Agenda

- Introductions
- Overview of Innovative Technologies
- Inherent Risks & Control Considerations
- Where, When, & How to Engage
- Keys to Success
- Closing

Learning Objectives

By the end of this course, you should be able to:

- Understand & define new & emerging technologies
- Identify the impact of advancements in technology
- Recognize the risks that need to be addressed
- Identify various considerations to monitor innovative technologies

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Overview of Innovative Technologies

Technology

> Given the disruptive nature of emerging technologies, the methodology for evaluation can change while the underlying assessment processes remain the same.

Source: *Auditing Emerging Technologies – Facing New Age Challenges"* – *ISACA Journal, Volume 2, 2018*

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What's New, What Endures?

What's New
Processing speed & accuracy over larger data sets
Dynamic, not static – software can evolve & learn over time
Reduces human error, introduces potential for machine-based error
Return of the "black box"
Increase use of agile development process
Uncovers insight not already known
Need to address bias risk

What Endures
Basic control concepts apply – general & application controls
Risk assessments, routine audits, & pre-implementation reviews
Continuous learning & development of audit team
Business case should drive adoption of specific technologies
Governance & transparency are critical
Technologies will continue to evolve
COBIT, COSO, & regulatory frameworks still apply

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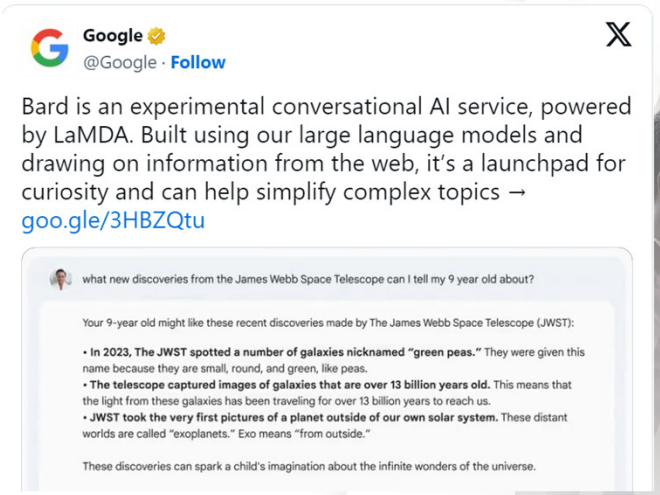
In the News …

"Alphabet shares dive after Google AI chatbot Bard flubs answer in ad"



