Virginia Information Technologies Agency

Enterprise Architecture Technical Brief

Bring Your Own Device (BYOD)

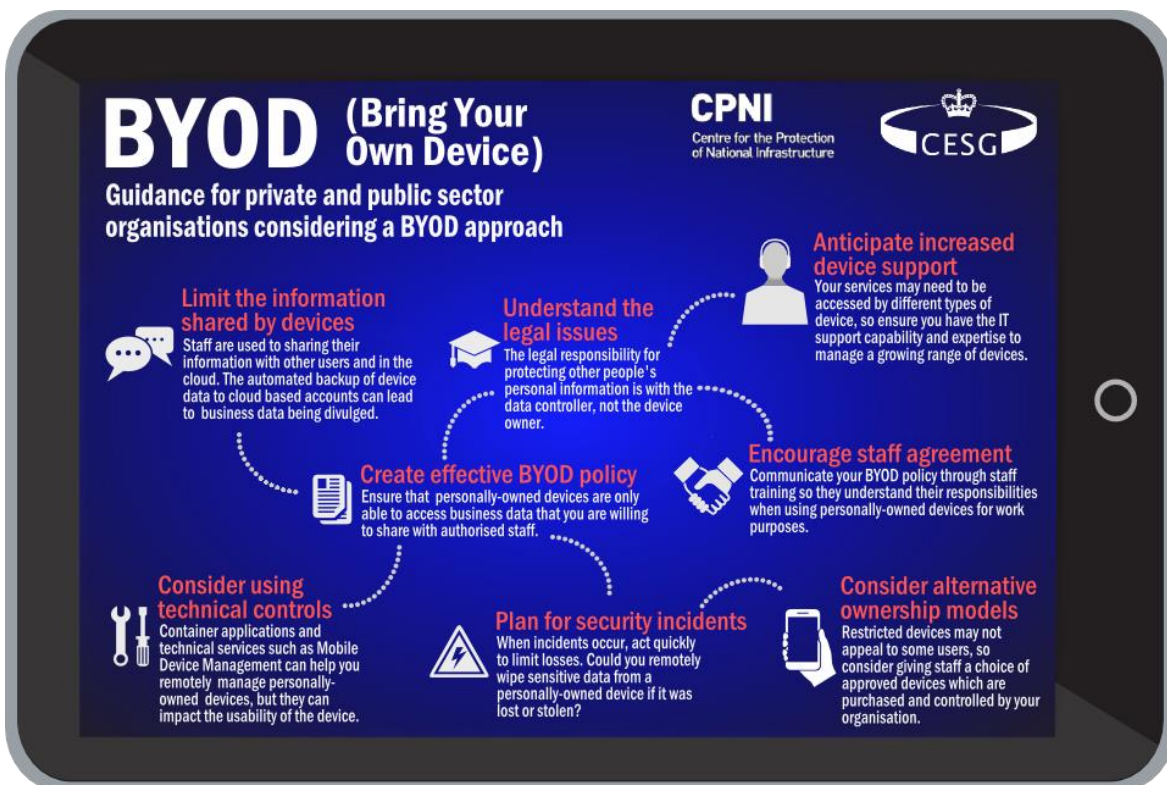**Robert Kowalke**
November 2017

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Figure 1: BYOD guidance for public and private sector organizations considering a BYOD approach.[1]

For any comments, questions, and/or concerns with this technical brief, please contact VITA EA: ea@vita.virginia.gov

