

K2's TECHNOLOGY UPDATE

CONTINUING PROFESSIONAL EDUCATION SERIES



K2 ENTERPRISES
WWW.K2E.COM

K2E CANADA INC.
WWW.K2E.CA

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CONTRIBUTORS: The shareholders, associates, and staff of K2 Enterprises and K2 Canada Inc. contributed to producing these materials.

Introduction

Three Rules of this Seminar

1. **There Are No Dumb Questions.** Please ask questions if you need further explanation. We welcome your questions and will do our best to provide accurate and meaningful answers.
2. **Obtain the Information for Which You Came.** If you have a specific interest in a topic, please let us know. If your topic is not part of the course materials, we will do our best to accommodate your request. Your instructor is anxious to meet your needs.
3. **Share and Share-Alike.** Your instructor is here to share relevant information about the course. We hope that you will be willing to do the same. If you have helpful tips or experiences, please share them with the other participants and us.

Course Development

The shareholders, associates, and staff of K2 Enterprises and K2E Canada Inc. developed this course and the related course materials. We aim to deliver high-quality educational practices that help you use and understand the tools and concepts discussed in this session more effectively.

We designed our course presentation style for busy professionals. Through numerous short case studies and feature reviews, we deliver concise, easy-to-understand, easy-to-absorb information.

To maximize your time and the value of attending this course, we have carefully filtered out trivial and obscure features. Our goal is not to cover every keystroke and menu option, but to provide a fast-paced course that focuses on state-of-the-art information technology and how it can benefit you and your staff.

About K2 Enterprises

For over three decades, our team members have delivered more than 45,000 technology-focused seminars, webinars, and conferences worldwide. To stay on top of technology, our team members read numerous technology trade magazines, attend conferences, and speak with technology companies each year to stay current with the latest information for our courses. Also, we experience everything we teach and recommend to our audiences. Because our shareholders and associates are based in different states and provinces, using technology efficiently and appropriately is essential to our business's success and survival.

Our Mission Statement

K2 aims to develop and deliver the highest-quality technology seminars and conferences for business professionals. We work cooperatively with professional organizations such as state CPA societies, associations of Chartered Professional Accountants, and technology vendors. We make every effort to maintain high integrity, family values, and friendship among all involved.

Our Instructional Team

For a complete listing of instructors and bios, please visit:

K2 Enterprises

[Instructors - K2 Enterprises](#)

K2E Canada Inc.

[Instructors - K2E Canada Inc](#)

The K2 Seminar Curriculum

Full-day Seminars

- K2's Advanced Excel
- K2's Business Intelligence, Featuring Microsoft's Power BI Tools
- K2's Case Studies In Fraud And Technology Controls
- K2's Excel Best Practices
- K2's Excel Essentials For Staff Accountants
- K2's Excel PivotTables For Accountants
- K2's Excel Tips, Tricks, And Techniques For Accountants
- K2's Next Generation Excel Reporting
- K2's QuickBooks For Accountants
- K2's Small Business Internal Controls, Security, And Fraud Prevention And Detection
- K2's Technology For CPAs – Don't Get Left Behind

Half-day Seminars

- K2's Artificial Intelligence For Accounting And Financial Professionals
- K2's Best Word, Outlook, And PowerPoint Features
- K2's Better Productivity Through Artificial Intelligence and Automation Tools
- K2's Case Studies In Fraud And Technology Controls
- K2's Data Analytics For Accountants And Auditors
- K2's Ethics And Technology
- K2's Excel Charting And Visualizations
- K2's Implementing Internal Controls In QuickBooks Online Environments
- K2's Improving Productivity With Microsoft 365Cloud Applications And Services
- K2's Mastering Advanced Excel Functions
- K2's Microsoft Teams
- K2's Securing Your Data: Practical Tools For Protecting Information
- K2's Technology Update
- K2's Top PDF Features You Should Know

Besides the seminars listed above, K2 also produces numerous one and two-day technology conferences annually. You can find a complete listing of our course offerings, including dates, locations, and course descriptions, on our website at:

K2 Enterprises

[Technology Conference - K2 Enterprises](#)



K2E Canada Inc.

[Technology Conference - K2E Canada Inc.](#)



On-Site Training

Working cooperatively with state CPA organizations and associations of Chartered Professional Accountants, we are pleased to offer all our seminars and conference sessions as on-site training opportunities. On-site training provides companies of all sizes with numerous advantages, including the following.

- **Customization.** K2 can customize the content of all on-site training events to meet your organization's specific needs. For example, we can combine selected parts of existing courses into a focused learning experience to meet your team's needs. Likewise, we can develop custom content from the ground up and deliver it to your team members, ensuring we meet your training objectives.
- **Cost savings.** For organizations of all sizes, on-site training can provide significant cost savings compared to public training venues. In addition to potentially reduced registration fees, these cost savings materialize in the form of reduced travel costs and reducing the amount of time team members spend away from the office.
- **Convenience.** Because you select your on-site training event's date, time, and location, on-site training is more convenient for you and your team than traditional training options. Many organizations schedule on-site training with staff meetings, retreats, and customer/client events to leverage the value of all participants' time.

Customization, cost savings, and convenience are the three C's of "training to go." For more information on how you and your organization can experience these benefits or schedule an on-site training event, please visit:

K2 Enterprises
[On-site Training - K2 Enterprises](#)

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Web-Based Training

K2 offers web-based CPE and CPD to accounting and business professionals throughout the United States and Canada. K2's award-winning instructors deliver two-, four-, and eight-hour webinars on numerous technology-focused topics.

Additionally, K2 provides on-demand training. On-demand courses offer you the advantage of receiving top-quality training at a time and location that fits your busy schedule. You can start a class today and complete it in the future. For more information, please visit:

For more information on either platform, please visit:

K2 Enterprises
[Webinars - K2 Enterprises](#)



K2E Canada Inc.
[Webinars - K2E Canada Inc](#)



K2 Internet Sites

K2 maintains multiple websites containing information and links relevant to CPAs and other business professionals as a service to the profession. Further, the content of these sites can enrich your experience during and after our seminars. In addition, our pages contain links to some of the top accounting and content management software solutions and even to a few sites that are just fun places to visit. If you have any comments or questions regarding our web pages, please email webmaster@k2e.com.

K2 has two primary websites. You can view information regarding CPE and CPD opportunities, access a library of technology tips and articles, and link to K2-related websites.

www.k2e.com



www.k2e.ca



www.cpafirmtech.com

CPA Firm Technology contains technology-related information explicitly targeted at public accounting firms. We include product reviews, hardware and operating system discussions, affinity programs for CPA firms, and Cloud computing resources.



www.accountingsoftwareworld.com

Accounting Software World provides information related to accounting and financial management solutions. Here, you can find software and service reviews, product comparisons, white papers, and other material of interest to those seeking information about accounting software and service solutions.



www.totallypaperless.com

For information about document management and paperless processes, please visit **Totally Paperless**. In addition, you will find reviews on hardware and software used by all types of businesses in document imaging and management processes.



Some Of Today's Major Topics



AI and machine
learning trends

Quantum computing in
accounting and finance

Understanding the
growing impact of
blockchain and digital
currencies in
accounting

Software and hardware
innovations

Learning Objectives



Identify and assess the impact of AI and machine learning on
accounting practices

List potential applications and implications of quantum
computing in accounting and finance

Identify the evolving role of blockchain technology and
cryptocurrencies in financial systems

Specify examples of the practicality and benefits of using the
latest software and hardware tools



AI Is Still Today's Hottest Topic

ARTIFICIAL INTELLIGENCE



Artificial Intelligence Everywhere

- Almost every publisher has an AI strategy
- With **Microsoft Copilot** broadly available, along with **Google's Gemini** and **ChatGPT**, productivity leverage is back
- Specific applications in accounting and finance are being released, and your stack is likely to get an AI upgrade
- Everyone wants to “be the expert,” but using generative AI tools is as much more of an “art” as it is a science

Choosing An AI Platform



Comparing The “Big Three”

ChatGPT

- Widely known and used
- Free and paid offerings
- Paid subscription provides access to DALL-E
- Free version has stale date

Gemini

- Google’s competitor
- Free and paid offerings
- Fast responses and three versions of each response
- Integrates with other Google services

Copilot

- Paid offerings integrate well with Microsoft 365
- For example, you can have Copilot create a PowerPoint presentation from a Word document

Are Multiple Platforms In Order?



- Some users might be best served by using multiple AI services, particularly when using AI to research complex topics, such as tax laws, accounting standards, or medical issues
- With multiple platforms in use, you can cross-check results to ensure consistency, which presumptively means accuracy
- However, you may want to ensure that the platforms you choose utilize different LLMs

What Do You Need From AI?



Needs & Solutions

- Projections and forecasts?
- Productivity gains?
- Accurate information?
- Competitive advantage?
- Confidential information?

