



Thomas Bronack, CBCP

Presentation Topics

- **Vulnerability Management**
- **SBOMs**
- **CSF 2.0 Structure and Usage**
- **Continuous Threat Exploitation Management (CTEM)**
- **Systems Development from Concept to final Product**

Tom Specializes in:

- **Enterprise Resilience,**
- **Corporate Certification,**
- **Vulnerability Management,**
- **Strategic and Tactical Planning,**
- **Project and Team Management**
- **Awareness and Training**

Topics include:

- **Vulnerability Management**
- **Continuous Threat Exploitation Management (CTEM), and Cloud Native Application Program Platform (CNAPP),**
- **Recovery Management**

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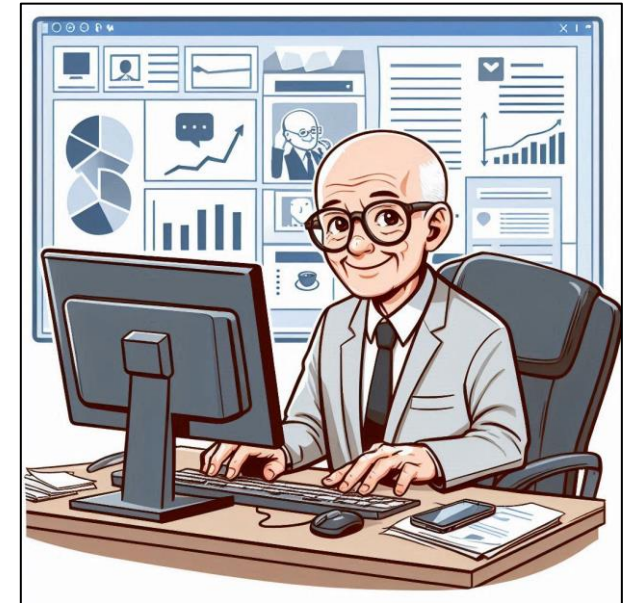
A word from Thomas Bronack

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I am a **senior level manager** with in-depth experience in **Enterprise Resilience, Vulnerability Management, and Corporate Certification** for large enterprises in disciplines like: Banking, Brokerage, Finance, Insurance, Pharmaceuticals, Vendors, and Manufacturing which provided me with a solid understanding of the risks faced by companies and how best to safeguard a firm through workflow, compliance, and recovery.

The Software Supply Chain is at risk, as demonstrated by recent events and world turmoil, and this document is designed to help company management understand the needs associated with **protecting their organization's** ability to continuously provide services to customers within Service Level Agreements (SLAs), even when vulnerabilities may cause a catastrophic problem requiring recovery plan activation and a Vulnerability Management process in place.

I am presently pursuing an “**Whole of Nation**” approach to providing a “**Secure by Design**” production environment that complies with the **Secure by Design pledge** to produce vulnerability-free components and supplying data the **Software Bill of Materials** (SBOM) needs to identify component owners for corrective action should an error condition be identified. This supports the software supply chain.



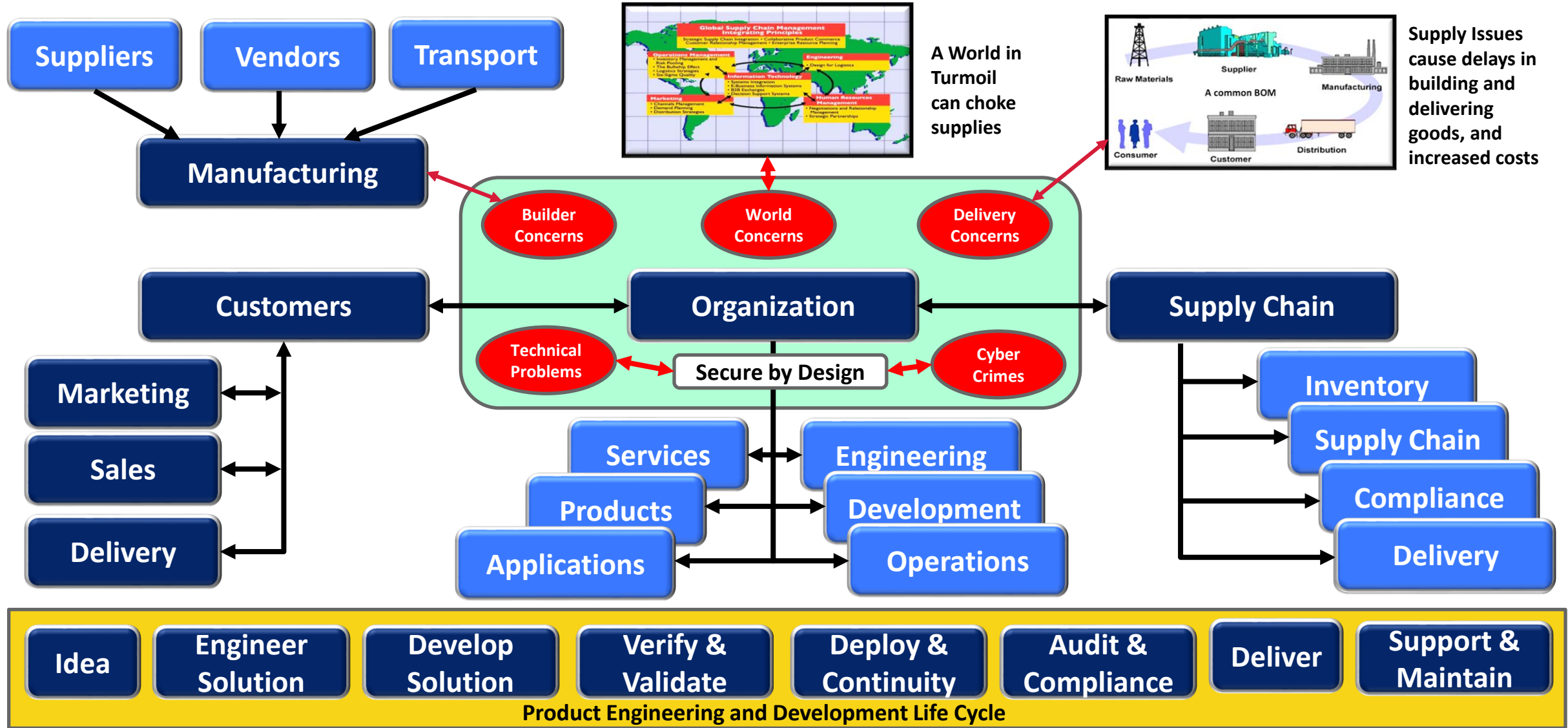
“A strong generalist with extensive IT industry experience, ready to help you”.

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1. **Rise in vulnerabilities** is largest threat to enterprises due to increased attacks by Nation-States (i.e., China, Russia, Iran, Korea, etc.) and Hackers, with costs rising every year.
2. The **rate of Vulnerabilities surpasses** the ability of most companies to fix them, leading to undue toil on staff, burnout and turnover.
3. **Vulnerability Management** must be considered to address this issue, along with the implementation of an SBOM tool to provide vulnerability-free applications for the production environment (legal requirement). **New Laws and Regulations** comply, and some require an **SBOM**.
4. **Business Continuity Management** must be enhanced to support Service Level Agreements and a company's ability to continue to supply services and products.
5. **The ability to develop** an idea to a concept that can be engineered, developed, and deployed to production as **vulnerability-free** must be defined and supported via "**Whole of Nation**" and "**Secure by Design**" guidelines provided by **DHS/CISA** for best performance and security.