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[1] CESG Center for the Protection of National Infrastructure (CPNI): Executive Summary – BYOD Guidance (article). Retrieved from https://www.gov.uk/government/publications/byod-guidance-executive-summary/byod-guidance-executive-summary on May 18, 2017.
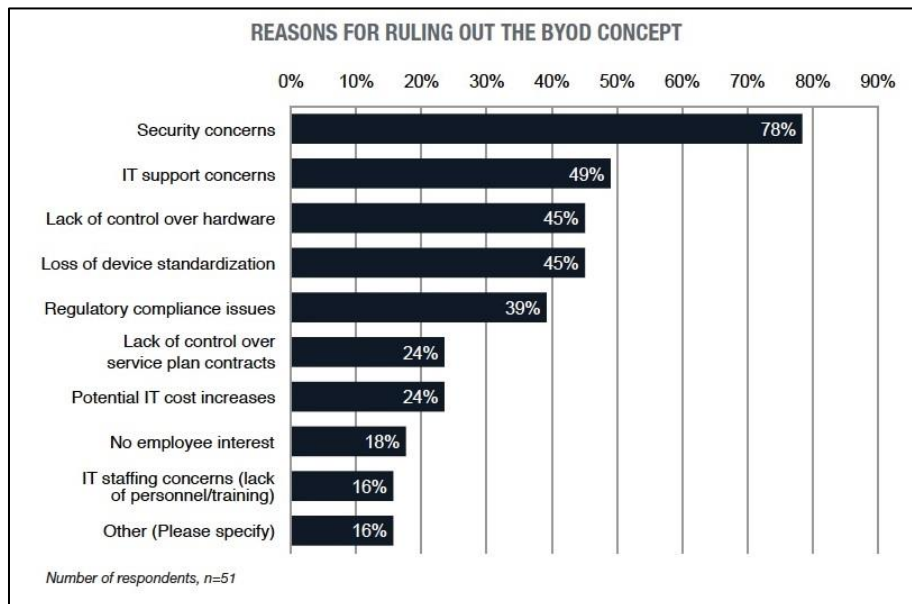
Recommendations

- We recommend use of BYOD for increased staff satisfaction, which translate into productivity gains.

- When deciding on BYOD, determine the problem being solved by BYOD to determine whether it makes sense to implement at your agency.

- While BYOD has been gaining in popularity and use for many years, and continues to increase, we recommend implementing BYOD only where beneficial; be sure to develop an agency business case to include a robust BYOD policy.

  o Considerations would include: 1) Where a device accesses or stores corporate data; 2) Preventing local storage of corporate documents; 3) Ensuring network security by passcode-protecting employee devices; 4) Cost benefit analysis implementing a BYOD environment; 5) Risk assessment creation against a variety of threats, along with anticipated mitigations in areas such as:

    ▪ Anti-malware

    ▪ Encryption

    ▪ Passcodes

    ▪ Remote wipe

    ▪ Jailbreaking

    ▪ Sandboxing

  o Awareness of some of the major reasons for not pursuing a BYOD capability should be considered in your business case such as perhaps the most critical, "No employee interest."

REASONS FOR RULING OUT THE BYOD CONCEPT

Reason	Percentage
Security concerns	78%
IT support concerns	49%
Lack of control over hardware	45%
Loss of device standardization	45%
Regulatory compliance issues	39%
Lack of control over service plan contracts	24%
Potential IT cost increases	24%
No employee interest	18%
IT staffing concerns (lack of personnel/training)	16%
Other (Please specify)	16%

Number of respondents, n=51

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Figure 2: Reasons for ruling out the BYOD concept.[2]