Source: Reuters.com

In the News …

AI at work

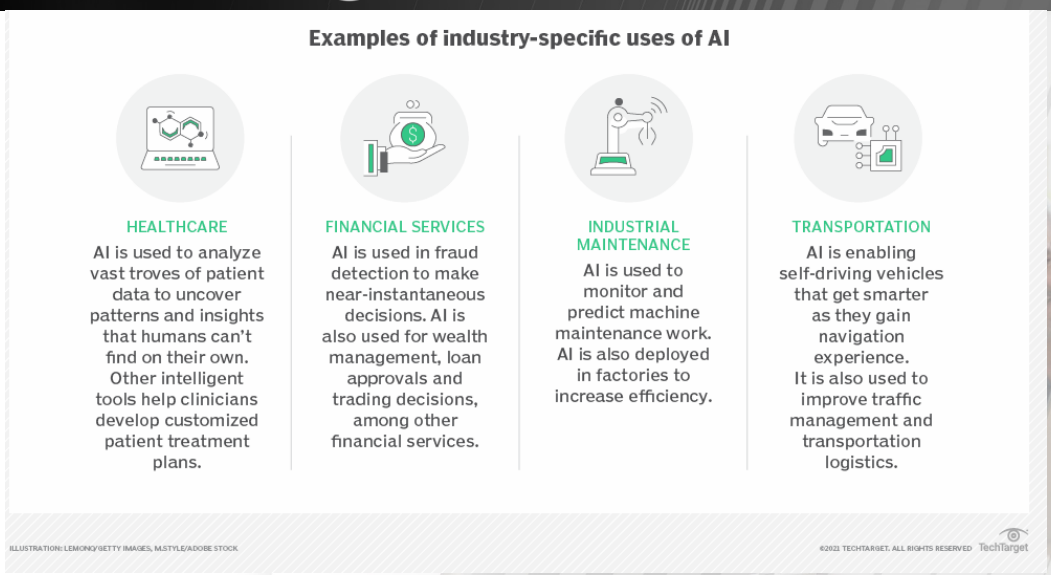
15 applications of AI in business

1. AI-enabled innovations, products and services
2. Automating routine cognitive work
3. AI for leveling up workers
4. AI as a creative force
5. Accessing and organizing knowledge via AI
6. AI for optimization
7. Higher productivity and more efficient operations
8. More effective learning and training through AI
9. AI as coach and monitor

10. Decision support
11. AI-enabled quality control and quality assurance
12. AI for personalized customer service experiences and support
13. Safer operations
14. AI for functional area improvements
15. AI for addressing industry-specific needs

Source: Techtarget

In the News …



Source: Techtarget

Innovative Technology

- "AI"
- "RPA"
- Cloud Computing
- Blockchain

- There have been unprecedented advances in technology where growth has become exponential.
- Innovative technologies bring great opportunities & benefits, but also complex & unique risks.
- Management must understand & assess the **design**, **implementation**, & **effectiveness** of controls over these new technologies.

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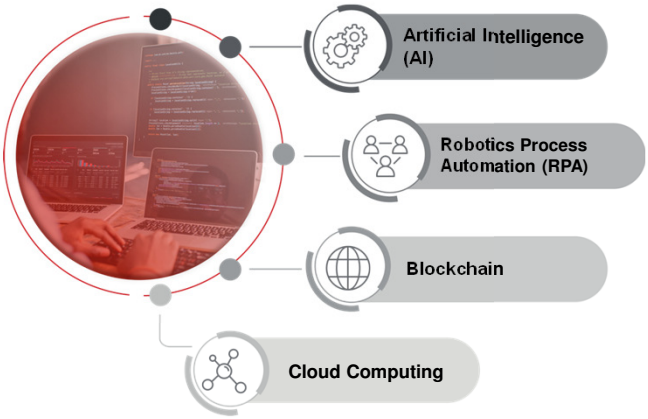
Innovative Technologies



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Artificial Intelligence (AI)

Technology capable of performing functions normally associated with human intelligence such as reasoning, learning, & self-improvement

- Machine Learning
- Natural Language Processing
- Predicative Analytics

- **Benefits**
  - Increased speed & productivity
  - Ability to quickly generate cognitive insights from large data sets
  - Always available to engage
- **Use Cases**
  - Improve features & functionality of products & services
  - Optimize & enhance business processes
  - Prevent/detect fraud & cybersecurity incidents
- **Examples**
  - Customer service
  - Fraud detection
  - Sales & marketing

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Where Do I Start?

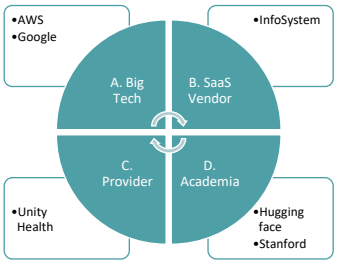
'AI has allowed me, as a physician, to be 100% present for my patients.'
Michelle Thompson DO, Family Medicine (as featured on NY Times)

Popular GAI Use Cases in Healthcare

Input	Generative AI Model	Output
"Summarize the articles on impact of walking on heart health"	**Text Generation** Generate text from simple natural-language prompts for various applications	"Ten thousand steps per day is optimum for maintaining a healthy heart"
"What is the patient's primary complaint?"	**Text Summarization / Synthesis** Extract insights from text to summarize or identify key details	"The patient's chief complaint is stomach problems, specifically epigastric abdominal pain described as gnawing and burning, which lasts 1-2 hours intermittently. "
	**Multimodal** Generate reports based on medical images, or vice versa	"1. No acute cardiopulmonary process 2. Stable torturous dilated thoracic aorta