Protecting Organizations is more difficult than ever

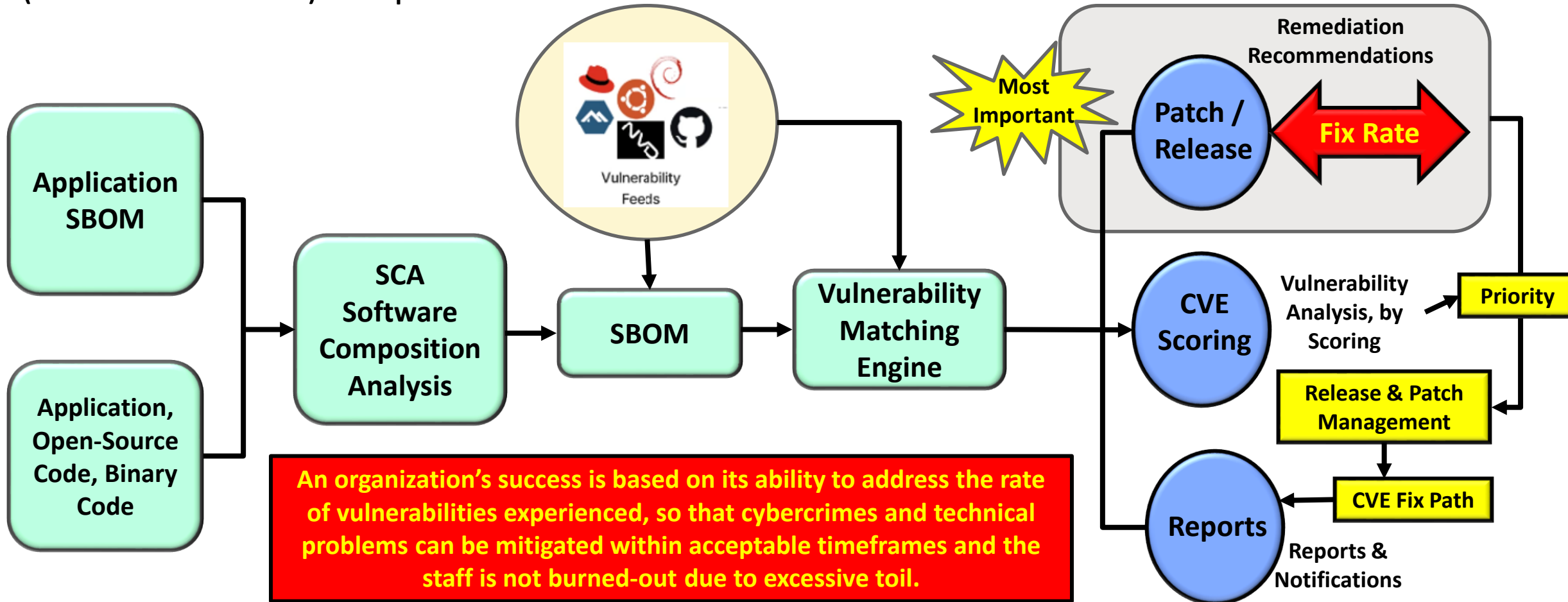
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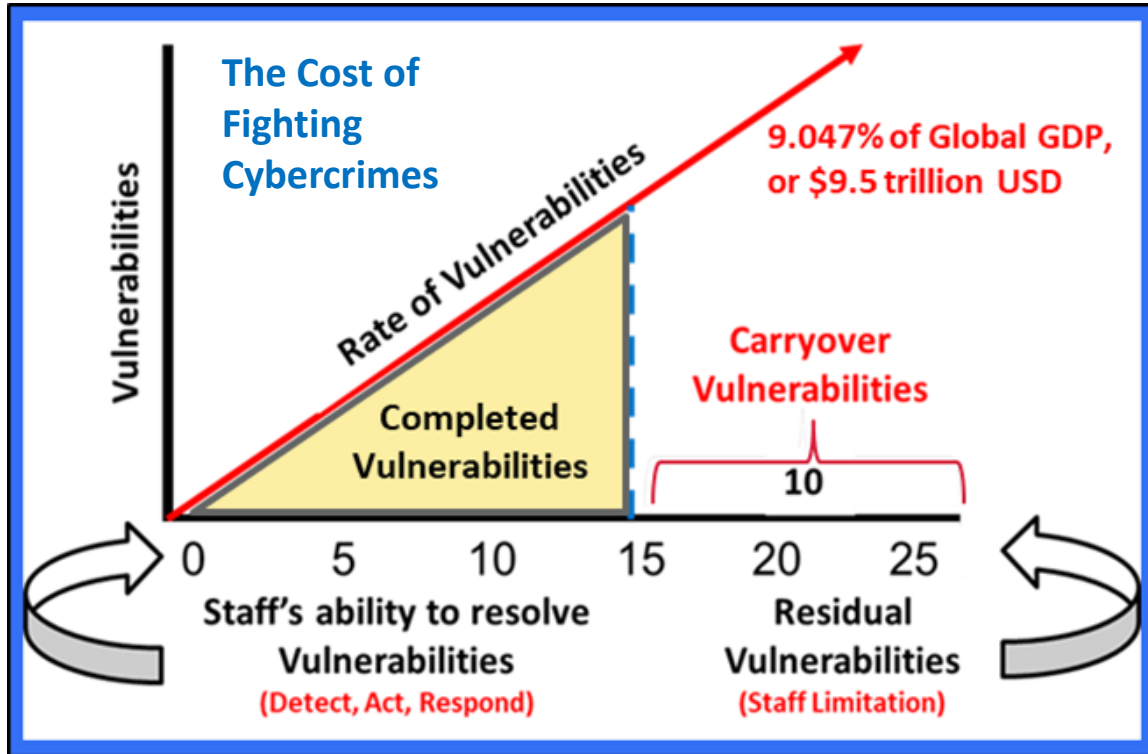
Identifying and Reporting Vulnerabilities

Vulnerabilities are identified within Applications, or existing Application SBOMs (Software Bill of Material) and reported.