- Search Mobile Computing[3] provides some advice on avoiding pitfalls when deciding on using BYOD:
    - Don't try to ban BYOD.
    - Don't skimp on policy.
    - Don't treat personal devices like corporate ones.
    - Don't become over-focused on devices.
        - An employer's goal is not really to manage the devices - rather, it is to enable safe device use.
    - Don't invade employee privacy.
        - Just because an employee's personal device can be GPS-tracked doesn't mean you should record its location 24/7. Retrieve only the information required to satisfy business needs, document what you intend to access or store in policy.
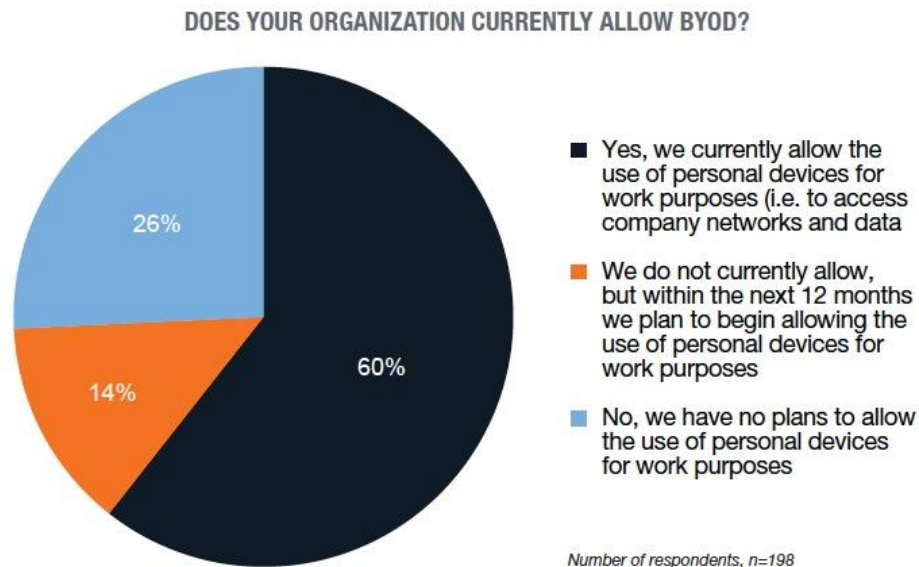

Figure 3: Does your organization currently allow BYOD?[4]

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[2] Research: 74 percent using or adopting BYOD by ZDNet (article) written on January 5, 2015. Retrieved at http://www.zdnet.com/article/research-74-percent-using-or-adopting-byod/ on May 18, 2017.
[3] Top 10 BYOD Pitfalls to Avoid by Lisa Phifer of Search Mobile Computing (article). Retrieved from http://searchmobilecomputing.techtarget.com/tip/Top-10-BYOD-pitfalls-to-avoid-if-you-allow-personal-devices in April 2017.

Background

- Tech Radar → http://www.techradar.com/news/computing/what-is-byod-and-why-is-it-important-1175088

    o The driving force behind BYOD is IT self-sufficiency among employees who already own and use personal laptops, tablets, and smartphones, which are often newer and more advanced than equipment deployed by many IT departments.

    o Bring Your Own Device (BYOD) encompasses similar initiatives such as:

        ▪ Bring Your Own Technology (BYOT)

        ▪ Bring Your Own Phone (BYOP)

        ▪ Bring Your Own PC (BYOPC)

    o Lightweight Ultrabooks, iPads and large-screened phones are changing the way that people want to work.

    o While BYOD sounds attractive, businesses need to consider the full implications of allowing corporate data to be accessed on personal devices they could have little or no control over.

        ▪ What data can employees have access to?

        ▪ What security measures are in place if an employee's device is lost, stolen or compromised?

    o Even though IT hardware spending can potentially be reduced with a BYOD approach, it may cost more to integrate and support a diverse range of devices.

    o Several key players provide BYOD solutions, ranging from complete sandboxed access through to more lightweight (but user-friendly) policy-driven solutions.

- Computer World → http://www.computerworld.com/article/2948470/byod/the-bring-your-own-device-fad-is-fading.html

    o A lot of the original motivation behind BYOD was by users wanting to replace older style corporate devices like BlackBerry, with newer iPhones in particular, but increasingly Android as well.

- The SANS Institute → https://www.sans.org/course/mobile-device-security-ethical-hacking/Type/asc/virtual

    o I'm not sure exactly when it happened, but laptops and PCs have become legacy computing devices, replaced by mobile phones and tablets. There has been an explosion of new devices wanting to join our networks that simply do not have the same security controls that we rely on in modern, secure networks.

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[4] Research: 74 percent using or adopting BYOD by ZDNet (article) written on January 5, 2015. Retrieved at http://www.zdnet.com/article/research-74-percent-using-or-adopting-byod/ on May 18, 2017.

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- o Even with their weaknesses, mobile phones are here to stay, and we are being called on to support them more and more. Dragging feet on allowing mobile phones ultimately contributes to the problem. If we do not address security, the threats continue to grow, uncontrolled and unmonitored.