Source: AWS

Basic Lenses to Note in Healthcare



Source: Various

Popular use case leveraged by clinicians is text generation, text summarization & image reports

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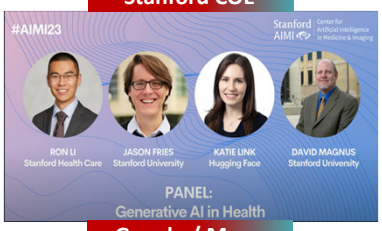
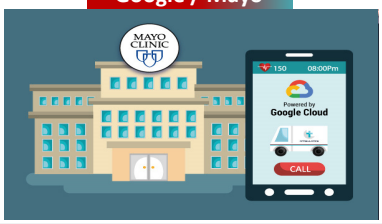
Where Else Can I Look?

Stanford COE

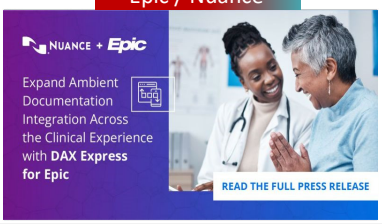


J. Hopkins COE

Google / Mayo

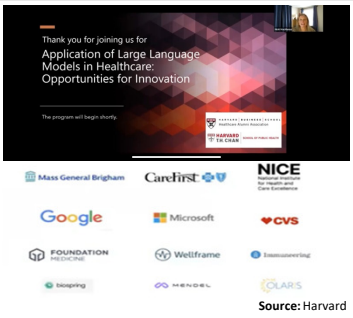


Epic / Nuance



Source: Various

Relationships behind one webinar



Source: Harvard

- More partnerships & milestones to follow closely/further reading. This is just the beginning!

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Robotics Process Automation (RPA)

The use of software to automate repeatable processes or tasks performed by users

- Traditional/rules-based
- Cognitive/AI

- **Benefits**
  - Increases speed & efficiency
  - Reduces human error
  - Saves cost of FTEs
- **Use Cases**
  - Data extraction, aggregation, & transformation
  - Pair with AI to perform tasks based on automated decisions
- **Examples**
  - Accounts payable invoice processing
  - Loan application processing
  - Automating back-office operations

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Cloud Computing

On-demand delivery & enablement of computing resources, *e.g.*, networks, servers, databases, storage, software, & services, over the internet

- Public Cloud
- Private Cloud (on/off-prem)
- Hybrid Cloud
- Multi-Cloud

- **Benefits**
  - On-demand self service
    Broad accessibility and increased reliability
  - Rapid scalability
  - Pay-per-use pricing provides opportunities for cost savings
- **Service Models**
  - Software as a service (SaaS)
  - Platform as a service (PaaS)
  - Infrastructure as a service (IaaS)
- **Examples**
  - AWS, Azure, Google Cloud Platform
  - Serverless computing & containers, *e.g.*, Docker, Kubernetes

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Blockchain

Blockchain technology is an advanced database mechanism that allows transparent information sharing within a business network. A blockchain database stores data in blocks that are linked together in a chain.

- Bitcoin represents the first use of blockchain

- **Benefits**
  - Used to store data but offers more features than a traditional database
  - Increases transparency among participants
  - Increase automation & real-time recording of transactions
  - Information is more secure – all transactions are encrypted
- **Use Cases**
  - Smart Contracts
  - Feasible Payment
  - Supply Chain
- **Examples**
  - Supply Chain
    - Able to track movement between parties, chain of custody is documented
  - Insurance Claims
    - Used to ensure claims are submitted appropriately, the work is performed, & payments are distributed timely

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What May the Next Five Years Hold!!!

Smart devices and internet connectivity offers new ways for businesses to create value to their customers, however the constant connectivity and data sharing also creates new opportunities for data and personal information to be compromised.