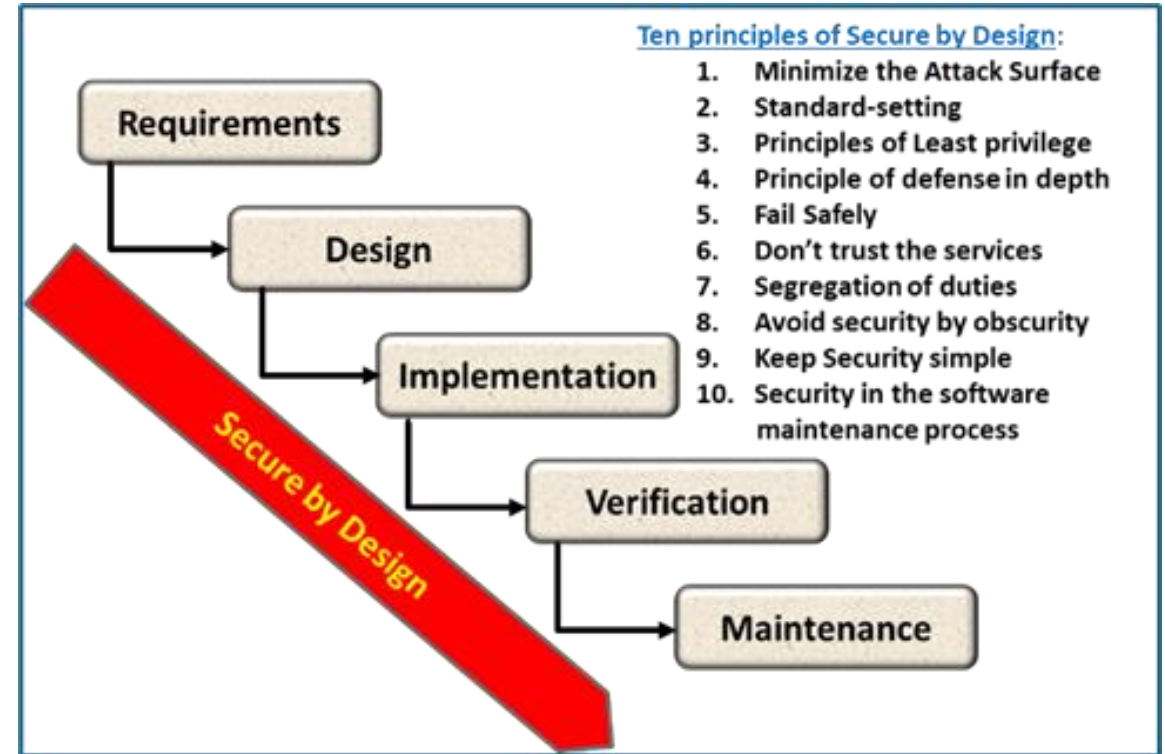
The Fix Rate associated with vulnerability repairs (Patch or New Release) should be equal to or higher than the rate of Vulnerability detection.



Fighting Vulnerabilities and Secure by Design



The **cost of fighting cybercrimes** and technology threats is estimated at \$9.5 Trillion and 9.04 % of Global GDP. Improving the vulnerability fix rate will greatly reduce costs and improve business service continuity and resilience.



The government has developed a **“Whole of Nation”** approach to combat these costs through the **“Secure by Design”** methodology developed by DHS/CISA to safeguard Government, Business, Infrastructure, and Utilities from cybercrimes and technology threats.

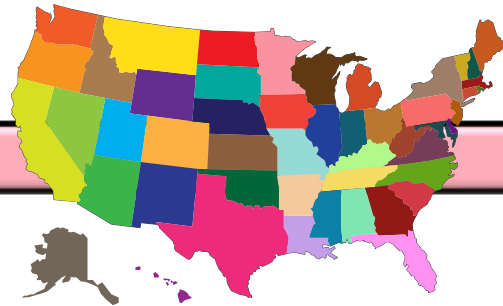
A Whole of World approach to Cybersecurity

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Whole of World Approach



Whole of Nation Approach



Department of Homeland Security



Cybersecurity Infrastructure Security Agency



CISA
CYBER+INFRASTRUCTURE

2030 Most Significant Cyber Concerns:

1. Supply Chain Compromises
2. Advanced disinformation campaigns
3. Rise of Digital Surveillance
4. Human error and legacy systems
5. Targeted Attacks
6. Lack of analysis and controls
7. Rise of advanced hybrid attacks
8. Skill shortage
9. Cross-border ICT suppliers as a single-point-of-failure
10. Artificial Intelligence abuse

Vulnerability Management Process:

1. Detect Vulnerability (SBOM)
2. Assess the Risk (CVE)
3. Prioritize Remediation (CVSS, KVE, EPSS)
4. Confirm Remediation
5. Optimize through automation
6. Advance the use of BOMs for Software, Release Control, and Artificial Intelligence

DHS/CISA - Secure by Design principles:

1. Build security considerations into the [software requirements specification](#)
2. Address possible abuse cases (e.g., how users may misuse the software).
3. Create and enforce secure code guidelines.
4. Use appropriate security tools.
5. Conduct security audits at multiple [stages of the SDLC](#).
6. Conduct vulnerability testing that includes negative testing and penetration testing.
7. Incorporate security within deployment and maintenance processes.
8. Ensure reused software is from trusted sources and properly evaluated.
9. Provide feedback throughout the process on security effectiveness.
10. Educate developers and QA teams on [secure coding techniques](#).

Business Resilience Definition and Plan of Action

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Business resilience refers to an organization's ability to adapt, recover, and thrive in the face of disruptions or unexpected changes that could impact its operations, people, assets, brand, or reputation. [It positions organizations to prepare for anything that might come their way¹](#).

Here's a plan on how to achieve business resilience within a major organization:

1. Risk Assessment and Identification:

1. Conduct a comprehensive risk assessment to identify potential threats and vulnerabilities. Consider both internal (e.g., supply chain disruptions, cyber attacks) and external (e.g., natural disasters, economic downturns) risks.
2. Engage stakeholders from various departments to ensure a holistic view of risks.

2. Business Continuity Planning:

1. Develop a robust business continuity plan (BCP) that outlines procedures for maintaining essential functions during disruptions.
2. Define roles, responsibilities, and communication channels during crises.
3. Regularly review and update the BCP to align with changing circumstances.

3. Diversify Supply Chains:

1. Relying on a single supplier or geographic region can be risky. Diversify suppliers and build redundancy.
2. Establish alternative sourcing options to mitigate supply chain disruptions.

4. Invest in IT Infrastructure and Security:

1. Strengthen IT systems and cybersecurity protocols.
2. Implement data backup and recovery mechanisms.
3. Train employees on security best practices.

5. Establish Strategic Direction and select supportive tools

1. Recovery Management Tool

² Awareness and training

12/13/2024

6. Employee Safety and Well-being:

1. Prioritize employee safety during disruptions.
2. Establish protocols for tracking remote and onsite workers' health and availability.
3. Provide mental health support and resources.

7. Scenario Testing and Drills:

1. Regularly conduct scenario-based testing and drills to validate the effectiveness of your resilience strategies.
2. Simulate disruptions and evaluate the organization's response.

8. Agility and Adaptability:

1. Foster an organizational culture that embraces change and agility.
2. Encourage cross-functional collaboration and innovation.
3. Be prepared to pivot swiftly when necessary.

9. Communication and Stakeholder Engagement:

1. Maintain transparent communication with employees, customers, suppliers, and other stakeholders.
2. Establish crisis communication protocols.
3. Address concerns promptly and proactively.

10. Learn from Past Disruptions:

1. Analyze previous disruptions and learn from them.
2. Identify areas for improvement and implement corrective actions.

11. Leadership Commitment:

1. Ensure that senior leadership actively supports and champions business resilience initiatives.
2. Allocate resources and budget for resilience planning and implementation.