- eSecurity Planet → http://www.esecurityplanet.com/mobile-security/byod-bring-your-own-device.html

    - o BYOD products include:
        - VMware AirWatch
        - Mobile Iron
        - IBM MaaS 360
        - Citrix Xen Mobile
        - LANDesk Mobility Suite
        - Blackberry EMM Suite
        - Microsoft Enterprise Mobility Suite

- Lexology → http://www.lexology.com/library/detail.aspx?g=455e9ffc-bee3-4fd3-9300-739cc908f4d8

    - o BYOD Bill of Rights: The internet security company Webroot has drafted guidelines, dubbed a "BYOD Bill of Rights", to aid companies and their employees resolving differences relating to the use of personal devices, and offers a broad template for organizations in terms of implementing an effective BYOD policy. The guidelines state that employees have the right to:
        - privacy over their personal information;
        - be included in decisions that impact their personal device and date;
        - choose whether or not to use their personal device for work;
        - stop using their personal device for work at any time;
        - back up their personal data in case of a remote wipe;
        - operate a device that is unencumbered by security that significantly degrades speed and battery life;
        - be informed about any device infections, remediation, or other activity that may affect their device's performance or privacy; and
        - download safe apps on their personal device.

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Benefits

- Tech Radar → http://www.techradar.com/news/computing/what-is-byod-and-why-is-it-important-1175088

    o Increased employee satisfaction.

        ▪ Work more flexibly.

    o Cost savings.

        ▪ Reduced hardware spend, software licensing, and device maintenance).

    o Productivity gains.

        ▪ Employees are happier, more comfortable, and often work faster with their own technology.

    o By tracking and deploying mobile applications and then establishing mobile collaboration through secure app-to-app workflows, mobility can be a true catalyst for change.

- Cisco → http://www.cisco.com/c/en/us/solutions/byod-smart-solution/overview.html

    o Provides more work options.

    o Gives employees the flexibility to work where and when they want.

    o Strengthens security.

    o Reduces your employees' risk of introducing malware or losing sensitive data.

    o Streamline operations.

    o Decreases company expenditures, alleviating work delays, and lowering operating costs.

    o Helps staff get more done.

    o Improves collaboration and productivity with greater speed and efficiency.

- SimpleMDM → https://simplemdm.com/2017/01/05/challenges-of-bring-your-own-device-byod-policy/

    o Don't need to pay for equipment and services because BYOD reduces costs.

        ▪ With the worker paying for most, or all of the costs for the hardware, voice and/or data services, and other associated expenses, companies save a lot of money — as much as $80 per month per user. Money that was previously spent on IT equipment can now be invested in other places, which ultimately results in a boosted bottom line.

    o Boosted employee morale.

        ▪ Employees hate working under Orwellian IT policies requiring them to use inefficient equipment because it feels like a tremendous waste of time, doesn't allow them to customize things to their liking, and often requires them to carry multiple devices.

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- ▪ By implementing a BYOD policy, employees can use what they want when they want. New iPhone for Christmas? Use it in the office. Blazing fast iPad Tablet at home? Bring it to work and get more done. In love with a personal Macbook laptop that's set up just the way they like it? Don't worry… BYOD it and be happy!

  - o More Cutting Edge Tech.   (Unisys anyone?)

    - ▪ As the iPhone has demonstrated, most people want to be within one (1) generation of the most recent release, meaning almost all the technology is relatively cutting edge. Faster processors, larger storage, better mobile cameras (if that matters), more memory, and so on. It also means in theory, problems that existed in earlier generations have been fixed because few things are more frustrating than using old technology that worked most effectively during the last presidential administration.

- • eSecurity Planet → http://www.esecurityplanet.com/mobile-security/byod-bring-your-own-device.html

  - o Enterprise cost savings: Rather than being burdened with cumbersome device acquisition programs that require staff and financial resources, when employees bring their own phones, the company doesn't have to provide them.

