.



**Table 1: FTC recommendations for IT security**

Start with security
Control access to data sensibly
Require secure passwords and authentication
Store sensitive personal information securely and protect it during transmission
Segment and monitor your network
Secure remote access to your network
Apply sound security practices when developing new products
Make sure your service providers implement reasonable security measures
Put procedures in place to keep your security current and address vulnerabilities that may arise
Secure paper, physical media, and devices

Source: Federal Trade Commission

While parts of this guidance are fairly intuitive, some of the lessons deserve closer inspection when viewed through the lens of proper product patching and support. When discussing sound security practices in product development, the FTC references companies that were cited and fined for failure to follow IT product platform guidelines for security. When discussing security procedures to address vulnerabilities, the FTC specifically recommends updating and patching third-party software, heeding any security warnings from vendors, and addressing them immediately. Failure to do so could mean that a company will come under scrutiny from regulators and other parties, ultimately incurring a substantial fine if a serious security issue occurs and the company had failed to adhere to compliance policies beforehand.

A number of other regulations and standards include patching-related stipulations, including

- PCI DSS Requirement 6.2, which requires that an assessor examine organizations' policies and procedures to verify that there is an established process for patch management
- ISO/IEC 27001 Section 12, which mandates that technical vulnerabilities should be patched, and there should be rules in place governing software installation by users.

Given this backdrop, companies increasingly tell Omdia that security and compliance go hand in hand as they consider software deployments and that both play an increasingly larger role in overall IT support and maintenance. For many compliance regimes, it is essential that documentation is maintained to prove how measures undertaken (at both policy and operational levels) meet compliance requirements. Automation of patching is likely to provide the most effective means of meeting such reporting requirements in the future as well as ensuring efficiency and avoiding greater impact of increased resource demand related to expanding patching requirements.

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Most regulations are either transaction based (e.g., in financial services and banking), data management based (e.g., data privacy and records storage in healthcare), or both. At Omdia, we regularly recommend that companies, regardless of the vertical industries in which they operate, need to create a strong foundation and culture of compliance as a matter of course for their existing IT and software deployments, especially if they ever hope to undertake transformative digitalization initiatives that will bring software to a more critical position in support of processes of all kinds. Our view is that such a foundation cannot exist without regular software patching and maintenance services, preferably ones that are automated and scalable and that free up time for CIOs and IT managers to concentrate on other initiatives. To that end, it makes sense for a company to work with its software vendors – the companies that actually create, update, patch, and support their products on a regular basis – to achieve that goal. For older products, getting there can include an upgrade to a more modern and fully supported version of the vendor's software that is designed to handle today's security threats, not those of five to ten years ago.

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# Risk is avoided only if patches are acquired from reliable sources

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Some companies undertake software patching and maintenance only when there is a degradation of performance, functionality, or reliability, or when a headline-grabbing security threat forces them to see what potential security holes need to be plugged. Sometimes in these circumstances, informal information sources such as advisory web sites might be used to research solutions and, potentially, also to source patching content. This can be a serious error that directly introduces risk if the patch turns out to be rogue or introduces technical error. Given ongoing security and compliance issues and the increased frequency of security breaches and attempted security hacks, many companies have decided they need a more formal approach, with regular software monitoring, patching, and maintenance as core functions of their IT operations. The breadth of scope of this kind of approach is well aligned with compliance and governance needs, incorporating a high-level view of the "lifecycle" of vulnerabilities and patches. This contrasts with some point solutions (e.g., database firewalls and web apps proxy) that claim to counter vulnerabilities but are limited in functional range and do not in any way provide a risk-oriented approach that is business aligned.

The same level of care is important when relying on any third-party services relationship for provision of software support. Inadequate definition of requirements could allow a service provider to get away with implementing "workarounds" as partial solutions to vulnerabilities in order to close down ticketed support requirements. In addition to constituting a potential risk because of their inadequate provenance, these are likely to cause increased costs of ownership because of their divergence from the software's standard development path, introducing regression costs at a later stage. Services vendors ultimately need to demonstrate that they are acting as a partner with customers and their software vendors around software patching and support needs, and they should demonstrate three important characteristics:

- **Trusted provider.** A trusted and tested provider has knowledge and expertise in securing data and enterprise IT environments and long-term experience handling enterprise-class security and support.
- **Security expertise.** A provider must have experience in securing the entire IT stack, across infrastructure, databases, and applications, and expertise in providing proactive and real-time support resources whenever and however required.
- **Comprehensive offerings.** A provider should offer a full, integrated suite of security and support offerings that are constantly evolving and innovating and be able to help a customer establish a culture focused on IT security and compliance.

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Customers Omdia speaks with say Oracle is working to dedicate a wide array of resources to demonstrate those characteristics in its support offerings across the Oracle stack, because it recognizes the critical part that Oracle systems play in many organizations.