Remember that business resilience is an ongoing process. [Regularly assess, adapt, and refine your strategies to stay prepared for the unexpected¹²³](#). 🌟

Getting started with facts and defined direction

Know your company:

1. Most Important Applications & Services (**Family Jewels**).
2. BIA to Define the damage caused if lost and maximum duration of survival without the application or service.
3. Define Requirements, Scope, Risk, Security, DevSecOps, Testing, Recovery, Acceptance, Deployment, and ITSM, ITOM.
4. Define Audit Universe implement legal & auditing functions.
5. Define Ideation, Brainstorming, Collaboration, to Concept cycle.
6. Implement Systems Engineering Life Cycle (SELC) to respond to new ideas or business opportunities.
7. Implement Systems Development Life Cycle (SDLC) to deploy new products and services.
8. Define Company Organization to respond to cybersecurity and technology problems in a timely manner to the appropriate authorities (i.e., [SEC Rule 2023-139](#))

Set you direction:

1. Most efficient, compliant, and secure production environment, capable of recovering from disaster events and providing continuous vulnerability-free products and services to customers. **Continuity of Succession / Delegation of Authority** must be included along with definition of duties.
2. Integrate guidelines, standard Operating Procedures, skill development, and awareness throughout the organization.

Know your Environment:

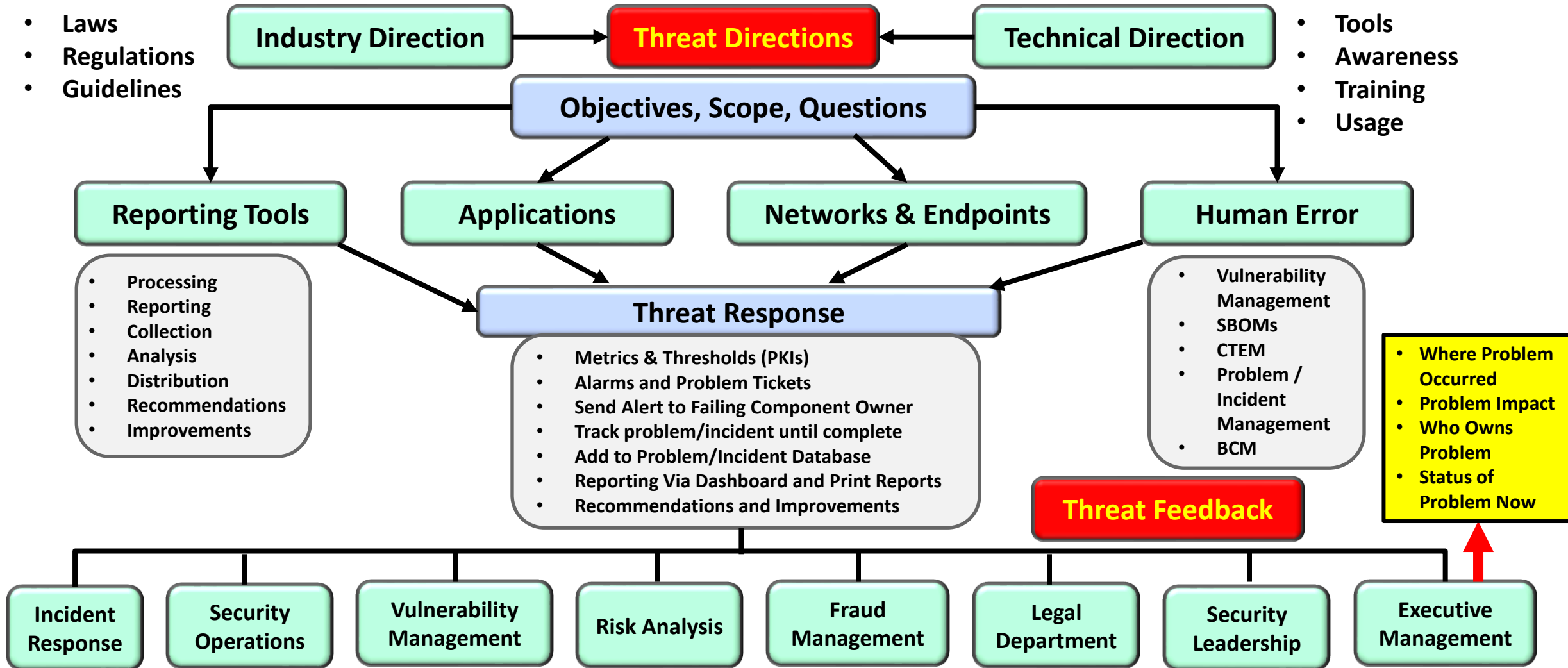
1. Physical and Data Security (Data Sensitivity & Data Flow).
2. Architecture and engineering process.
3. Asset Inventory and Configuration Management.
4. Identify and Access Management.
5. GRC based compliance and attestation, CIA based cybersecurity and elimination of viruses and malware.
6. Development and implementation of DevSecOps.
7. Personnel Titles, Job Functions and Responsibilities, and the integration of sensitive and required services within their everyday work tasks.
8. Staff training and development.
9. Continuous Monitoring and Improvement, along with the adoption of new technologies and processes (i.e., SRE).
10. Deploying error-free products and services (see [EO 14028](#) and [OBM M-22-18](#)) and utilize the latest technologies to respond to encountered anomalies and verify compliance.

Addressing Threats

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- Laws
- Regulations
- Guidelines

- Tools
- Awareness
- Training
- Usage



Know and Control your Environment



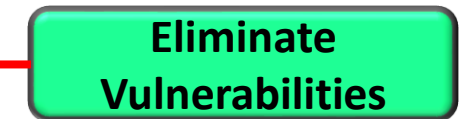
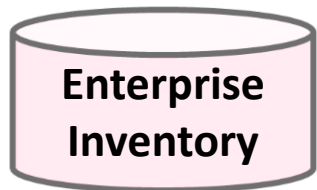
- **HWAM**
- **SWAM**
- **Technology Management**
- **Release Management**
- **Patch Management**
- **End-of-life**

- Facilities, or Locations
- Configuration of equipment
- Services and Applications
- COOP
- Location Recovery

- **Acquisition** - Order through Delivery
- **Install** and Test
- **Turnover** to User
- **Redeploy** as needed
- **Terminate** within laws and regulations

- **Components** via SBOM RBOM, or AIBOM
- **Identify Countries** parts origin
- Adhere to Laws and **country restrictions**
- Identify Vulnerabilities
- License Management

- **Identify** Vulnerabilities prior to production
- **Apply** Patches and Update Releases
- **Validate** mitigations
- **Vulnerability-free** production
- **CTEM** after Production