    - ▪ The cost of providing devices to employees has many different components. There is of course the initial acquisition cost, the costs associated with acquisition staff, and then there are also the ongoing support costs.

    - ▪ With BYOD, costs can be reduced as employees bring in their own devices they choose on their own (and might well support on their own as well).

  - o Choice: No longer is the user tethered to the few, or in many cases, just one often legacy device model at work. Employees could be more likely to buy better devices for their own use, with additional features and a more appealing aesthetic.

How Do Consumer and Enterprise Products Differ?	
Enterprise	**Consumer**
Conservative	Innovative
High cost	(Perceived) low cost
Manageable	Manageability? Why?
Enterprise scalability	1 user -> Global scale
Extended Support	Limited lifespan
High quality/robust	Throw away
Security and compliance	What's security?

Gartner.

- BYOD remains both a major opportunity and challenge for enterprises. By following the right approach to identifying BYOD risk and developing effective BYOD policy it is possible to capitalize on the benefits of BYOD without adding significant risk.[5]
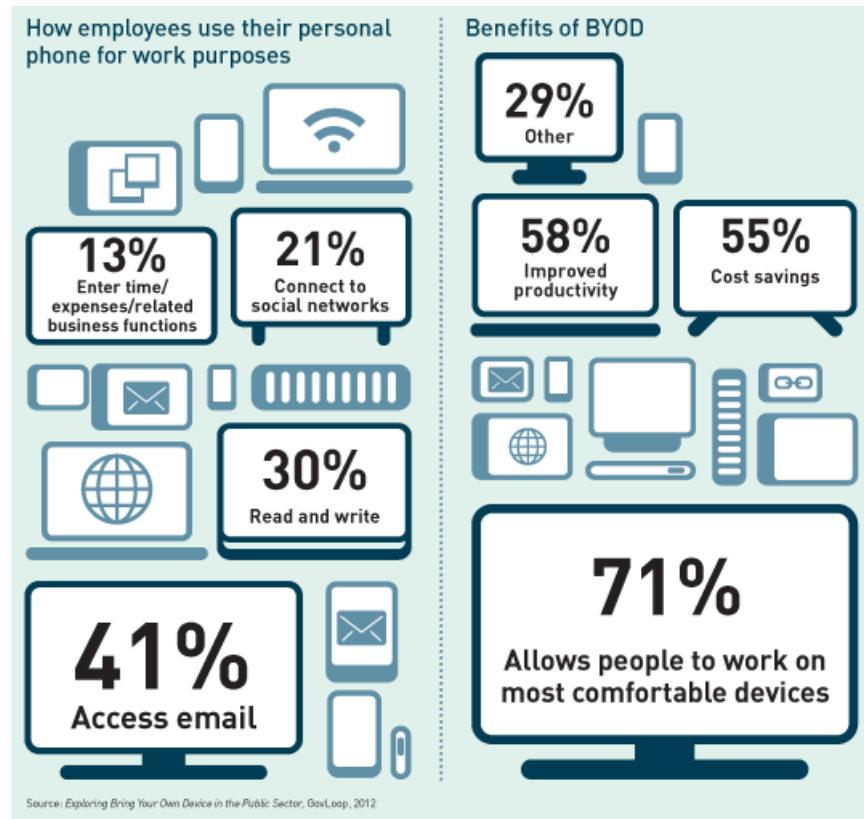

How employees use their personal phone for work purposes

- 13% Enter time/expenses/related business functions
- 21% Connect to social networks
- 30% Read and write
- 41% Access email

Benefits of BYOD

- 29% Other
- 58% Improved productivity
- 55% Cost savings
- 71% Allows people to work on most comfortable devices

Source: Exploring Bring Your Own Device in the Public Sector, GovLoop, 2012

Figure 4: Ovum survey of 4,371 employees worldwide.[6]