Enablement

- Policies
- Standardized procedures
- Creative use
- Sandbox development
- Protection



AI Effectiveness Comes From The Models, Courtesy Raju Vegesna, Zoho

ONE MODEL DOESN'T FIT ALL

There Is A Need For Multiple Models



- Narrow models
- Small Language Models (SLMs)
- Medium Language Models (MLMs)
- Large Language Models (LLMs)

Narrow Models



- Purpose-driven, narrow models doing one task at a time
 - Grammar (text), data sets, NLP (Zoho's Ask Zia, Otter, Fireflies, Fathom)
 - Predictions (events like weather and self-driving cars)
 - Anomaly (time-series, trend analysis, etc.)
 - Email filtering
 - Voice assistants like Siri, Alexa, or Google Assistant
 - Recommendation systems like Netflix, Amazon, and Spotify
- Domain-specific
 - Finance, legal, security, etc.
- Fast and responsive, portability to mobile devices
- Multiple models deployed across Zoho
- Some vendors are trying to use a single model, frequently LLM

Small Language Models (SLMs)



- Models in the 3-7 billion parameter range
- Easier to fine-tune, less emergent (than MLMs and LLMs)
- Inference is done on the CPU (as opposed to GPU)
- Microsoft Phi-3 launched April 23 (10x cheaper than LLMs)
- Zoho's usage:
 - Translation
 - Advanced noise cancellation (AV Stack)
 - Transcript generation

Difference In Model Recognition



- Narrow Model: \$100
- Small Language Model: \$9,
which is correct and sufficient
- AI is improving legacy
applications like OCR

Narrow Model: \$100

Small Language Model: \$9



Medium Language Models (MLMs)



- Models in the 20-50 billion parameter range
- Can be fine-tuned, more emergent than smaller models. Zoho is starting to deploy these in
 - Documents: Ask questions in your documents; mark anomalous documents
 - AV: Generate intelligence over transcripts

Large Language Models (LLMs)



- Models in the 50+ billion parameter range
- Emergent behavior
- Not easy to fine-tune
- Hallucinations more common
- Zoho is integrated with public LLMs while investing in their own LLMs
 - Content generation
 - Find an anomalous legal document and recommend the corrected version



LET'S GO INTO AI DEMO MODE



HARDWARE STRATEGIES

Hardware Strategies



- Select a single vendor for PCs – HP, Dell, Lenovo, or ???
- Select a single vendor for printers and peripherals
- Acquire commercial grade devices with 3- to 5-year warranties
- Specify two or more standard configurations based on the needs of end users
 - Clerical
 - Data analysis workstation
 - Graphical workstation
- Use multiple monitors (Laptop PC with docking station or Desktop PC) and a pointing device (Mouse)

Recommended Configurations



PC Buyer

- Windows 11, Microsoft 365
- Intel Core i5-i9, AMD Ryzen 5-9
- Dedicated Graphics
- 16-32GB DDR5 RAM
- 1TB Or Greater Solid-State Drive
- Thunderbolt 4
- AI enabled

Mac Buyer

- MacOS, Microsoft 365
- M3 or M4 Pro/Max ARM
- Dedicated Graphics
- 8-128 GB of Apple RAM
- 1TB Or Greater Solid-State Drive
- Thunderbolt 5
- AI enabled



WINDOWS 10 END-OF-LIFE



Windows 10 End-Of-Life

- Windows 10 will reach end of life on October 14, 2025
- In many cases, otherwise serviceable Windows 10 PCs will not meet the minimum system requirements for Windows 11
- Several strategies exist to preserve PC functionality:
 - Abandon existing hardware and acquire a Windows 11 capable PC
 - Maintain existing hardware and continue to run Windows 10 without support (no tech support, bug fixes, or security updates)
 - Maintain existing hardware and continue to run Windows 10 with ESU
 - Maintain existing hardware and install Linux

Windows 10 ESU Program



- [Extended Security Updates](#) program
- Available to individuals and organizations of all sizes
- ESU program enables Windows 10 PCs to continue to receive critical and important security updates through an annual subscription service after support ends on October 14, 2025
- Device must be using latest version of Windows 10 (22H2)
- ESU can be purchased through Microsoft Volume Licensing Program at \$61 for the first year with a single license minimum
- Price doubles each year for up to three years (\$61/\$122/\$244)

Windows 11 System Requirements



- **Processor:** 1 gigahertz (GHz) or faster with two or more cores on a compatible 64-bit processor or system on a chip (SoC)
- **RAM:** 4 gigabytes (GB) or greater
- **Storage:** 64 GB or greater available storage
- **Graphics card:** Compatible with DirectX 12 or later, with a WDDM 2.0 driver
- **System firmware:** UEFI, Secure Boot capable
- ★ **TPM:** Trusted Platform Module (TPM) version 2.0
- **Display:** High definition (720p) display, 9 inch or greater monitor, 8-bit color required
- **Internet connection:** Internet connectivity is necessary to perform updates, and to download and use some features

Yes, Windows 12 Is On The Way!



Features

- [Windows 11 version 24H2](#) is unique, based on a new version of the Windows platform underneath, codenamed [Germanium](#)
- AI Integration: Windows 12 is expected to heavily integrate AI features, building on the AI capabilities introduced in Windows 11
- New UI Design: A redesigned user interface is anticipated, potentially offering a more modular and customizable experience
- System Requirements: Windows 12 may require newer hardware, including PCs with neural processing units (NPUs) for advanced AI features

Release Timeline

- The earliest potential release for Windows 12 is in **late 2025**, with an announcement possibly in early summer 2025
- With the “bewitching date” of October 14, 2025, reached for Windows and Office



The Next Big Thing Is Almost Here

QUANTUM COMPUTING

Quantum = 5th Industrial Revolution



- AI/Quantum acceleration
 - Impact on AI significant
 - Models run in parallel
 - “Nature is quantum from the start” – Sean Carroll
- Thought Leaders
 - Dario Gil – IBM
 - Dr. Charina Chou and Hartmut Neven (“Chief Optimist”) – Google
- Quantum hardware, encryption
 - 60 Minutes 12/3/2023
 - Michio Kaku Quantum Supremacy – “Quantum is the language of the universe”
 - Separate session on quantum
- Quantum computing recently generated the world’s first truly random number

Quantum Computers & Encryption



- Y2Q (sometimes called Q-Day) – when Quantum Computers break encryption
 - Spy agencies and bad actors are warehousing data to be decrypted; that is quantum hacking
- Biden administration deadline for new encryption is 2035, but Shor’s algorithm could break decryption by 2029 or sooner
- NIST has announced four quantum-resistant algorithms after a six-year competition: [CRYSTALS-Kyber](#), [CRYSTALS-Dilithium](#), [FALCON](#) and [SPHINCS+](#)

Quantum Computing



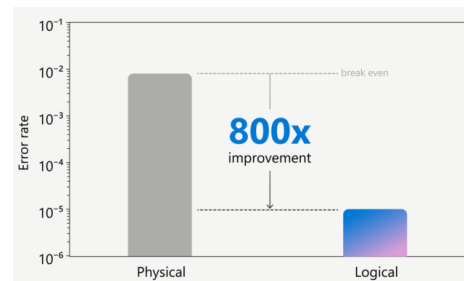
What You Really Need To Know

- Quantum computing is fast and powerful...more so than anything we've seen before
- Therefore, it can process tremendous volumes of data in short time frames...think about how this plays into AI and training LLMs to be even better in the future
- Because of its speed and power, quantum computing renders almost all forms of encryption in widespread use today ineffective, meaning new forms of security will need to emerge
- Despite advanced, quantum computing is not YET mainstream

Microsoft And Quantinuum Errors



- Microsoft and Quantinuum say they've demonstrated a quantum computing system that can reduce the error rate for data processing by a factor of 800
- Qubits tend to be “noisy” — that is susceptible to perturbations that introduce errors
- They created four highly reliable logical qubits from just 30 physical qubits
- Will be available in private preview for Azure Quantum Elements



Quantum Timeframe



- Don't see an obstacle to 2030 availability, according to Dario Gill
- No fundamental breakthroughs needed - Hartmut Neven
- Machines are clearly running today, and capabilities are expanded with each new release
- Programs for some applications don't have to be rewritten, they simply run orders of magnitude faster
- Small quantum machines can outperform some of the largest traditional computers today

Quantum Applications



- Cleveland Clinic – Dr. Serpil Ezurum
- Model the behavior of proteins, which change shape to change function. When wrong, this causes disease.
- Cancer and autoimmunity are the first targets



Quantum Computers In Accounting



Optimization Problems

Large Data Sets

Fraud Detection

Cryptography

Tax Optimization

Even Fraud Creation!



Public Practice, Industry, And Productivity

ACCOUNTING APPLICATIONS

Top Small Business Products



SaaS

1. [Accounting Power](#)
2. [FreshBooks](#)
3. [Kashoo](#)
4. [Momenteo](#)
5. [OneUp](#)
6. [QuickBooks Online](#)
7. [Patriot Software](#)
8. [Xero](#)
9. [Wave](#)
10. [ZipBooks](#)

More Sophistication (SaaS/DT)

1. [AccountEdge](#)
2. [CustomBooks \(was AccountingSuite\)](#)
3. [CYMA](#)
4. [QuickBooks Enterprise](#)
5. [Sage 50 Accounting](#) (Canada)
6. [Sage 50 US](#)
7. [Spire Systems](#)
8. [Xledger](#)
9. [ZarMoney](#)
10. [Zoho Books](#)

QuickBooks Desktop



- Subscription only at this point
- No new customers are being accepted
- Cannot buy in retail stores
- Although there has been no announcement to this effect yet, many believe that QBD will not be available in two to three years...
 - This is likely NOT the case for Enterprise
- If you or clients use QBD, you might want to consider options



Z O H O

- Privately Held
- Publicly Responsible
- First Bootstrapped Unicorn
- Homegrown Apps
- No Azure or AWS
- Manage Engine Network
- Privacy #1 – No Tags
- Single Suite
- Single Portal
- SOC 2 & GDPR
- Breakthrough product with Zoho Practice

28

Years

15K+

Employees

60+

Apps

150+

Countries

100M+

Users

750K+

Customers

The Single Suite - The Future of SaaS



Current Mid-Market Technology



SaaS

1. [Acumatica Cloud ERP](#) ([more](#))
2. [Certinia](#) (formerly Financial Force)
3. [Dynamics 365 Business Central](#) ([more](#))
4. [Dynamics 365 Supply Chain](#)
5. [IFS Cloud](#)
6. [NetSuite](#) ([more](#))
7. [Odoo](#)
8. [Sage Intacct](#) ([more](#))
9. [Unit4 Cloud](#)
10. [Workday](#)

Hosted

1. [Aptean Industrial Manufacturing ERP](#) (formerly Open Systems TRAVERSE)
2. [Deltek](#)
3. [ECI Macola](#)
4. [Exact Globe+](#) ([more](#))
5. [Epicor](#)
6. [Hansaworld](#)
7. [Infor CloudSuite Financials](#)
8. [Sage Business Cloud X3](#)
9. [SAP Business One](#)
10. [SYSPRO ERP](#)

Intuit Enterprise Suite



Targeted Fit

- Operate multiple US-based entities
 - Generate over \$3 million in annual revenue
 - Multi-entity (but all must be service & project-based businesses)
 - Single-entity, requiring multi-dimensional reporting
- Industries: Construction, Non-profit, Service, originally stated manufacturing

Intuit's Selling Points

- Accountant access
- Multi-entity
- Dimensions
- Industry Customization
- Project Management
- FP&A

Looking For CAS Systems?