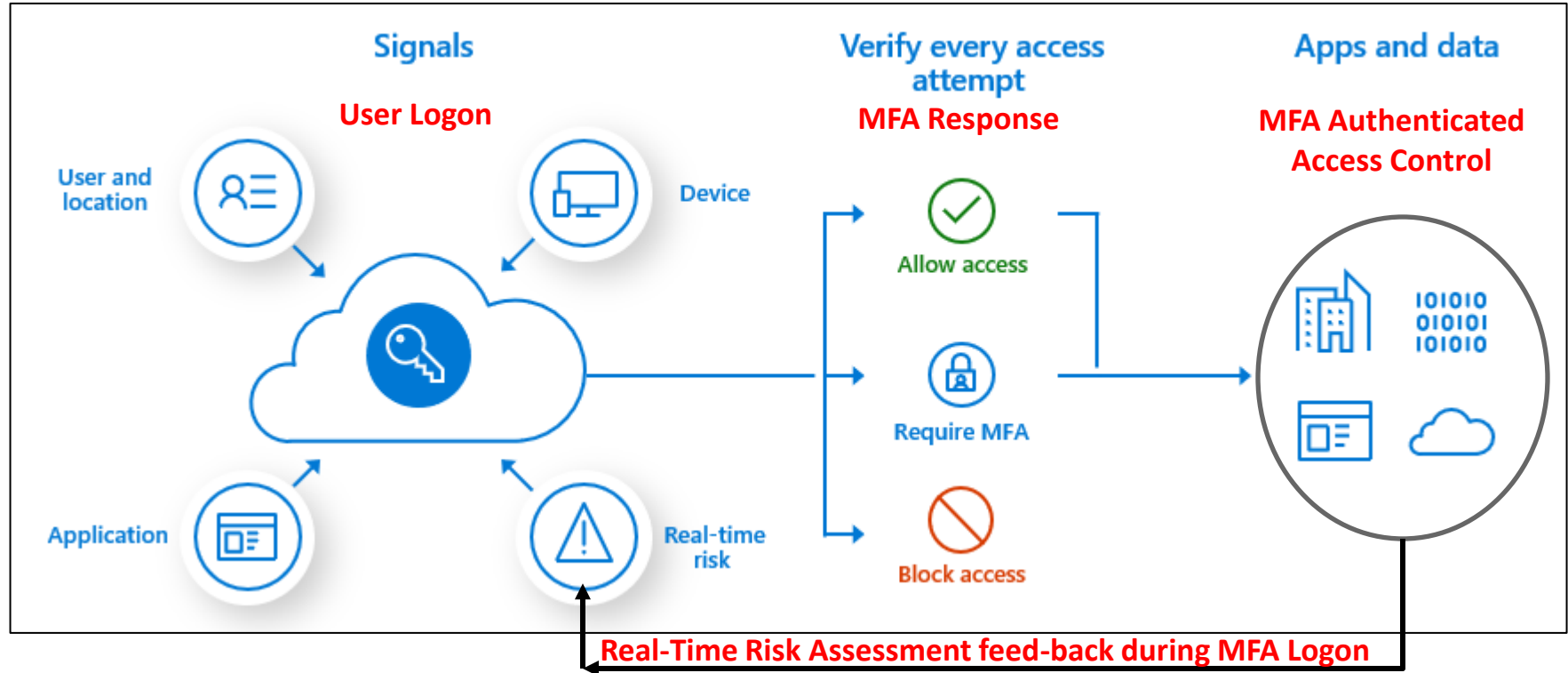


Requiring a Safer Login Process with MFA

MFA – Multi-Factor Authentication

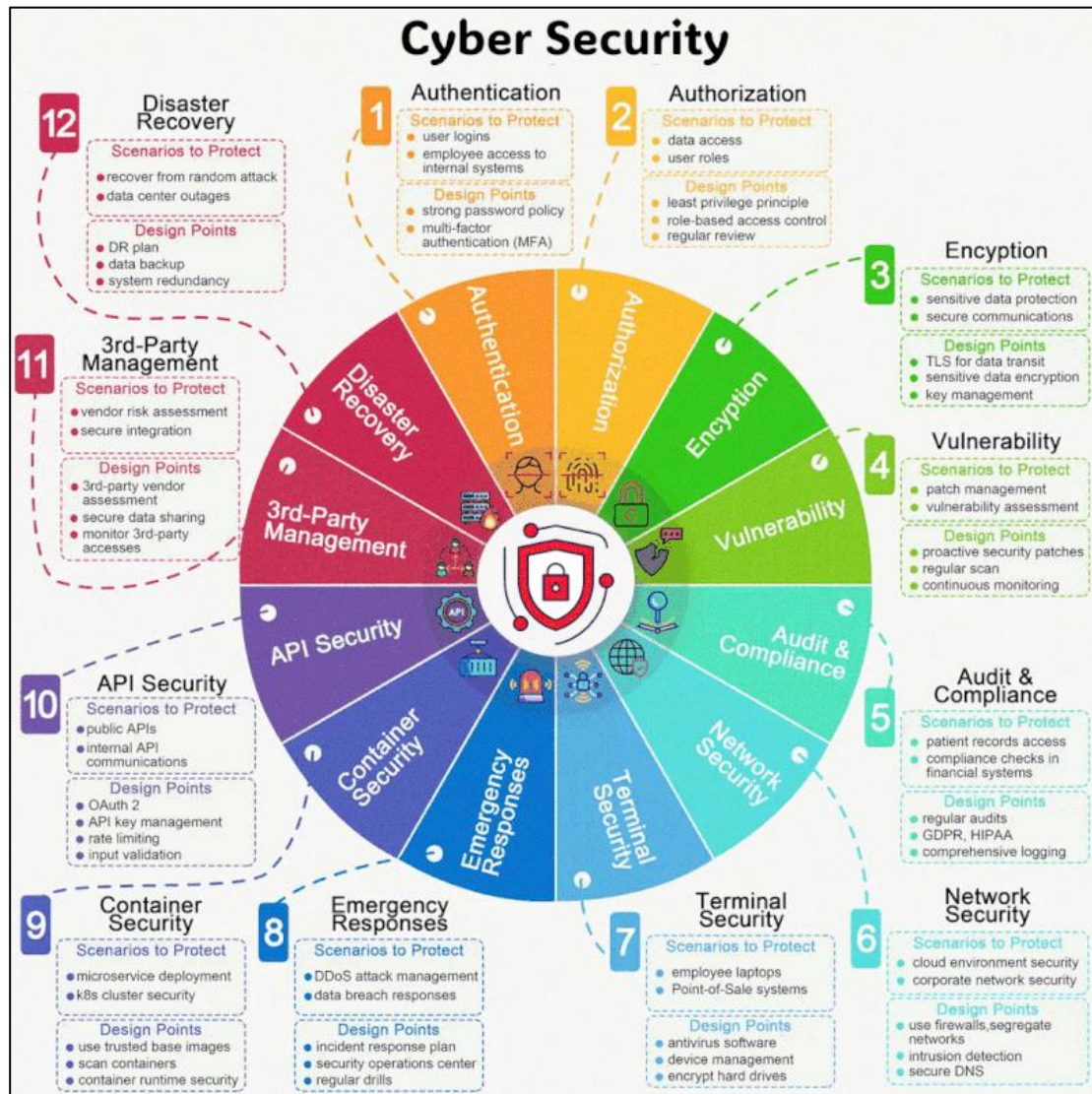
MFA Process example:

- User Logs On
- MFA requests Phone # verification
- MFA sends Code to Phone
- User enters code for verification
- MFA authorizes or rejects access based on matching code and component (i.e., phone, or IP address).



The recommended way to enable and use Microsoft Entra multifactor authentication is with Conditional Access policies. Conditional Access lets you create and define policies that react to sign-in events and that request additional actions before a user is granted access to an application or service.

Cyber Security and Continuity of Service



See [Link](#) for more detailed information.

Steps needed to protect enterprise and maintain business services:

- 1. Authentication** - Identity Management,
- 2. Authorization** – IAM, RBAC, ABAC, MFA, ZTA,
- 3. Encryption** – Hashing, Key Management,
- 4. Vulnerability** – CVE, CVSS, KVE, EPSS, SBOM, RBOM, AIBOM, Patches, New Release Management
- 5. Audit & Compliance** - eliminate risk through controls
- 6. Network Security**, Audit universe, Cross-Walks, Audit Scripts, Artefacts, Reports, Improved Controls,
- 7. Terminal Security**, IP Addresses, VPN
- 8. Emergency Response**, COOP,
- 9. Container Security** – Kubernetes, Docker, etc.
- 10. API Security** – and Open-Source Modules
- 11. 3rd-Party Security**, Supply Chain Management
- 12. Disaster Recovery**, Business Continuity, Personnel Safety and Violence Prevention.