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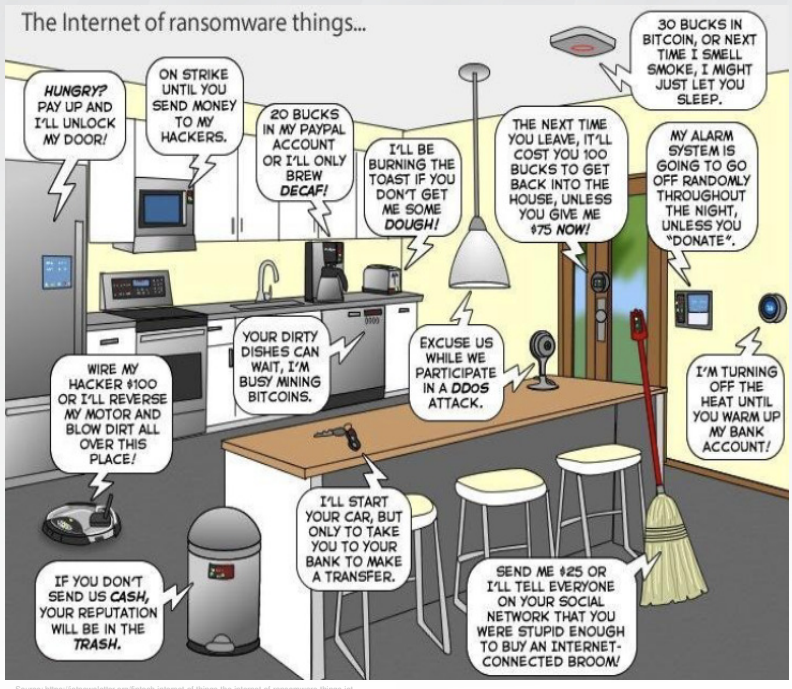

Source: https://iotnewsletter.org/fintech-internet-of-things-the-internet-of-ransomware-things-iot

Inherent Risks & Control Considerations

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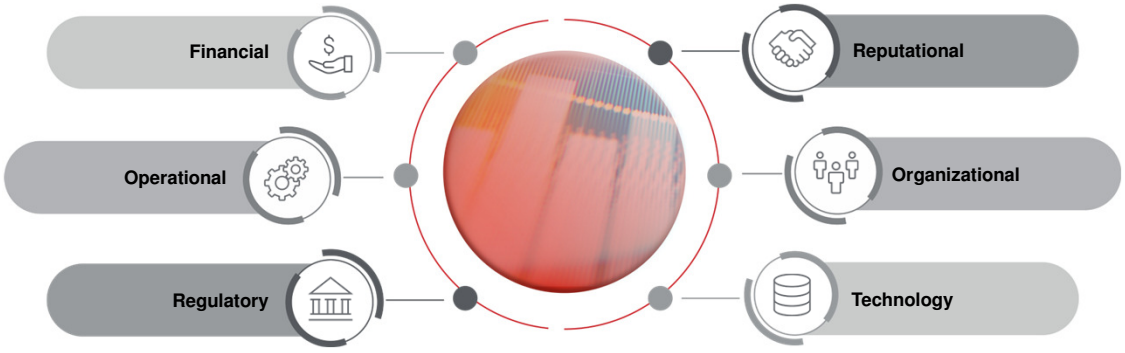
Common Risk Categories



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AI Risks

Reputational

- AI could generate inaccurate or harmful content which could result in loss of customer trust or negative publicity
- Algorithmic bias could result in poor business decisions &/or negatively impact customers or society at large

Organizational

- There is a lack of trust in adoption of AI because the organization is unable to explain & demonstrate how AI systems reach conclusions or generate output

Regulatory

- The use of personally identifiable information (PII) data to train AI systems could result in violations of privacy laws & regulations

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Robotic Process Automation (RPA)

Financial

- Financial misstatements are a result of deficient design or misconfiguration
- Implementation, operation, & maintenance costs outweigh long-term savings

Operational

- Misconfigurations or inadequate RPA design & implementation may perpetuate processing errors

Technology

- Poor & incomplete data could result in output that fails to achieve business objectives
- Changes to dependent applications could impact bots' ability to perform automated tasks

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Cloud Computing Risks

Regulatory

- Inability to evaluate & understand compliance requirements prior to go-live could result in regulatory, industry, or internal compliance issues or fines