SaaS

- AccountantsWorld Accounting Power
- Aplos – NFP
- FreshBooks
- QuickBooks Online
- Sage Intacct
- Xero
- Zoho Books

Desktop (hosted)

- AccountEdge
- CYMA
- QuickBooks Enterprise
- Sage 50
- Spire Systems

AI In Accounting Applications



Industry	Public Practice
• Botkeeper • Digits • MakersHub.ai • Supervizor	• 4ImpactData • Aider • Black Ore Tax Autopilot • Diligence • laurel • Wolters Kluwer TeamMate Document Linker • Zoho

CPA Firm Software



Established	Innovative
• Wolters Kluwer • Thomson Reuters • Intuit • IRIS/Hg Capital • Many others...	• Additive.ai • Black Ore Tax AutoPilot • Liscio/HubSync/Diligence • SmartVault/Suralink/Zoho • With new products arriving...

Integration Of Tools Daily



- Enhancing Workflows with Microsoft 365
 - Automating repetitive tasks in Excel with Power Query and AI formulas
 - Leveraging Power BI for data visualization and financial reporting
 - Using Teams for collaboration and document management
- Combining SaaS Accounting Platforms
 - Seamless integration between QuickBooks, Xero, and payroll/tax software
 - API-driven automation to reduce manual data entry
 - Best practices for syncing financial data across multiple platforms
 - Provisioning ASC 740 for FASB Accounting Standards Update (ASU) 2023-09 8 categories of tax reporting (2025 for public companies, 2026 for private)
- Real-world Use Cases of Technology Integration
 - Mid-size firms adopting cloud-based accounting for scalability
 - Large firms leveraging AI for risk assessment and fraud detection
 - Small businesses using automation to streamline bookkeeping

Happy 40th Birthday Excel!



- Microsoft Excel was first introduced in 1985 for Apple Inc.'s Macintosh computer
- It was initially introduced as Multiplan, a very popular CP/M, but lost popularity on MS-DOS systems to Lotus 1-2-3
- By 1988, Excel began to outsell Lotus 1-2-3 and the emerging QuatroPro
- Excel has evolved from a basic spreadsheet tool to a complex business intelligence and data analytics tool, introducing features such as 3D charts, VBA for macros, PivotTables, and improvements in interface and calculation functions
- The modern spreadsheet was introduced in VisiCalc, created by Doug Klunder in 1979



In the late 1970s, personal computers were primarily seen as devices for hobbyists, with limited use in professional settings. During this period, Dan Bricklin, an MBA student at Harvard University, and Bob Frankston, a software engineer, conceived the idea of a computer program that could replicate the functionality of a financial ledger on a computer screen.

Improving Collaboration And Communication



- Best Collaboration Tools for Accounting Firms
 - **Slack, Microsoft Teams, and Zoom** for real-time communication
 - Secure client portals for document sharing and approvals
 - Cloud-based project management tools such as **Asana** and **Trello**
- Enhancing Client Relationships Through Technology
 - Secure messaging for real-time client engagement
 - Automating client notifications and appointment scheduling
 - Implementing chatbots for basic client inquiries and support
- Remote Work and Hybrid Office Strategies
 - Best practices for cybersecurity in remote work settings
 - Cloud storage solutions: **Google Drive, OneDrive, and Dropbox**
 - Ensuring compliance with data privacy laws when working remotely



DATA ANALYTICS AND VISUALIZATION

Data Analytics And Visualization

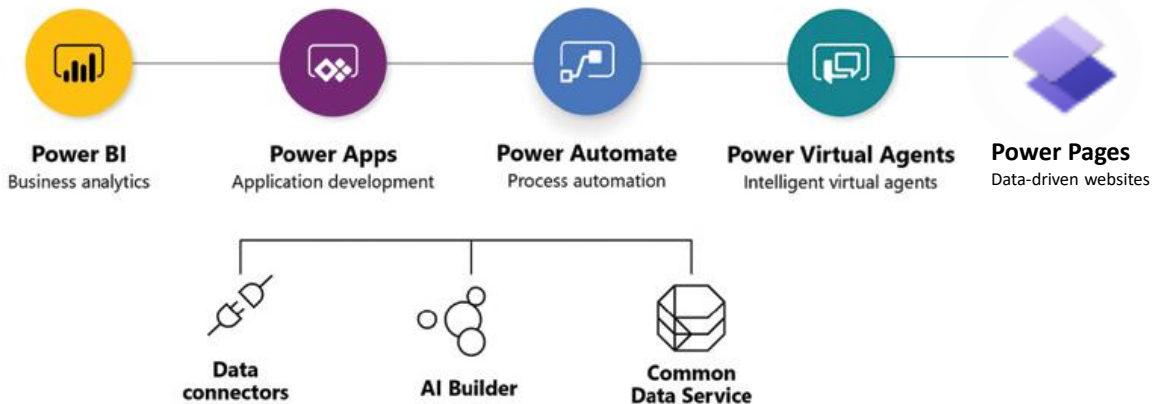


- **Enhanced Decision-Making with Real-Time Data**
 - Interactive dashboards provide real-time financial insights for better business strategy
 - AI-driven analytics detect trends and anomalies in financial reports
 - Predictive modeling improves revenue forecasting and risk assessment
- **Automated Reporting and Compliance Monitoring**
 - Machine learning automates data aggregation, reducing manual reporting errors
 - Regulatory compliance tools ensure adherence to tax and financial laws
 - Customizable visualization tools enhance financial presentations and client reports
- **Integration with Business Intelligence Systems**
 - Seamless data imports connect accounting platforms with enterprise systems
 - Cloud-based analytics allow access to insights from multiple locations
 - Advanced filtering enables deeper analysis of operational and financial metrics

Microsoft's Power Platform



The low-code platform that spans Office 365, Azure, Dynamics 365, and standalone applications



Source: Microsoft



CYBERSECURITY MEASURES

Cybersecurity Measures



- **Advanced Threat Detection and Prevention**
 - AI-powered monitoring detects suspicious activity in accounting and financial data
 - Multi-factor authentication strengthens login security for sensitive records
 - End-to-end encryption protects client communications and transactions
- **Regulatory Compliance and Risk Management**
 - Compliance frameworks ensure adherence to data protection regulations (e.g., GDPR, CCPA)
 - Automated security audits identify vulnerabilities in accounting systems
 - Secure backup solutions prevent data loss from cyberattacks or system failures
- **Employee Awareness and Training**
 - Phishing simulation programs educate staff on recognizing security threats
 - Role-based access controls minimize unauthorized exposure to financial data
 - Secure file-sharing protocols prevent data leaks in remote work environments

Apple - Oops OR Intent?



- The Cupertino corporation released iOS 18 and macOS 15 (code-named Sequoia) on September 16, 2024, with no mention of Apple's Enhanced Visual Search (EVS)
- Lost privacy lawsuits
 - CSAM (child sexual abuse materials)
 - iPhones, iPads, MacBook, Apple watches, Apple TV, etc. — recorded conversations that Apple employees then shared with contractors and advertisers to assist them in marketing their products
 - Ending encryption when ordered to by governments

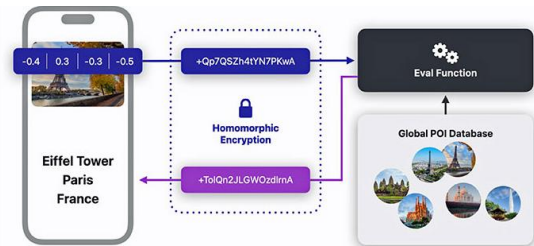
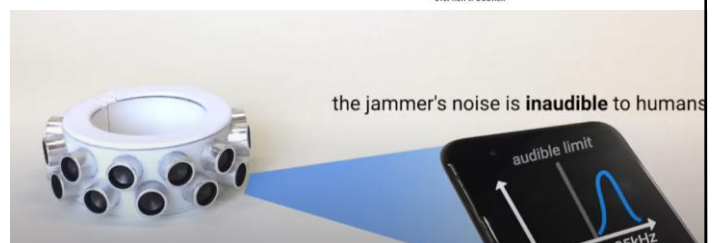
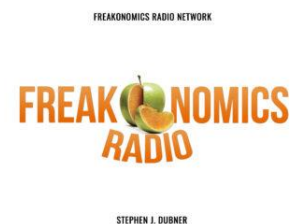


Figure 2. An Apple device locally handles the left and middle steps. The blue arrow shows a device sending an encrypted description of its photos to Apple. On the company's server, an evaluation function identifies the subject of each photo by consulting a global point-of-interest database. Keyword descriptions are then returned to the originating device. Source: Apple October 24, 2024, [scientific american](#)

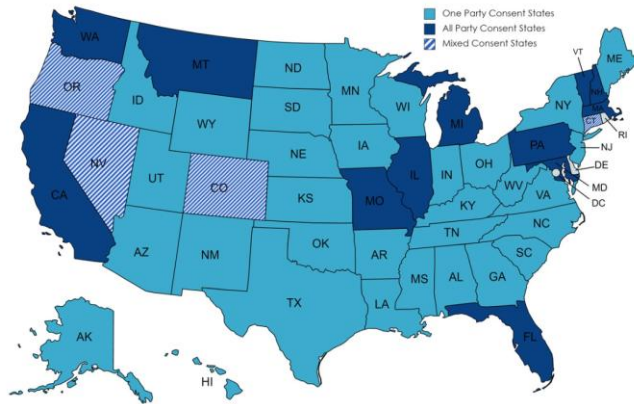
How To Poison The AI Machine



- When computer scientist Ben Zhao learned that artists were having their work stolen by AI models, he invented a tool to thwart this at the SAND labs at Univ. of Chicago
- Two poisoning tools: one called [Glaze](#), the other [Nightshade](#)
- Fights Clearview AI, too
- [Bracelet](#) of Silence
- Fawkes image "Cloaking" for Personal Privacy



States With One-Party Consent



- There are 37 states (+DC) that are considered one-party consent states. In addition, Connecticut can also, at times, be regarded as a one-party consent state
- Keep in mind while using Teams, Zoom, Otter, Fathom, and others

What's Being Done With Your Data?