Vulnerability Management definition and process

Vulnerability management is a **continuous, proactive, and often automated process** that keeps your computer systems, networks, and enterprise applications safe from cyberattacks and data breaches. As such, it is an important part of an overall security program.

Process:

- **Plan** how to use Vulnerability Management
- **Discover** where your vulnerabilities exist
 - Vulnerability-Free Production Applications
 - Continuous Scanning for new Vulnerabilities impacting production applications via Continuous Threat Exploitation Management (CTEM)
- **Scan** applications with SBOMs (Software Bill of Materials)
- **Report** vulnerabilities, their symptoms, and mitigations via patches and new releases
- **Deploy** patches and new releases to mitigate vulnerabilities

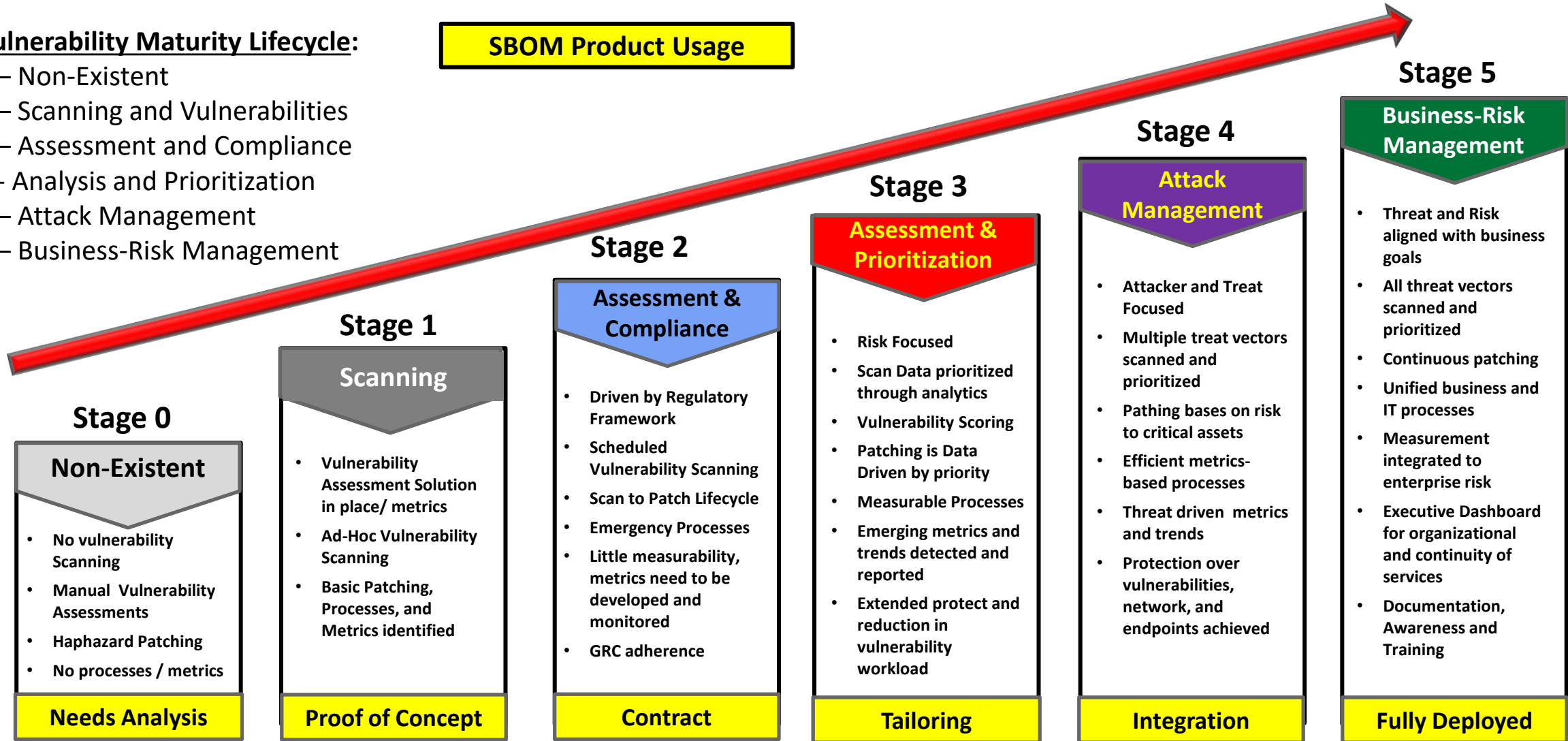


Vulnerability Management Maturity Lifecycle

SBOM Product Usage

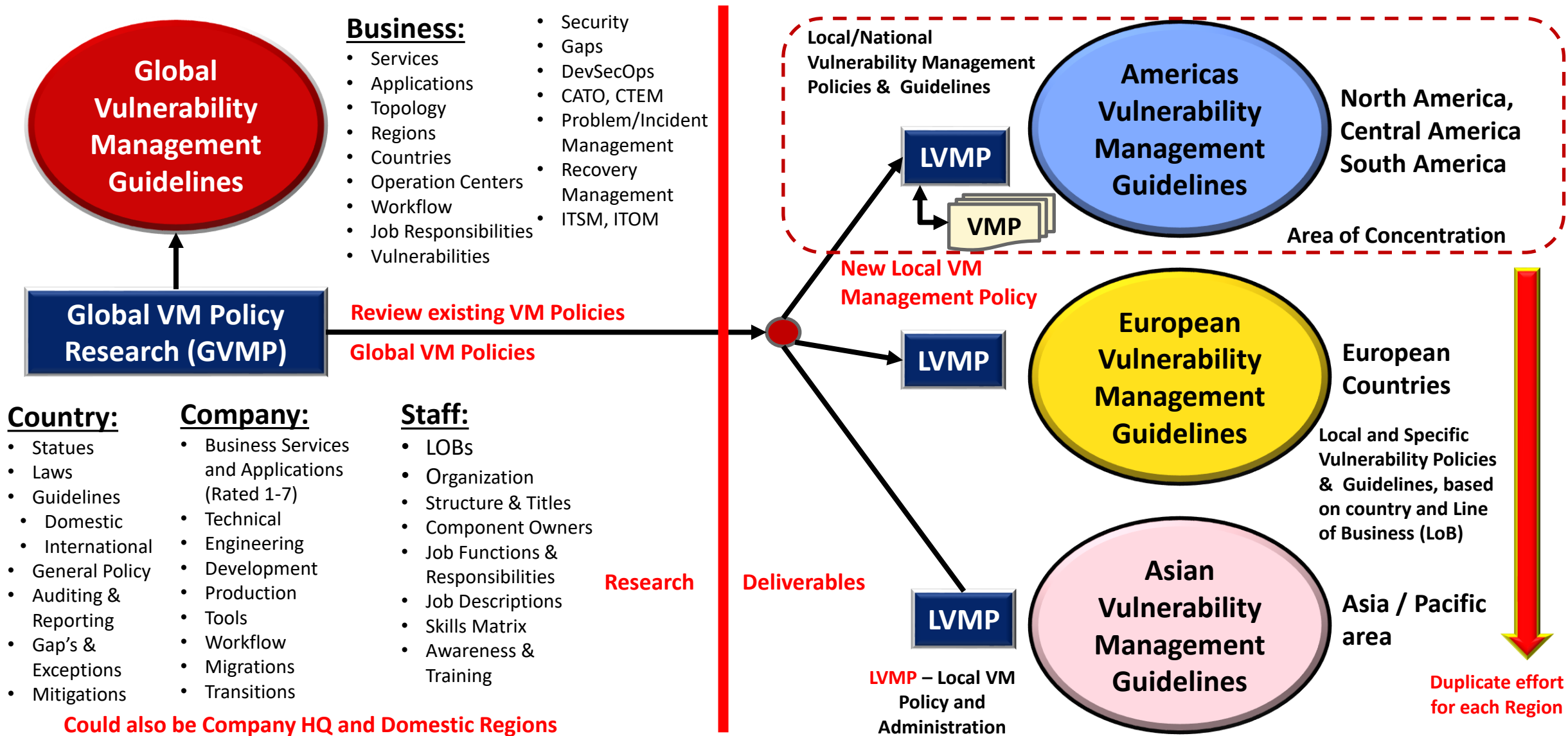
Vulnerability Maturity Lifecycle:

- 0 – Non-Existent
- 1 – Scanning and Vulnerabilities
- 2 – Assessment and Compliance
- 3 - Analysis and Prioritization
- 4 – Attack Management
- 5 – Business-Risk Management



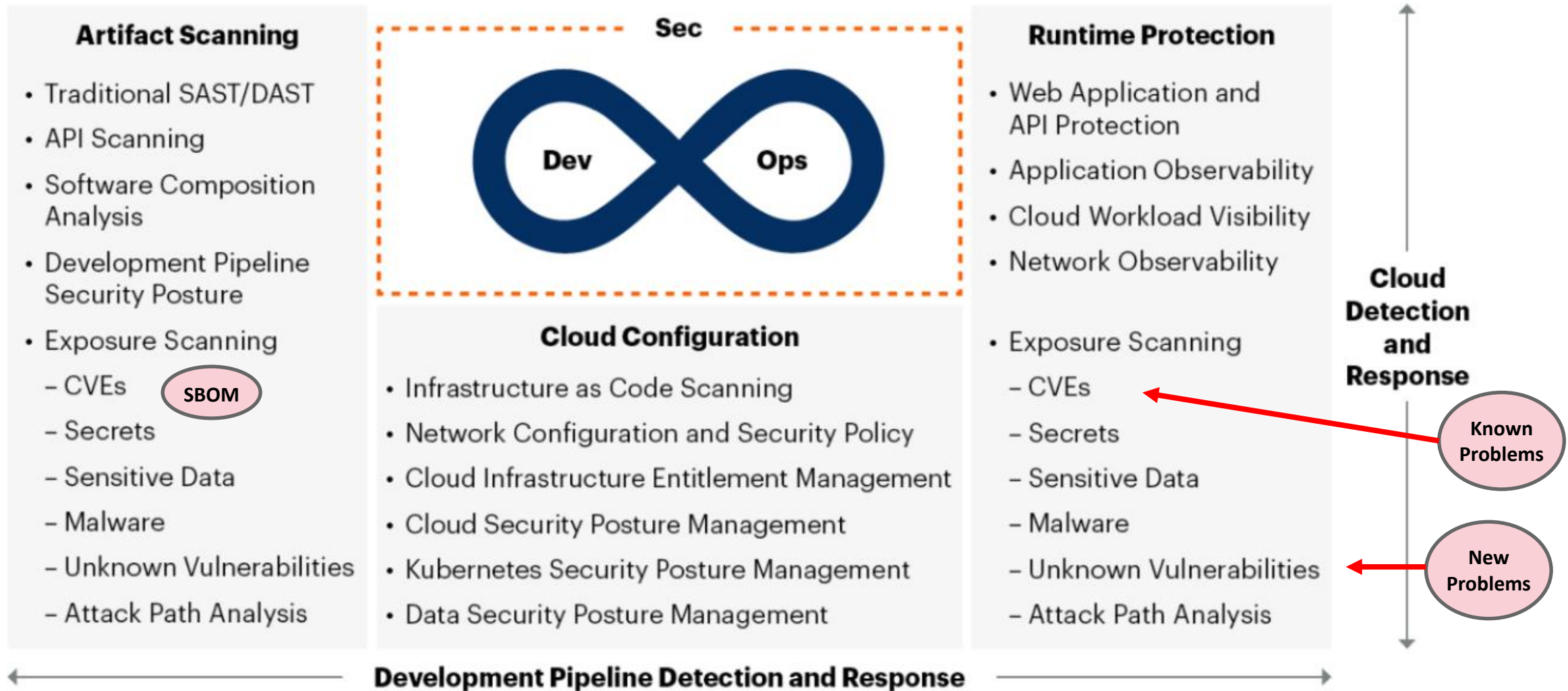
Global Vulnerability Management Policy generation

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Cloud Native Application Protection Platform (CNAPP)

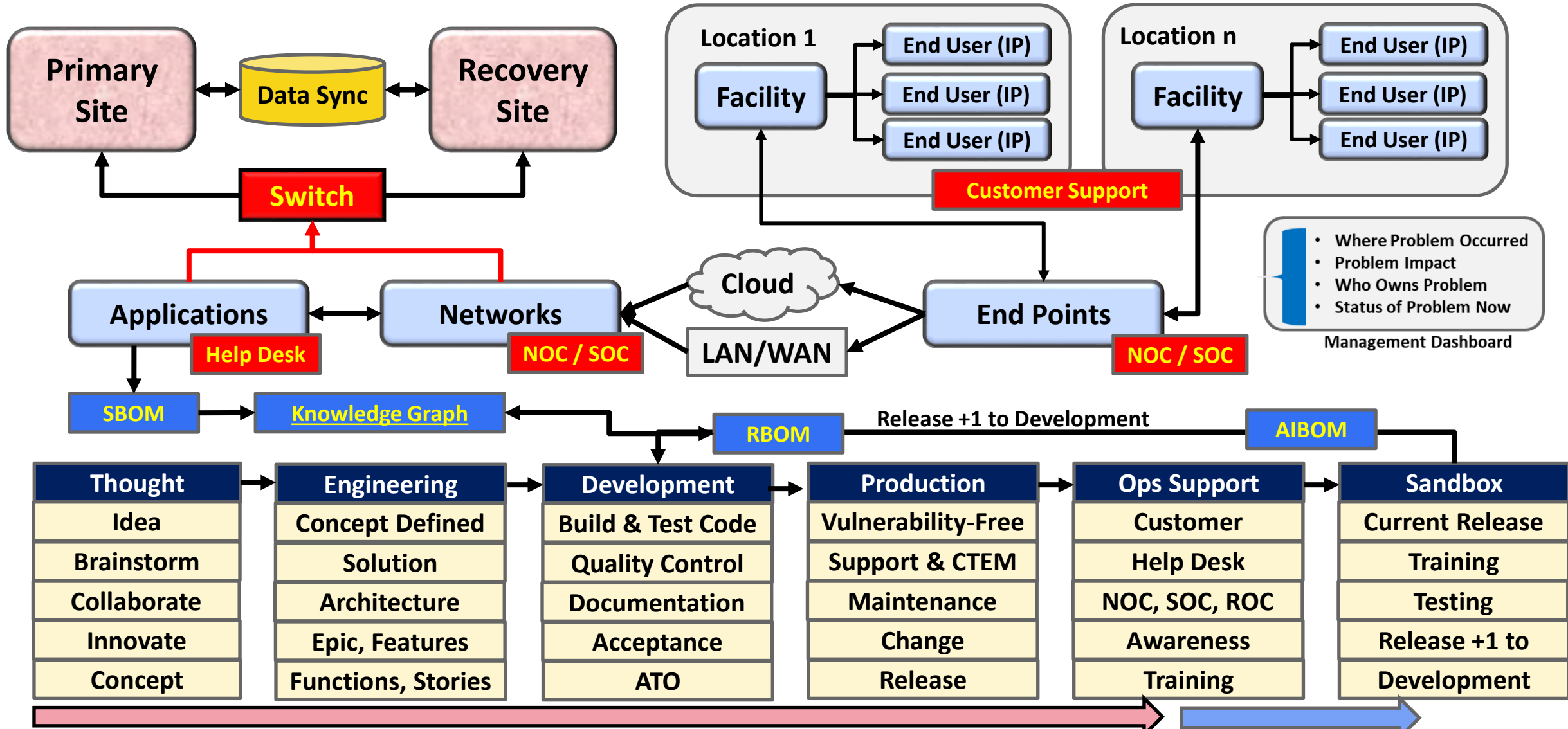
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CVEs = common vulnerabilities and exposures