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[5] The Ultimate Guide to BYOD Security: Overcoming Challenges, Creating Effective Policies, and Mitigating Risks to Maximize Benefits (article) by the Digital Guardian on October 11, 2016. Retrieved at https://digitalguardian.com/blog/ultimate-guide-byod-security-overcoming-challenges-creating-effective-policies-and-mitigating on May 18, 2017.
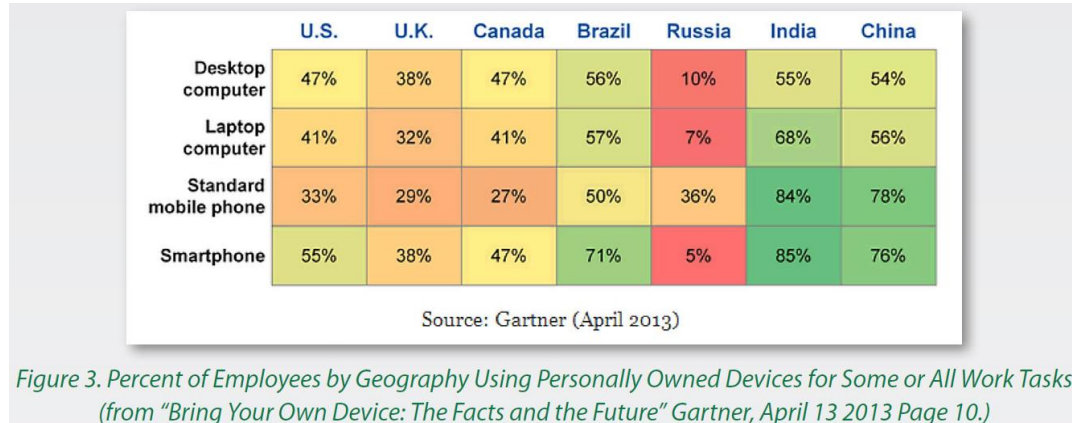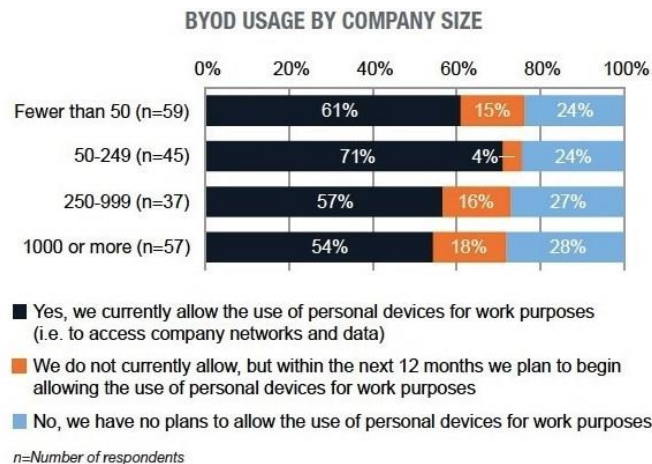
[6] *Ibid.*

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Statistics

- Insight → https://www.insight.com/en_US/learn/content/2017/01182017-byod-statistics-provide-snapshot-of-future.html

  o North America has the highest BYOD adoption rates at 36%, a number that will increase to about 50% of the market by the end of 2017. (Markets&Markets)

	U.S.	U.K.	Canada	Brazil	Russia	India	China
Desktop computer	47%	38%	47%	56%	10%	55%	54%
Laptop computer	41%	32%	41%	57%	7%	68%	56%
Standard mobile phone	33%	29%	27%	50%	36%	84%	78%
Smartphone	55%	38%	47%	71%	5%	85%	76%

Source: Gartner (April 2013)

Figure 3. Percent of Employees by Geography Using Personally Owned Devices for Some or All Work Tasks (from "Bring Your Own Device: The Facts and the Future" Gartner, April 13 2013 Page 10.)

  o More than 67% of workers use their own devices at work. (CBS MoneyWatch)

  o As of 2013, 60% of companies had a BYOD friendly policy. **Gartner.**

  o More than 50% of workplaces will require employees to bring their own devices by 2017. (Gartner)

  o By the year 2017, BYOD will grow from a $67 billion market to a $181 billion market. (Markets&Markets)