- Sold or given away
- Used to build new AI models
- Used by bad actors for identity theft and ransomware
- Used by bad actors to create malware
- Spoofing/creating voice and video (Fake AI)
- Social media posts
- Sub-Processors – review for the "naughty" and "nice" list

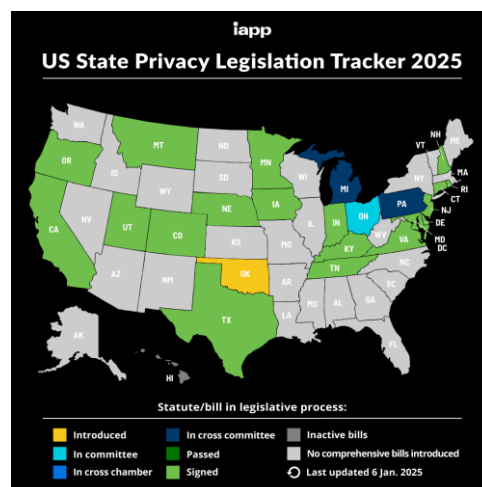


State Privacy Regulations



1. California Consumer Privacy Act (Oct 1, 2020, amended Jan 1, 2023)
2. Colorado Privacy Act (Jul 1, 2023)
3. Connecticut Personal Data Privacy and Online Monitoring Act (Jul 1, 2023)
4. Delaware Personal Data Privacy Act (Jan 1, 2025)
5. Indiana Consumer Data Protection Act (Jan 1, 2026)
6. Iowa Consumer Data Protection Act (Jan 1, 2025)
7. Kentucky Consumer Data Protection Act (Jan 1, 2026)
8. Maryland Online Data Privacy Act (Oct 1, 2025)
9. Minnesota Consumer Data Privacy Act (Jul 31, 2025)
10. Montana Consumer Data Privacy Act (Oct 1, 2024)
11. Nebraska Data Privacy Act (Jan 1, 2025)
12. New Hampshire SB 255 (Jan 1, 2025)
13. New Jersey SB 332 (Jan 15, 2025)
14. Oregon Consumer Privacy Act (Jul 1, 2024)
15. Rhode Island Data Transparency and Privacy Protection Act (Jan 1, 2026)
16. Tennessee Information Protection Act (Jul 1, 2025)
17. Texas Data Privacy and Security Act (Jul 1, 2024)
18. Utah Consumer Privacy Act (Dec 31, 2023)
19. Virginia Consumer Data Protection Act (Jan 1, 2023)

US State Privacy Legislation 2025



Watch Data Sub-Processors



- EU Artificial Intelligence Act was passed in 2021 in response to the advent of generative AI systems like ChatGPT, in force since August 2024
- Classifies applications into four categories (“unacceptable”, “high”, “limited”, and “minimal”) based on their risk of causing harm, plus an additional category for general-purpose AI
 - Unacceptable risks in apps are banned
 - High-risk apps must comply with more rigorous requirements for security, transparency, and quality and must have conformity assessments
 - Limited risk apps only have transparency obligations
 - Minimal risk apps are unregulated
 - General purpose AI has transparency requirements and must be evaluated when risks are above the “limited” level



Data Sub-Processor Resources



- EU AI Act list of [authorities](#)
- The European Commission (EC) is considering banning all high-risk Sub-Processors and applications
- Build your own table of risks - Minimal (M), Limited (L), High (H), Unacceptable (U)

Application	Function	Risk
Kred	Social scoring system that measures an individual's influence and outreach on social media	U
HireVue	Uses AI to analyze video interviews, assessing candidates' facial expressions, word choice, and speech patterns to help recruiters identify the best candidates for a job	H
Botkeeper	Combines machine learning and human oversight to automate bookkeeping tasks, such as transaction categorization, reconciliation, and financial reporting	M



These Prototypes Show Promise As Emerging Technology

INTERESTING TECHNOLOGY TO WATCH

Electric Vehicles



- Many products in the market from scooters to bicycles to motorcycles to cars to over the road trucks to off-road
- Charging infrastructure making progress, Tesla wins
- Severe winter showed that better power sources needed
- Energy wind farms in Kansas worked when coal plants couldn't produce energy

EV Charger Setup Home



Common Questions

- Tesla Chargers? \$600 (now \$620) + \$3,000 new panel
- Ford Charger at home came with Lightning truck, about \$600 used
- Time to charge? See chart →
- Only one vehicle on the Ford charger at home, mobile charger only adds about 3 miles per hour

What Type of Chargers?



Detroit Testing Underground EV Chargers

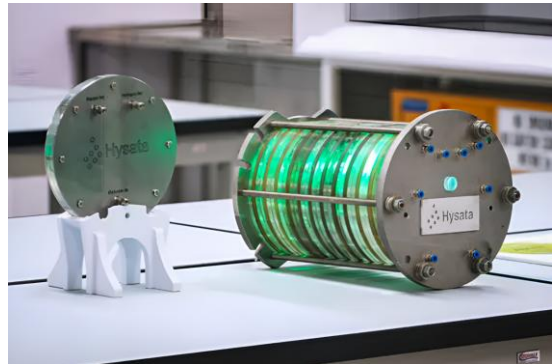


- Demonstrations held November 29, 2023
- Copper inductive charging coils allow vehicles equipped with receivers to charge up their batteries while driving, idling, or parking above the coils
- The quarter-mile segment of 14th Street will be used to test and perfect the technology ahead of making it available to the public within a few years, according to the Michigan Department of Transportation
- The technology belongs to Electreon, an Israel-based developer of wireless charging solutions for electric vehicles. The company has contracts for similar roadways in Israel, Sweden, Italy and Germany
- The pilot initiative in Michigan was announced in 2021 by Michigan Gov. Gretchen Whitmer

Hydrogen Batteries



- The world's most efficient system for producing hydrogen is scaling up for mass production. Some energy is always lost when turning water into hydrogen and oxygen — typical processes lose about 20-30%
- The Australian startup Hysata developed a new system, avoiding bubbles in the fluid that block the conduction of electrical charge and improving efficiency to 95%
- Hydrogen has advantages over batteries for long-term energy storage: It is more energy-dense — meaning it can be more easily used in industries such as aviation — and doesn't lose charge over long periods



GNSS/PNT Refines 50-Year-Old GPS

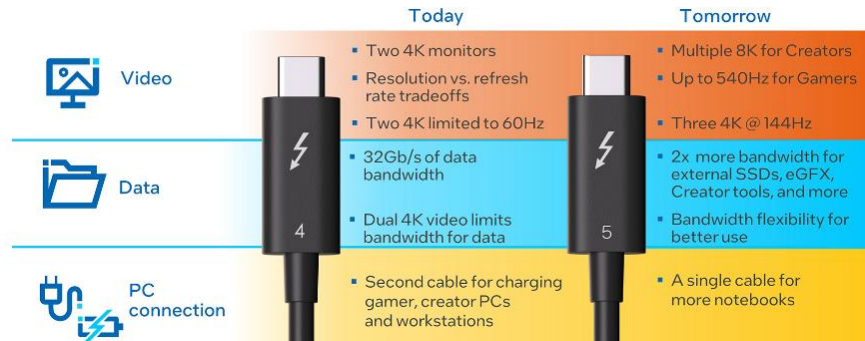


- Vocabulary
 - GNSS – Global Navigation Satellite System
 - PNT – Positioning, Navigation and Timing
 - QZSS – Quasi-Zenith Satellite System
 - PNT – uses QZSS services to compliment GPS for more precision
- Benefits to GNSS/PNT
 - Vital systems
 - Robust security
 - Increased processing power
- Precision
 - Agriculture
 - Aviation
 - Facilities
 - Military
- GNSS correction
 - Precise Point Positioning (PPP)
 - Centimeter, 5 seconds
 - Real-time Kinematic Positioning (RTK)
 - 5-10 cm, 20-25 minutes
 - State Space Representation (SSR)
 - 5-10 cm, 10-30 seconds

Thunderbolt 5



- Doubles Thunderbolt 4 capacity to 80 gigabits
- 120 gigabits per second
- Supports USB4 V2
- Doubles PCI Express data



3D Printers Becoming Mainstream



Type of 3D Printer	Price	Speed	Complex	Precision	Main Characteristics
1. FDM (Fused Deposition Modeling)	L	M	L	M	Widely used, accessible, uses plastic filaments, popular for home use.
2. Resin 3D Printing (SLA, DLP, LCD)	L/M	M	M	H	Uses UV-sensitive resin, ideal for detailed models, delicate parts.
3. SLS (Selective Laser Sintering)	M/H	M	M	M/H	Uses polymer powders, suitable for industrial applications, no supports needed.
4. DMLS (Direct Metal Laser Sintering)	VH	M	H	H	Metal 3D printing, used in aerospace and automotive, expensive.
5. EBM (Electron Beam Melting)	VH	M/H	H	H	Similar to DMLS, uses an electron beam, suitable for industrial applications.
6. Binder Jetting (Ceramio One from CES was \$5,000)	M/H	M/H	H	M	Uses powder and binding agent, capable of full-color models, versatile.
7. Multi Jet Fusion (MJF)	VH	H	VH	H	Advanced plastic 3D printing, extremely fast and accurate, industrial use.
8. PolyJet / Material Jetting	H	H	M/H	VH	Full-color and multi-material printing, used for detailed models, expensive.
9. Direct Energy Deposition (DED)	VH	VH	VH	M	Melts and fuses metals, used for large parts and repairs, less precise.
10. LOM (Laminated Object Manufacturing) / SDL	M	H	M	High	Layers of paper or plastic, full-color capability, wood-like parts.