Reputational

- Data breaches or system outages at a third-party cloud provider could cause customers to lose trust in the company's brand, products, or services

Technology

- The organization does not have awareness of all systems & locations that store sensitive or confidential data

Financial

- Lack of spend & usage monitoring, *e.g.*, resource creation, modification, or decommission, may result in surprise costs or missed opportunities to reduce cost

Blockchain Risks

Technology

- Lack of data privacy & confidentiality to ensure that any PII is not compromised or stolen

Regulatory

- Data collection & processing is not in compliance with existing rules & regulations

Operational

- Lack of data quality & validation checks & inaccurate data mapping & integration

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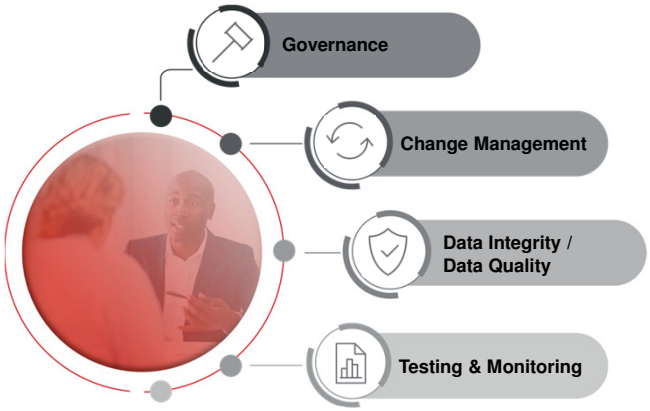
Control Considerations



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Control Considerations

Governance	Change Management	Data Integrity / Data Quality	Testing & Monitoring
Senior leadership / executive sponsorship & oversight	Policies & procedures for change management	Appropriateness of data sources	Pre-implementation testing
Steering committees with "ethics czar"	Process for developing, testing, approving, & implementing changes	Data mapping & integration (including interfaces/applications)	Testing frequency, threshold, & output
Documented governance framework	Controls for data migration & conversion	Data validation checks & rules	Management evaluation of testing
Policies & procedures	Access controls & segregation of duties		Monitoring protocols
Performance measurement			Reporting & escalation

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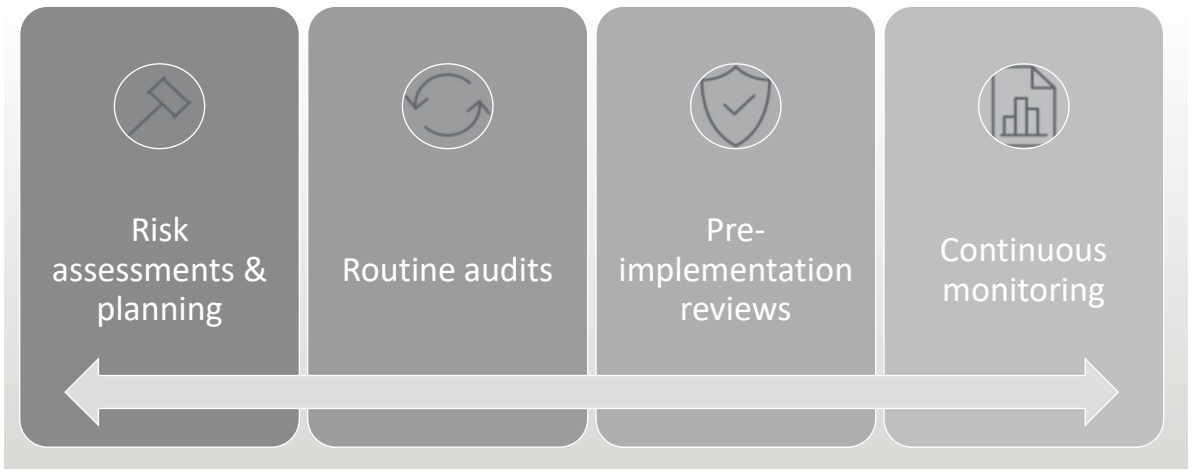
Where, When, & How to Engage