Furthermore, Oracle support provides levels of capability and security that are far above offerings from third-party, non-Oracle software support vendors. Those third-party vendors cannot provide security fixes, as Oracle points out, because those vendors cannot alter Oracle's source code, and they are unfamiliar with the technical details of the vulnerabilities that Oracle fixes. Customers of those third-party support vendors also do not benefit from Oracle's ongoing security assurance efforts, because all previous fixes and patches are already part of each subsequent Oracle software release.

One longtime Oracle customer, a major cable and communications company based in the southern US, has a large deployment of 450 Oracle servers including six Oracle Exadata systems. Those systems are used to support the company's enterprise data warehouse, supplying a critical backbone for all internal and external business processes. In fact, the customer was one of the early adopters of Oracle Exadata and has watched Oracle's support services evolve over time.

Upon the initial Oracle Exadata rollout, software updates required a time-consuming update of the firmware and the entire platform because Exadata is an engineered system designed to deliver benefits as an integrated platform. Building on those experiences, Oracle introduced Platinum-level support for Exadata in 2012. This provides greater visibility into the back-end system and includes proactive elements such as the "phone home" capability that allows Oracle support engineers, working with the customer's support staff, to detect potential issues before they become critical.

The enhanced support level also provides the customer with greater capabilities around software patching; the customer typically patches once or twice a year depending on need and criticality. (Platinum support provides for four patch cycles per Oracle Exadata full rack.) The customer can coordinate any patching with Oracle support engineers to ensure proper change management within the systems and limit any disruption to the company, its employees, and its own customers.

The customer says that a regular patching schedule and a strong emphasis on IT security companywide provide assurances that its systems are less vulnerable and more secure. Since Exadata is powering some of this customer's most essential systems, downtime would have a direct impact on internal IT's ability to deliver on its service level agreements to internal and external customers (even with robust storage, disaster recovery, and redundancies in place). Working with Oracle's Platinum-level support also allows the customer to offload some of the internal support to Oracle support engineers, freeing up its own IT staff to concentrate on other projects and initiatives. The customer expects additional innovation in Oracle's patching and support procedures with even more automated functionality. Oracle continues to work with the customer through regular meetings and other methods to ensure the customer's patching and support are properly addressed.

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# Recommendations

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- **Make any culture change necessary to stop patching being viewed as an optional or merely operational consideration; ensure it is considered an essential element of organizational wellbeing.** Organizations need to realize that decisions to reduce their commitment to assiduous patching can adversely impact software integrity and so cannot be considered solely in an operational context. Inadequate patching can lead to exploitable vulnerabilities within organizational software, and while patches remain unapplied, the time available for malicious actors to cause loss continues to extend. The resulting security, compliance, and risk implications are impossible to resolve without completion of the necessary patching, and delay increases the likelihood of potential costs to the organization.  
In light of these implications, decisions on patching policy need to be reviewed in a broad business context, not just by considering tactical and operational elements such as additional licensing or perceived support savings. Practices such as use of unsupported software versions, poorly managed or partially executed third-party support, or reliance on poor advice sources need to be eliminated.
- **While the ideal aim is to patch anything and everything necessary, any prioritization must be risk driven.** IT environments must be thoroughly understood from a risk perspective, in both a business and a technical context. The former takes into account the relative business criticality at the level of individual services, which clarifies the impact of related business-level risks (e.g., financial and reputational). The latter considers the technical characteristics of constituent service elements (e.g., OS, database, hardware, and applications) and any challenges due to particular vulnerabilities that are active as well as their exposure via networking to different threat environments (e.g., if resources are internet facing).
- **Patching information must be from authoritative sources, otherwise using it constitutes risk.** Governance of patching must stipulate what sources of patching guidance can be considered trustworthy. For example, software suppliers are the authoritative source of security information for their products, whereas the internet is not a source of dependable patching guidance. Additionally, sources such as the National Vulnerability Database (NVD) and computer emergency response team coordination center (CERT/CC) are managed and authoritative, whereas generic software-vulnerability scanning tools can be insufficiently specialized to deliver reliable information. For example, such tools can fail to appropriately recognize a software version specifically enough (and, as a result, whether a patch has been applied), causing inaccuracy in their reporting of outstanding issues and a "garbage in, garbage out" effect. In any case, reporting is the highest level of value that these tools can provide, and organizations are still required to assess and source requisite patches for themselves. The exception is where provision of outsourced patching services is in place: here, governing services agreements must stipulate that only the most reliable sources of patching information may be used.

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- **Patching processes must not be the weak link in organizational protection.** Organizations need to commit to executing patching as part of regular security maintenance within their recurring maintenance activities. Patching is a key proactive protection measure and is a critical aspect of good IT security governance. Failure to plan and prepare for periodic maintenance activities will result in incomplete patching and, ultimately, a degraded security posture that links directly to increased board-level concerns over security.

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# Appendix

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## Further reading

Federal Trade Commission (2015) *Start With Security: A Guide for Business*. Available at <[www.ftc.gov/tips-advice/business-center/guidance/start-security-guide-business](http://www.ftc.gov/tips-advice/business-center/guidance/start-security-guide-business)> [Accessed January 2020]

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