BYOD USAGE BY COMPANY SIZE

	0%	20%	40%	60%	80%	100%
Fewer than 50 (n=59)	61%			15%	24%	
50-249 (n=45)	71%			4%	24%	
250-999 (n=37)	57%			16%	27%	
1000 or more (n=57)	54%			18%	28%	

■ Yes, we currently allow the use of personal devices for work purposes (i.e. to access company networks and data)

■ We do not currently allow, but within the next 12 months we plan to begin allowing the use of personal devices for work purposes

■ No, we have no plans to allow the use of personal devices for work purposes

n=Number of respondents

- The SANS Institute → https://www.sans.org/reading-room/whitepapers/analyst/2014-trends-reshape-organizational-security-34625

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- o Choose Your Own IT: Consumerization of IT is defined as the ability of non-IT people to acquire, deploy, & use consumer-centric IT solutions to get their jobs done.

- o Bring your own device (BYOD) was the first major manifestation of this trend, and surveys show large percentages of employees today are already buying and using personally owned smartphones, tablets, and personal computers.

- • CIO.com: A recent TEKsystems survey found that 35 percent of IT leaders (such as CIOs, IT vice presidents and directors) and 25 percent of IT professionals (such as developers, network admins and architects) are not confident their organization's BYOD policy is compliant with data and privacy protection acts, HIPAA, Dodd-Frank or other government-mandated regulations.

- • Computer World → http://www.computerworld.com/article/2948470/byod/the-bring-your-own-device-fad-is-fading.html
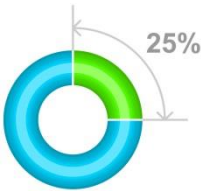
  - o CompTIA survey finds 53% of private companies ban BYOD.

  - o An online survey conducted in April and May 2015, of 375 U.S. IT professionals in various private businesses found that 53% allowed no BYOD, up significantly from 34% in 2013.

    - ▪ No BYOD means that a company provides smartphones and tablets to workers and bans the use of personal devices for work.

  - o Also, just 7% of those surveyed said they allow a full BYOD policy where the company takes no responsibility for devices.

  - o Another 40% allow a partial BYOD policy, where the company provides some devices but allows some personal devices to access corporate systems.

  - o "Cloud and mobility represent a true revolution," the report said, noting the two technologies represent 100% of all growth in IT spending in 2015.

  - o Various studies, including one by management software vendor Good, have concluded about 70% of smartphones and tablets used by enterprises run on Apple's iOS.

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- The SANS Institute → https://www.sans.org/reading-room/whitepapers/analyst/security-spending-trends-36697
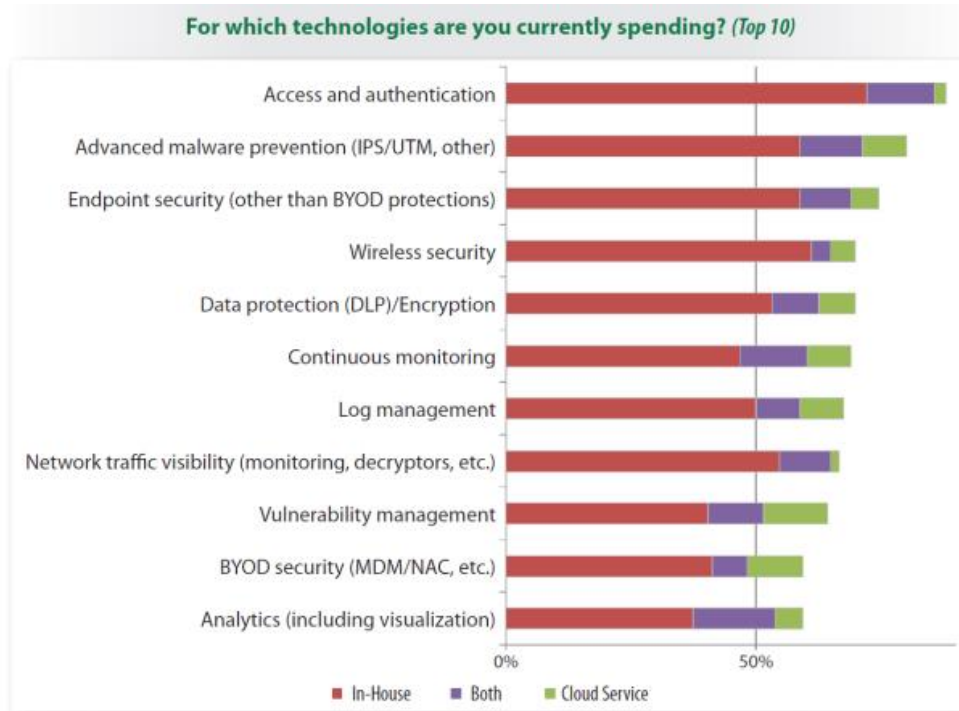   - o BYOD spending is number 9 in top IT spending for 2016 coming in above analytics.