Stacks, Recommendations, And Other Smart Options

PRACTICAL TECHNOLOGY CHOICES



Technology Strategies

- Adopt a productivity suite – Microsoft 365, Google Workspace, Zoho One (reverse backup)
- Attempt SaaS adoption where possible (mobile first, SOC Audit)
- Standardize your technology stack (fewer tools is better)
- Integrate and automate your processes and apps
- Assume continuous change (training plan)
- Leverage emerging technology (AI, SSO, Facial Recognition)
- Overall, the simplest approach has advantages

Pros And Cons Of Single Sign On



Okta

- Pros
 - Built-in contextual access for MFA
 - Customizable user portal
 - Multiple integrations with third-party applications
 - User self-service portal
- Cons
 - Can be buggy at times
 - May not work well with Microsoft apps

Microsoft Entra ID

- Pros
 - Integrates well with other Microsoft products
 - Geared towards enterprise use
 - Simple to understand subscriptions
- Cons
 - Contextual access to MFA only available on premium tier
 - No User SSO application

Other alternatives include Zoho Directory, JumpCloud, CyberArk, OneLogin, Passly (formerly AUTH Anvil)

Okta Pricing



Single Sign-on (SSO)	Adaptive SSO
\$2 per user, per month	\$5 per user, per month
• Okta Integration network. • Custom org URLs. • SIEM integration.	• All SSO features. • Location, device, network contextual access management. • Risk-based Authentication.
Multi-factor Authentication (MFA)	Adaptive MFA
\$3 per user, per month	\$6 per user, per month
• Security questions. • Okta Verify OTP. • Windows Hello and Apple TouchID.	• All MFA features. • Location, device, network contextual access management. • Network anonymizers.

Microsoft Entra ID Pricing



Entra ID Free	Entra ID P1	Entra ID P2	Entra ID Governance
Free	\$6.00 per user, per month	\$9 per user, per month	\$7 per user, per month
• SSO unlimited. • Cloud authentication. • Customizable user sign-in page. • Partial MFA and conditional access.	• All Free features. • Group assignment to apps. • Cloud app discovery. • Full MFA and conditional access.	• All P2 features. • Identity protection. • Full end user self service.	Identity governance.

How Does Your Tech Stack Compare



Today	Retiring?
• Microsoft Teams/365/Adobe • Grammarly/Cal.com/Bitwarden • Copilot/Gemini/ChatGPT • Defender/Sophos/CrowdStrike • HP Dragonfly Gen4/ViewSonic • Cloud-based Accounting (QBO?) • Zoho One • iPhone/Apple Watch • Stream Deck/Camtasia	• Zoom/GoToWebinar • Calendly/LastPass/YubiKey • Cortana • Webroot • iPad • QuickBooks Desktop • ShareFile • Citrix?

Well-Established, Replacements



What's Now

- Wi-Fi 6E
- 5G
- Graphics Processing Units
- 4K
- 1 Gigabit Ethernet
- Smartphones & watches

What's Next

- Wi-Fi 7
- 6G
- Neural Processing Units (AI)
- 8K
- 100+ Gigabit Ethernet
- Wearable and AR/VR headsets



Practical Recommendations For Purchases

HARDWARE TRENDS

Fundamental Computer Technology



PC Buyer

- Windows 11, Microsoft 365
- Intel Core Ultra & AMD Ryzen 5-9
- Dedicated GPU (ARC, Radeon)
- 32-64GB of RAM, DDR5
- PCIe Gen 4 128GB-1TB of NVM Express Solid-State drive (NVMe)
- Thunderbolt 5, for HDMI/USB

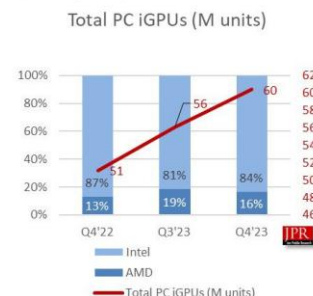
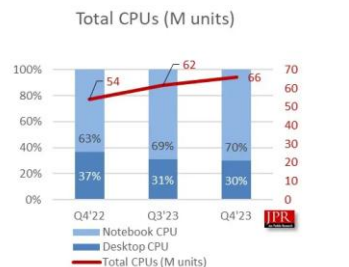
Mac Buyer

- MacOS, Microsoft 365
- M3/M4 PRO/MAX ARM
- Dedicated ProRes graphics
- 8-64GB of RAM (DDR5 Unified)
- PCIe Gen 4 128GB-2TB of NVM Express Solid-State drive (NVMe)
- Thunderbolt 5, for HDMI/USB

PC Sales Growth



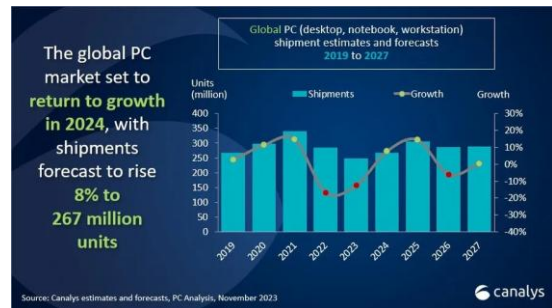
- CPU shipments surpass levels during the pandemic era — demand for AMD and Intel processors has recovered
- Since Q4 2022, CPU shipments have increased 7% every quarter, for a 22 % increase
- iGPU (integrated graphics) are up 18% YOY, to 60M units



PC Sales Growth



- Up 8% to 267 million units
- Driven by new AI software
- AI-powered PCs will account for 19% of PCs shipped in 2024
 - M-series Macs
 - Ryzen 8000
 - Intel Core Ultra (Meteor Lake)
- Snapdragon X Elite could help ARM-based PCs grab 30% of the market share by 2026



Computer Chips



- Intel
 - Core Ultra (Meteor Lake, 14th Gen, "I" naming is gone)
 - Ultra = Neural Processor Units (NPUs)
 - AI integration
 - DDR-5 support
 - Better integrated graphics
 - Received \$20B from the US CHIPS and Science Act for the AZ Intel Ocotillo Campus, OH, NM, and OR, 30,000 jobs
- AMD
 - Nine new Ryzen 8040 mobile with AI software for the seven with a [Neural Processing Unit](#)
 - [Ryzen 8700G](#) with integrated Radeon Graphics can almost match Nvidia's GTX 1650, an entry-level gaming GPU

Computer Chips



- Apple M3, M3 Pro, M3 Max
 - 3nm
 - 2.5x the M1 rendering
 - All-New GPU Features Dynamic Caching, Mesh Shading, and Hardware-Accelerated Ray Tracing

Apple M3 chip specs: M3 vs M3 Pro vs M3 Max

	M3	M3 Pro	M3 Max
CPU	8 cores	12 cores	16 cores
GPU	10 cores	18 cores	40 cores
Memory	Up to 24GB	Up to 36GB	Up to 128GB

- Snapdragon X Elite – mid 24
 - Arm CPU faster than AMD's top-end mobile APU
 - [12x](#) Intel Core Ultra 7
 - 12 Oryon 4.3Ghz cores (Nuvia)
 - TSMC 4nm

Snapdragon X Elite Performance in Geekbench 6

Windows

Sample chip	Single-Core	Multi-Core
Snapdragon X Elite	2,574	12,562
Ryzen 9 7940HS	2,475	11,667
Ryzen 9 7945HX	2,727	15,623
Ryzen 5 7600	2,736	12,260

Phone Chips



A17 Pro/A16 Bionic

- 64-bit ARM-based system on a chip (SoC) built on 3 nm process by TSMC
- Apple-designed 64-bit six-core CPU with 8 GB of RAM:
 - Two high-performance cores run at 3.78 GHz.
 - Four energy-efficient cores run at 2.11 GHz.
- 16 Core Neural Engine capable of **35 trillion operations per second**
- Support for AV1 decoding and USB 3.2 Gen 2 (up to 10 Gb/s)
- A18 in the fall with the iPhone 16 (later)

ARM/Qualcomm Snapdragon 8

- Snapdragon 8 Gen 3, announced in October 2023, has 8 cores, 8 threads, Hexagon NPU with 34 TOPS
- X Elite has 12 cores, integrated Oryon CPU has 2x the power of the A17, GenAI models of 13B parameters, 4.5 the speed with 45 TOPS
- CPU Configuration: It has a 1+5+2 CPU setup, including one Cortex-X4 core, five Cortex-A720 cores, and two Cortex-A520 cores
- 30% faster than its predecessor; 20% more efficient
- AI Capabilities: Designed for on-device generative AI tasks, it supports text-to-image generation, photo expansion, and large language models with over 10 billion parameters
- Used in Samsung Galaxy S24

AI Chips Vs. GPU

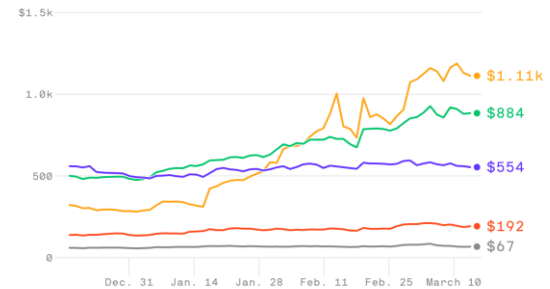


- Nvidia H-100, H-200, B-200
- Amazon – [Inferentia](#)/[Graviton4](#)/ Trainium2
- Cerebras – [Giant chip](#)
- Google Tensor Processing Units (2015), [Cypress](#)/Maple/[Axion](#)
- Intel [Gaudi 3](#)
- Microsoft [Maia 100](#)/Cobalt 100
- Meta – Meta Training and Inference Accelerator ([MTIA](#)) & Research SuperCluster ([RSC](#)) and [Artemis](#)
- [GroqChip](#) – Language Processor Unit (LPU), clusters for memory access, 230 MB, with 80TB of memory bandwidth for 16 chip-to-chip interconnects