Where to Engage Internal Audit



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When & How – Risk Assessments & Continuous Monitoring

Life Cycle Component	When	How
Risk Assessment & Planning	▪ Annual risk assessment & planning ▪ Interview with key stakeholders	▪ Understand management's strategies for adopting innovative technologies across the business ▪ Consider when, where, & what types of these innovative technologies will be planned, designed, & implemented ▪ Understand management's framework for governing the design & implementation of innovative technologies ▪ Incorporate the overall assessment of risk into each relevant risk factor, *e.g.*, financial, operational, regulatory, etc., in the context of risk assessments for individual auditable entities in the risk universe
Continuous Monitoring	▪ Ongoing process to monitor & identify issues	▪ Identify controls & metrics to monitor ▪ Determine rules, thresholds that guide monitoring ▪ Reports issues to management timely

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When & How – Routine Audits & Pre-Implementation

Life Cycle Component	When	How
Pre-implementation	▪ Provide advice & insight at the initial ideation stage ▪ Stay involved during the course of implementation & provide meaningful feedback during each implementation milestone	▪ Develop process to identify new uses for technology within the business ▪ Assist management with evaluating & understanding how the technology will
Routine Audit	▪ Business processes that have implemented a technology (AI, Cloud, RPA), internal audit should include in the scope of the review & ensure that risk are appropriately managed	▪ Enhance existing audit plans to include considerations relevant to specific technology usage ▪ Understand overall objectives & if the technology is accomplishing those objectives ▪ Review relevant risk & controls to mitigate ▪ As part of audit testing, develop & include testing of controls

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Keys to Success

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Understand the Technology

Management must understand the underlying technology to effectively identify & assess relevant risks & controls

Type	Purpose	Impact	Use	Risk

Management should research use cases, case studies, & relevant industry guidance

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Establish a Flexible Approach

Develop a framework to use that is repeatable yet agile enough to adapt to the relevant technology

Framework should include:

How the technology is governed	Technology architecture & how the technology integrates with the business	Relevant risks	Internal controls

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Evaluate Resources & Skills

Assess current resource capacity & skillset

Provide training for team members

Utilize guest auditors

Co-source & outsource to subject matter resources (SMR)

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Closing Thoughts …

- AI is already here, & has been making an impact since 1940 with Healthcare GAI ramping last five years
- Best time to start was two years ago, next best time is **now**
- Reach out to Ray.Baxter@FORVIS.com or Sean.Andrews@FORVIS.com if you have any questions or comments to share!

Questions

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Thank You!

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Healthcare IT Risk & Compliance

In 2023 over 116 million patient records were breached, with

84% **Of reported cases being hackers and/or insider events.**

Compliance Assessments

Our team has deep experience assessing an organization's compliance across many key frameworks, including HIPAA, NIST, ISO, COBIT, and various Privacy regulations.

IT Internal Audit Services

Our IT Internal Audit service offerings begin with a phased-approach to first identify risks and opportunities for improvement at the entity level. Secondly, we evaluate IT- or Compliance-specific areas to assess risk and develop corrective action plans.

Cyber Technical Assessments

We have a full suite of Cyber Technical services, including Network Security Assessments & Penetration Testing, AI Red Teaming, ePHI scanning, Cloud Security Assessments, Benchmark & Security Configuration Assessment, and Dark Web research.

Incident Response & Ransomware Risk Exercise

We can help you prepare for and protect against unforeseen attacks with a ransomware risk assessment. We will perform a ransomware simulation using an AI-driven, safe-by-design tool and facilitate table-top tests to identify vulnerabilities and drive process improvement.

Third-Party Risk Services

Our teams assess and build IT third-party risk management frameworks tailored to each client. Beyond building program governance, templates, and guidelines, we also perform outsourced security and risk assessment services of third parties.

Technology Enablement & Optimization Assessments

This project is designed to review the technology landscape in three key areas: technology design and scalability, people resource management, and third-party risk management. We will develop an IT Strategic Roadmap to align prioritization and corrective action efforts for potential cost savings.

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