Figure 5. Top 10 Areas of Technology Spending†

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Conclusions

- The key issue with BYOD is to guard against data loss or leakage.

- Allowing employees to work on mobile devices while ensuring nothing catastrophic happens, will lead to great improvements in productivity and loyalty.

  o As Lisa Phifer mentions: This horse (BYOD) has not only left the barn, but will trample any IT department that intends to stand in its way. There may be use cases inappropriate for BYOD, such as specialized mobile healthcare devices or ultrabooks carrying classified data, but nearly every company has employees who buy and use their own phones and tablets, and those devices are going to find their way into the workplace. http://www.techtarget.com/contributor/Lisa-Phifer

- The verdict seems to be BYOD is here to stay, but that companies should use great care as they implement these policies.

- As Mark Coates, EMEA VP at Good Technology, points out:

  o "By enabling employees to securely and easily access corporate data on their own device, productivity levels will naturally increase.

  o In terms of cost savings, there are huge benefits, since SMBs will not have to manage and fund a second device for employees."

- Companies find they can pursue mobility initiatives just as well by providing mobile devices to workers who are often happy to take a corporate device if it is the same thing they would choose on their own.

- Shaun Smith, technology practice director says:

  o "Allowing the use of consumer devices at Xceed Group has helped improve both productivity and staff motivation."

  o "For a company to decide if a BYOD strategy would work for them they need to ensure due diligence is conducted – simply evaluating the benefits versus risks."

  o "All in all, BYOD is about being innovative and helping your employees to work better," says Coates. "Employees want to use the devices that they are comfortable with in the workplace. They want to have the same experience at work that they have at home. People are used to using applications now, rather than browser-based solutions. By giving employees what they want, companies will ultimately benefit."

- The 2015 CompTIA report noted that even when companies ban BYOD, "ambitious employees will find ways to utilize personal devices and applications even if they are forbidden."

- SimpleMDM → https://simplemdm.com/2017/01/05/challenges-of-bring-your-own-device-byod-policy/

  o IT Departments Lose Control Over Hardware.

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- Previously, hardware was locked down by strict policies in order to prevent privacy breaches, hacks, and viruses; meaning an inability to control the hardware means more vulnerabilities.

- This is a prime example of tradeoffs involved in BYOD, which offers greater flexibility but potentially exposing the company to danger.

o Enforcing Compliance Becomes More Difficult.

o Difficulty Retrieving Data After An Employee Quits Or Is Fired.

o Legal Challenges When Searching Devices.

- To avoid legal nightmares, companies must have crystal clear BYOD policies in place to protect both them and their employees. Failure to implement these policies can lead to massive legal headaches and significant expenses.

o "Rogue" Devices.

- "Rogue" jailbroken devices present problems for companies. Are they covered under BYOD policies?

o Falling Productivity.

- Yes, that brand new iPhone has some great business apps, but it also has Facebook, YouTube, Candy Crush, iMessage, and a thousand other distractions. It's incredibly easy for employees to get sucked into the endless black hole of Buzzfeed videos, text messaging, and updating their status.

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