Stock prices for select semiconductor companies

Daily: Dec. 18, 2023, to March 15, 2024

— Super Micro Computer — NVIDIA — Synopsys — Advanced Micro Devices
— Marvell Technology



Quantum Chips



- Many competitors
- Trying to outperform classical computers
- Some tasks can't be done on a classical computer: materials, weather, IoT
- IBM [Heron](#), Osprey(433) & others
- Intel [Tunnel Falls](#), Tangle Lake(49)
- Google [Sycamore](#), Bristlecone(72)
- Microsoft [Azure Quantum](#)
- China Jiuzhang(76)
- Honeywell



A Few Sample Products

COMPUTERS

HP Dragonfly G4 Specifications



- CPU - 13th Gen Intel Core processor
- GPU - Intel integrated
- RAM - Up to 32 GB
- Storage - Up to 2 TB
- Display - 13.5-inch, 3:2, 3K2K OLED, 400 Nits
- Camera - 5MP
- Audio - Bang & Olufsen, dual mics
- Ports - 2x Thunderbolt 4 with USB C, 2x SuperSpeed USB Type-A, HDMI 2.0, Nano-SIM, Audio jack
- Connectivity - Wi-Fi 6E, Bluetooth 5.3, 4G LTE or 5G (optional)
- Dimensions - 12.39 in x 8.78 in x 0.72 in
- Weight - Starting at 2.98 lbs.
- \$2,031



Dell



XPS 13-17

- 13th Gen Intel
- Dedicated GPU (NVIDIA)
- 500 Nits
- \$500-2,650



Latitude 13-16

- 13th Gen Intel
- Integrated GPU
- 250 Nits
- \$1,001-2,099



Lenovo



X1 2-in-1

- Think 2-in-1 as a form factor = laptop and tablet in one device
- Laptop, tablet, & tent modes
- \$500-2,650



X1 Carbon

- Continues to be leading edge
- Intel® Evo™ with 13th Gen Intel® Core™ vPro® CPU
- Gen 4 SSD
- 500 nits
- \$1,200-2,600



Apple MacBook Pro



- CPU – M3 Pro 11, 12 or Max, 12, 14, 16 Core – March 8
- GPU – Pro (14), 18, 30, or 40 Cores, 16-core Neural Engine
- RAM - Up to 96 GB
- Magic Keyboard with Touch ID, Force Touch trackpad
- Storage - Up to 8 TB
- Display –14, 16” Liquid Retina XDR display², 1600 nits
- Camera - 1080p FaceTime HD camera
- Audio - High-fidelity six-speaker sound system with force-cancelling woofers
- Ports - Three Thunderbolt 4 ports, HDMI port, SDXC card slot, headphone jack, MagSafe 3 port
- Connectivity - Wi-Fi 6E, Bluetooth 5.3
- Dimensions - 12.31 in x 8.71 in x 0.61 in
- Weight - Starting at 3.6 lbs.
- \$1,599-4,199



Framework Laptop Specifications



- CPU – Ryzen 7 or 9, Intel 13th Gen
- GPU – Radeon 780M or RX7700S
- RAM - Up to 64 GB
- 10 key can be on the right or left
- Storage - Up to 4 TB
- Display – 13, 16”, 500 nits
- 6x user-selectable expansion cards
- Connectivity - Wi-Fi 6E, Bluetooth 5.2
- Dimensions – 14.0 in x 11.4 in x 0.70 in
- Weight – 2.1 – 2.4 kg
- \$849-2,053



Ricoh Scanners



1. Ricoh fi-8170:

- A **high-speed desktop scanner** designed for reliable color scanning
- Estimated daily scan volume of **10,000 sheets**
- Features **Automatic Separation Control** and **Multi-feed Detection** to prevent jams
- [Ideal for business environments with its robust performance and compact footprint](#)

2. Ricoh fi-8040:

- A **front-office scanner** with network scan capabilities
- **PC-less scanning** directly to email, network folders, or FTP servers
- **Wi-Fi-enabled** for flexible placement
- [40 ppm scanning speed and 600 DPI optical resolution](#)

3. ScanSnap iX1600:

- A **Wi-Fi-enabled color network scanner**
- **One-touch scan and store** to up to 30 destinations, including cloud applications
- **60 ppm** scanning speed and **600 DPI** optical resolution
- [Comes with Adobe Acrobat Pro DC subscription](#)

4. Ricoh fi-7300nx:

- A **fast Wi-Fi-enabled color network scanner**
- **Ideal for high-traffic areas** with its compact footprint
- **60 ppm** scanning speed and **600 DPI** optical resolution
- [Cloud-ready and supports TWAIN and ISIS drivers](#)

Canon Scanners



1. Canon image FORMULA R40: This tabletop scanner offers excellent image quality, a small footprint, and a user-friendly app. [It has a 50-page automatic document feeder and is priced around \\$250.](#)

2. Canon CanoScan LiDE 300: A budget-friendly option with a slim design. [It's easy to use and provides decent scanning performance at a price of approximately \\$58.](#)

3. Canon DR-C230: An entry-level scanner suitable for basic scanning needs

4. Canon DR-C225: Known for its speed and auto-feed capabilities

5. Canon DR-M160II: A professional-grade scanner with high-quality results

6. Canon DR-M260: Designed for high-volume scanning tasks

7. [Canon CR-L1: A versatile check scanner for Remote Deposit Capture \(RDC\)](#)

Apple iPhone 16, Plus, Pro, & Max



- All models on the A18 Pro or Bionic instead of the A17
- 3nm – N3E from TSMC
- Neural Engine core increase
- Geekbench 6 Speeds - Single/multi core
 - A18 – 3500/8200
 - A17 Pro – 2906/7231
 - Snapdragon 8 Gen 4 – 2985/10762



Apple Watch Series 9 & Ultra 2



- The Apple Watch Series 9 packs a swifter S9 chipset than the Series 8's S8 silicon
- Apple U2 chip (Ultra-wideband)
- 4-core Neural Engine
- The S9 chipset also includes a neural engine that powers several smart features of the Series 9. The Series 8 does not have this feature
- Apple also brings a new pink color to the Watch Series 9.
- The Apple Watch Series 9 has a brighter display, peaking at 2,000 nits
- With Double Tap, users can “click” their watch hand’s index finger and thumb twice to interact with apps on the Series 9
- Issues with the oxygen sensor IP late 2023, early 2024
- \$399-699



New iPads!



- 13" iPad Air - \$799+
- iPad Pro gets
 - An OLED display
 - M4 processor – 3nm 10 core
 - 11" \$999, 13" \$1,299+
- Apple Pencil Pro is haptic
- New Magic Keyboard \$349



Apple Vision Pro “Spatial Computing”



- M2 and brand new R1 chips for the sensor inputs, 12ms
- Twin 4K displays inside the headset for HDR picture quality. For glasses you'll need custom \$100 ZEISS inserts
- EyeSight uses a front display to show others that you are engaging with them or are immersed in the headset
- visionOS allows for 3D experiences native to the Vision Pro. iOS and iPadOS apps are available in a Vision Pro App Store along with visionOS apps
- The crown on the top of the headset allows you to control how immersed in the headset you are, from augmented reality to virtual reality.
- No controllers needed — the headset relies on eye and hand tracking in addition to voice commands
- \$3,499-5,000, costing \$1,509 to build
- January 19, 2024



Google Pixel 8/Pro



- Google Tensor G3 “Zuma”
- ARMV8.5+ or ARMV9 CPUs using Advanced Memory Protection with Memory Tagging Extension (MTE)
- 50MP Isocell GN2 using staggered HDR technology
- Pixel 8 has a 2,400 x 1,080 display while the Pixel 8 Pro has a 2,992 x 1,344 screen
- 5,000mAh energy cell
- 162.6 x 76.5 x 8.7mm – very close to Pixel 7
- October 2023



Samsung Galaxy Z Fold 6 & Z Flip 6



- What is it? The next flagship Samsung foldable
- When is it out? Possibly July with Olympics
- How much will it cost? Will likely start at \$1,799.99
- Possible cheaper Z Fold 6 FE
- Fold Colors: Dark Blue, Light Pink and Silver
- Flip Colors: Light Green, Light Blue, Silver and Yellow
- Probable Snapdragon 8 Gen 3 or Exynos 2400
- Wider cover screen on both
- S Pen included
- Dust resistance
- No more crease



Galaxy S25/S25+/S25 Ultra



- Camera Improvements
- Entry level size to 6.36" from 6.2 on the S24
- Ultra screen size 6.9" from 6.8"
- Screen brightness increase
- Wide angle lens upgrade to 12 or 50MP
- Variable telephoto
- Snapdragon 8 Gen 4, matching the A18 numbers, or X Elite?
- Android 15



Humane AI Pin



- \$699, \$24/mo. subscription
- Post-smartphone device





Important Technologies & Standards To Follow

COMMUNICATIONS & STANDARDS

Wi-Fi 7 Unifi U7 Pro



- The U7 Pro is a ceiling-mounted Wi-Fi 7 access point designed for demanding, large-scale environments
- It supports 6 spatial streams and operates in the 6 GHz frequency band for interference-free Wi-Fi
- With a coverage area of 140 m² (1,500 ft²), it can handle 300+ connected devices
- Powered via PoE+ and equipped with a 2.5 GbE uplink, it's suitable for high-performance networks
- \$189



Wi-Fi 7: What's New



- Newest Wi-Fi standard now out (802.11be)
- Speeds up to 46 Gbps
 - Unless using for mesh, need ethernet speeds above 1 Gbps
- Uses same frequencies as Wi-Fi 6E, but allows for channels of up to 320 MHz vs. 160 MHz for 6/6E
- All three standards use WPA 3, which encrypts all data between the access point and devices
- The first devices are available from Unifi and TP-Link now

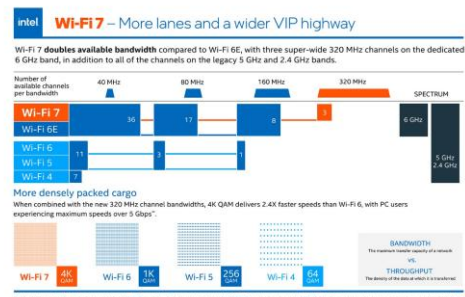
	Wi-Fi 6	Wi-Fi 6E	Wi-Fi 7
IEEE Standard	802.11ax	802.11ax	802.11be
Frequencies used (GHz)	2.4, 5	2.4, 5, 6	2.4, 5, 6
MIMO Streams	8	8	16
Channel Width	20, 40, 80, 80+80, 160MHz	20, 40, 80, 80+80, 160MHz	20, 40, 80, 80+80, 160, 320MHz
Max speed	9.6 Gbps	9.6 Gbps	46 Gbps
WPA Standard	WPA 3	WPA 3	WPA 3



Wi-Fi 7: Technical Considerations



- Wi-Fi 7 includes 320 MHz Channels & 4K QAM (**Quadrature Amplitude Modulation**), providing more densely packed channels and more data density.
- The benefit of a typical Wi-Fi 7 laptop is a potential maximum data rate of almost 5.8 Gbps. This is 2.4X faster than the 2.4 Gbps possible with Wi-Fi 6/6E and could easily enable high-quality 8K video streaming. In addition, it could reduce the time for a 15 GB file download to roughly 25 seconds vs. the one minute it would take with the best legacy Wi-Fi technology.
- With MLO (**Multi-Link Operation**), Wi-Fi 7 devices can simultaneously connect on two bands. This enables faster speeds through aggregation. Or, both bands can be used concurrently to share redundant/unique data for improved reliability with ultra-low and precise latencies.

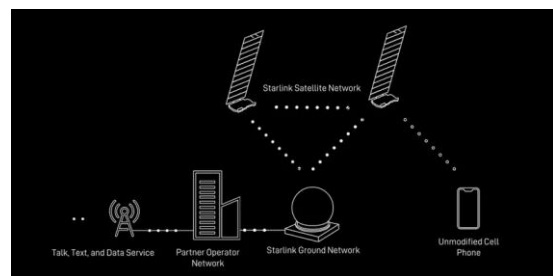




New LEO For Phones



- AT&T, T-Mobile, Google, Samsung, Apple all participate
- Starlink sent and received texts over a 4G/LTE connection between mobile phones via its latest generation of satellites, called v2mini, for the first time in January 2024, following similar projects from Amazon, Apple, AST SpaceMobile, Huawei, and Lynk Global
- Factors: Larger dishes, beamforming, satellites lower





The Never- Ending March To The Cloud



Have You Noticed This Trend?

- Think back fifteen years...what were **your thoughts about Cloud Computing then?**
 - What was our **profession's view toward Cloud Computing?**
- **Today, how is Cloud Computing perceived?**
 - Many business professionals now spend 100% of their time working through Cloud-based desktops
 - Of those who do not use Cloud-based desktops, many – probably the majority – spend at least 50% of their time working with Cloud-based platforms and services

Cloud-Computing's Importance



- Our **information is no longer held hostage**, freeing us for **easier and more effective collaboration, internally and externally**
- Cloud-based apps and services allow us to **work from any device and any location** if we have a reasonable connection
- What are the potential **impacts on security**?
 - *Are they positive, negative, or mixed?*
- Cloud-based apps and services should **reduce the number of devices we need** to get our jobs done
 - *Could it really be possible to work from only our phone?!?!?*

Think About This Scenario...



If you're 100% in the Cloud, all you really need is a connection to the Internet...could that be through your cell phone?

*Can you connect
an external
monitor to your
phone?*

*Can you connect a
keyboard to your
phone?*

*Can you connect a
mouse to your
phone?*



WHY WOULD I NEED A DESKTOP, LAPTOP, AND/OR TABLET?

And What About The Economics?



Reduced hardware costs

Fewer devices will result in smaller CAPEX

Reduced software costs

Fewer devices will result in consolidation of software licenses

Reduced maintenance and support costs

Fewer devices means there are fewer things that can go wrong

Reduced security exposure points

Fewer devices reduce the number of potential security exposure points

How Does This Align With WFA?



- **WFA is here to stay!**
 - Maybe not for 100% of team members
 - Maybe not for 100% of workdays
- For those who embrace the march to the Cloud, **WFA is a “native” benefit of working in this environment**
 - IT staffs don’t have to enable WFA
- Moreover, team members don’t have to work differently when working away from the office...**everything flows through the Cloud!**

But, There Are Bumps In The Road



- If your **Internet connection is slow or fails**, you won’t get much done that day!
- **“True” 5G cellular connections are game-changers**
- With true 5G, you’re looking at **connection speeds of up to 20 Gbps**
 - That’s **twenty times faster** than most fiber connections!
- And even faster connections are on the way!

Connectivity – What's Important?



SPEED



AVAILABILITY



RELIABILITY



SECURITY



PRICE

6G And Beyond

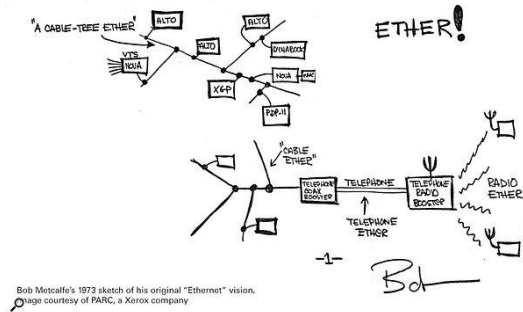


- Extreme High Frequency (EHF)
- 6G will deliver theoretical terabit speeds
- Most users will get more than 100Gbps
- Extreme-low latency of less than one millisecond
- 6G satellite technology and intelligent surfaces capable of reflecting electromagnetic signals will deliver low latency, multi-gigabit connectivity to parts of the world where it has been too difficult or too expensive to reach
- Early 2028, but could be as late as 2030

Faster Ethernet



- **100 Gbps** Ethernet is now commonplace in data centers, enabling rapid data transfer
- **IEEE 802.3bz** (2.5 Gbps and 5 Gbps) provides intermediate speeds for enterprise networks
- **IEEE 802.3cd** (50 Gbps and 200 Gbps) targets high-speed data center links
- **IEEE 802.3cm** (400 Gbps) is under development
- Challenges and Research Areas: Signal Integrity, Energy Efficiency, Optical Ethernet, Terahertz Ethernet



Bob Metcalfe's 1973 sketch of his original "Ethernet" vision.
Image courtesy of PARC, a Xerox company

FCC Quadruples Basic Broadband



- Standard was updated March 14, 2024, last updated 2015
- 100 Mbps download and 20 Mbps upload is the new standard
- Four-fold increase compared to a 2015, which set the benchmark to 25 Mbps download and 3 Mbps upload
- Goal is to have 1 Gbps/500 Mbps for American consumers
- Benchmark compliance is measured with [NTIA's BEAD](#) Program and multiple [FCC USF](#) programs
- [Nvidia GeForce Now](#) game streaming service requires at least 35Mbps for 1080p at 240 FPS
- For movie streaming, Netflix needs 15 Mbps or higher for 4K streaming but it also aspires to expand into cloud gaming

Other Evaluations By The FCC



- Last year, the White House announced plans to invest \$42 Billion for universal internet access by 2030
- Fixed terrestrial broadband service (excluding satellite) has not been physically deployed to approximately 24 million Americans, including almost 28% of Americans in rural areas, and more than 23% of people living on Tribal lands
- Mobile 5G-NR coverage has not been physically deployed at minimum speeds of 35/3 Mbps to roughly 9% of all Americans, to almost 36% of Americans in rural areas, and to more than 20% of people living on Tribal lands
- 45 million Americans lack access to both 100/20 Mbps fixed service and 35/3 Mbps mobile 5G-NR service
- Based on the new 1 Gbps per 1,000 students and staff short-term benchmark for schools and classrooms, 74% of school districts meet this goal
- For casual users, 100 Mbps should be plenty



Private Equity, Supply Chain, and Global Elections

EXTERNAL MARKET FACTORS

PE Affects On Profession/Industry



Business Consequences

- Lack of investment/vision in many platforms
- Marketing numbers often don't reflect reality
- Support frequently reduced
- Rarely add much value
- Much "dry powder" capital
- I'm told to "get over it"

Personal Impacts

- Good exits for partners and owners
- Expectations of team members and employees increased
- Five-year cycles with bonuses
- Numbers managed "from a spreadsheet"
- Transactional

Supply Chains Remain Tight



- Demand likely to exceed production
- Planners conservative with inflation uncertainty, wars & election year, where 4 Billion people in 50 countries will have elections
- Manufacturing plants around the world not coming online as quickly as expected
- PC demand up



Regulatory, Tools, And Policies

MANAGEMENT AND GOVERNANCE

8 Notable IT Failures - CIO



- **Tech trouble in the skies**
 - United, Hawaiian, and Southwest had service outages, but so did the FAA
- **The NYSE's brittle backup process**
 - Incorrect backup to Chicago
 - Caused the next day session to continue the previous day's session
- **In space, no-one can cancel your software license**
 - Oracle software use for Space Shuttle has \$15M price over 3 years
 - Can't shut it off, can't afford audit
- **Software licensing situation cloudy**
 - Nutanix used software it didn't license
- **Turn off the lights, the party's over**
 - Minnechaug Regional High School in Massachusetts had been happily running a "green" lighting system installed by 5th Light, hit by malware, stayed on at full brightness continuously for ten years
- **When a crash means a real crash**
 - MRH-90 Taipan, a military helicopter used in Australia, not patching led to crash
- **Cascading phone failures down under**
 - Optus outage from routing changes by Singtel
- **Artificial intelligence, real failure**
 - Lawyers at Levidow, Levidow & Oberman using ChatGPT with court case hallucinations
 - CNET retracted 35 stories written with RAMP (Responsible AI Machine Partner)

Governance



Policies

- [Responsible AI Institute](#)
- [FinCEN Guidance](#) (BOI)
- [Integrated Growth Advisors](#)
- [Supervizor](#) – Continuous Audit
- [TimeCredit](#) – Technical Memos

Privacy

- [Privacy Lock](#) – Global Privacy Compliance
- NIST updated its [Cybersecurity Framework](#) on February 26, 2024, for the first time in a decade, adding a new area of focus: governance

SaaS Management



Costs

- Service scalable on demand
- Variable performance for users
- SaaS licensing tools
 - [Privacy.com](#) (Virtual Card for SaaS payment restrictions)
 - [StackShine](#) (now owned by FinQuery(formerly LeaseQuery))
 - [Spendflo](#)
 - [Substly](#) (SMB)

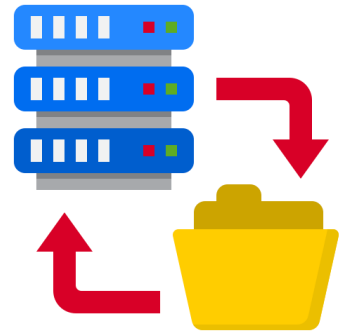
Security

- Distributed Endpoints
- Security risk increase
 - EDR/MDR
 - Unified Endpoint Management
- Security risk decrease
 - Cloud usually more secure
 - Silos isolate risk by application

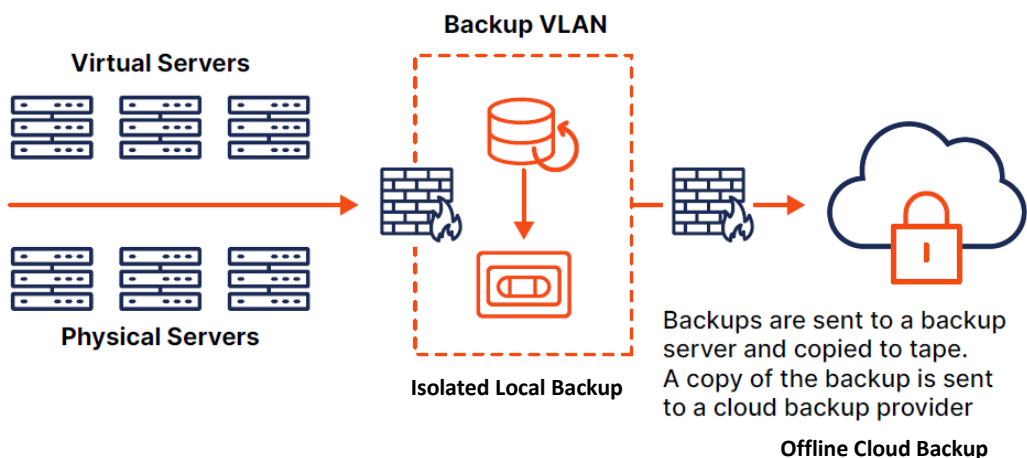
Effective Backup Plan



- Data loss can cripple an organization or put it out of business altogether
- An effective backup plan should be:
 - Automatic
 - Redundant
 - Regularly tested
 - With a copy stored off-site
 - With a local isolated or air-gapped copy
- 3-2-1 – 3 backup copies, 2 media types, 1 copy offsite

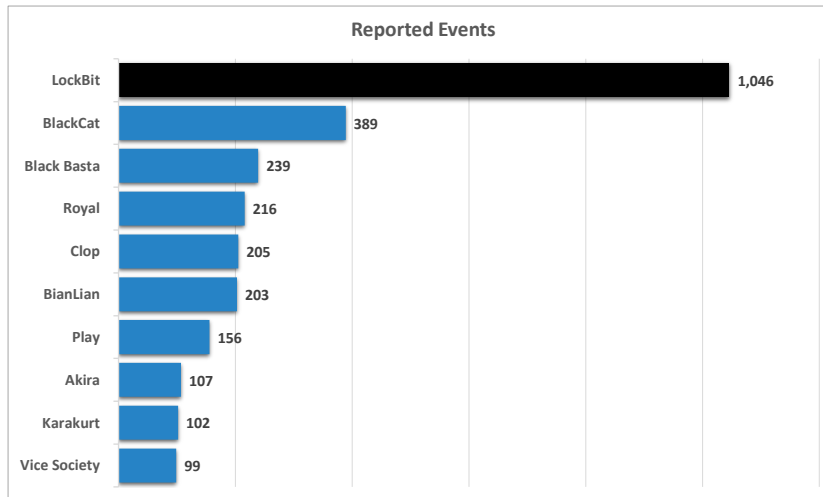


Isolated And Offline Backup



Source: Liska, Ransomware, ActualTech

Top Ransomware Groups (July 22 - June 23)



Source: Tom's Hardware

Ransomware Cryptocurrency Payments



Cumulative Ransomware Payments, 2023 vs. 2022
Through June 2023

Bitcoin accounts for 98% of ransomware payments



© Chainalysis

Evolving Cybercrime Interdependence



- Cybercrime is evolving into a complex web of interdependent cybercriminals
- Cybercriminals are selling their knowledge as a service to other cybercriminals
- Types of services offered
 - Internet access brokers (IABs) – acquire and sell compromised credentials
 - Counter anti-virus services (CAVs) – scan malware to identify flagged code before initiating a malware campaign
 - Negotiation customer services – negotiate payments with victims
 - Bulletproof hosting – information of cybercriminal customers is not collected or disseminated

2023 Europol IOCTA Report
Internet Organized Crime Threat Assessment

Social Engineering

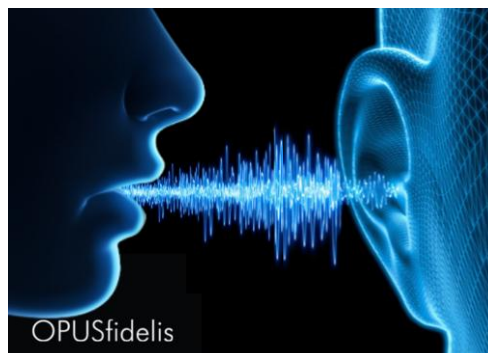


- A common form of social engineering is "vishing" (voice phishing)
 - For example, a person pretending to be an IT manager may request your username and password to perform required server maintenance
 - Or a person, using information gleaned from LinkedIn or Facebook, may impersonate a user to Help Desk personnel to recover or reset a password
- More than 90 percent of all cyberattacks start with phishing
 - Targeted phishing attacks that include phone calls are three times more effective, as reported by IBM in 2022

Deepfake Audio

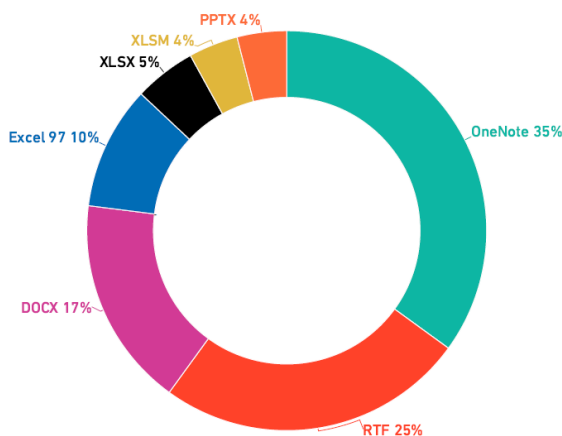


- UK CEO received a spear-phishing e-mail from someone posing as his parent company's CEO
- Message requested that \$302,000 be wired in the next hour to a Hungarian supplier
- The e-mail was followed up with a phone call from the parent company's CEO, confirming the payment
- The victim said that he recognized "his boss' voice and slight German accent" as well as the "cadence and careful enunciation", so he made the payment to the scammers



Malicious File Attachments

2023 Malicious Office Files



Remains the Top
Attack Vector

Incident Response In A Nutshell



- **Contain** – Disconnect systems from network, disable switches in broad-base attack, disable outbound traffic
- **Eradicate** – Delete malware, disable affected user accounts, patch or mitigate vulnerabilities exploited, determine attack vector and implement controls against future attacks
- **Recover** – Restoration of files and data from secure and reliable backup sources
- **Post Incident** – identify root cause and create plans to prevent future incidents, identify communication and process flaws, evaluate response procedures and staff security training, and enforce security policies

Source: Microsoft Security, *Ransomware Incident Response Playbook Framework*

Ransomware Response



1. Determine which systems are impacted, and immediately isolate them
2. If you are unable to disconnect devices from the network, power them down to avoid further spread of the ransomware infection
3. Triage impacted systems for restoration and recovery, with mission critical systems actioned first
4. Consult with your incident response team to develop and document an initial understanding of what occurred based on their initial analysis
5. Engage your internal and external teams and stakeholders with an understanding of what they can provide to help you mitigate, respond to, and recover from the incident
6. Take a system image and memory capture of a sample of affected devices, such as workstations and servers
7. Contact local and federal law enforcement

Source: www.cisa.gov/shields-up

Potential Blockchain Benefits In Accounting



Improved
Transparency
and Traceability

Enhanced
Security

Increased
Efficiency and
Reduced Costs

Smart
Contracts

Summary



- If you thought technology had moved fast in the past, hang on!
- AI, Quantum and other emerging technologies will impact you
- Applications continue to proliferate, but less may be more
- Technology complexity is so great, few comprehend the risks



LET'S TAKE A TEN MINUTE BREAK...