From Idea to Product, with Support and Recovery

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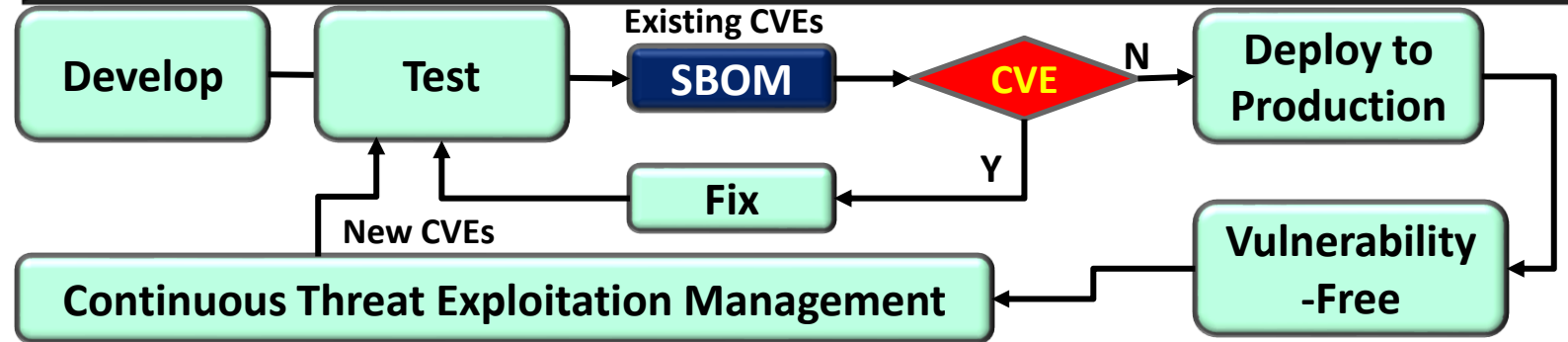
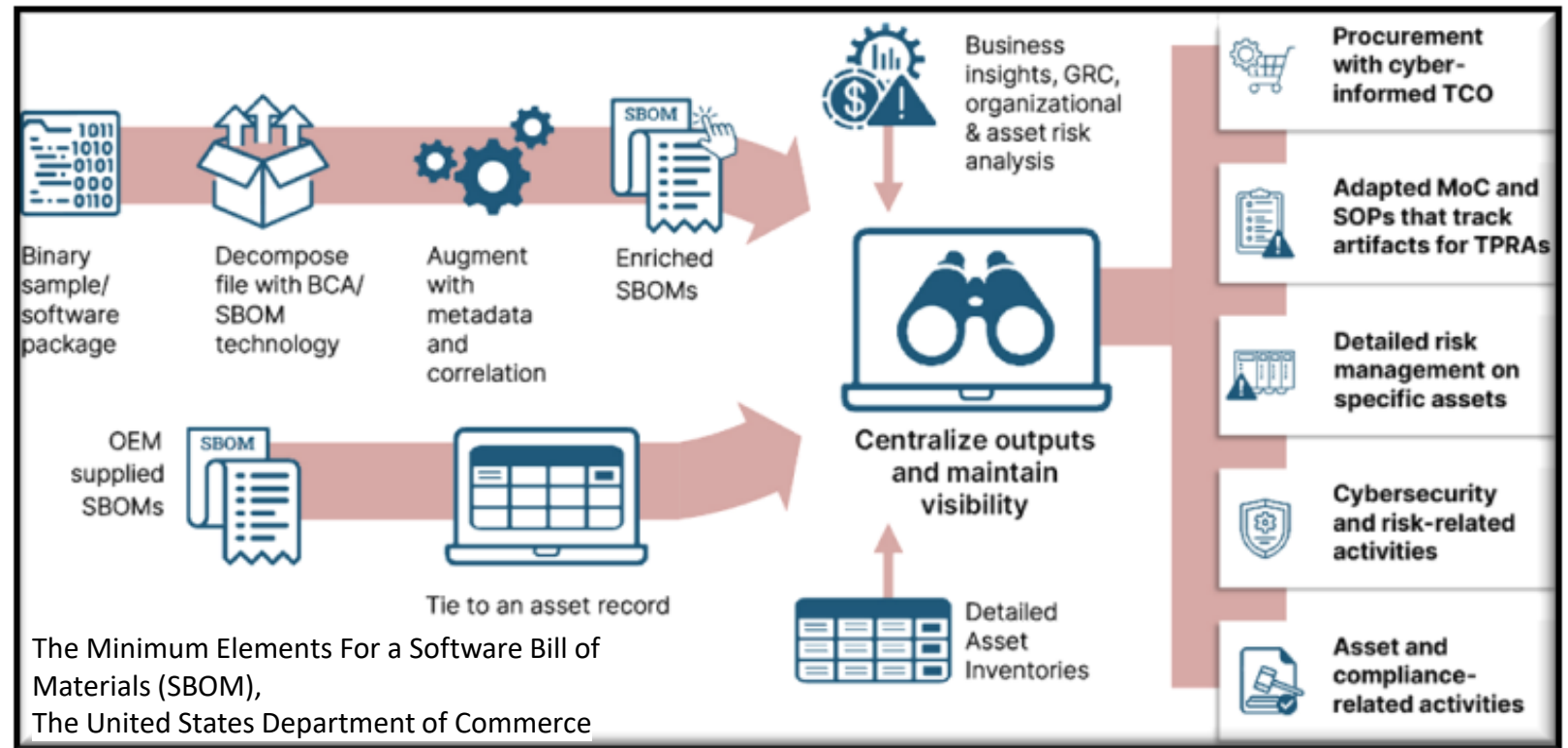
What is an SBOM and how does it work

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Software Bill of Materials (SBOMs) are used to validate program components used to create applications by scanning the application code and identifying program components (Open-Source Code, Vendor Code, and other Binary software products).

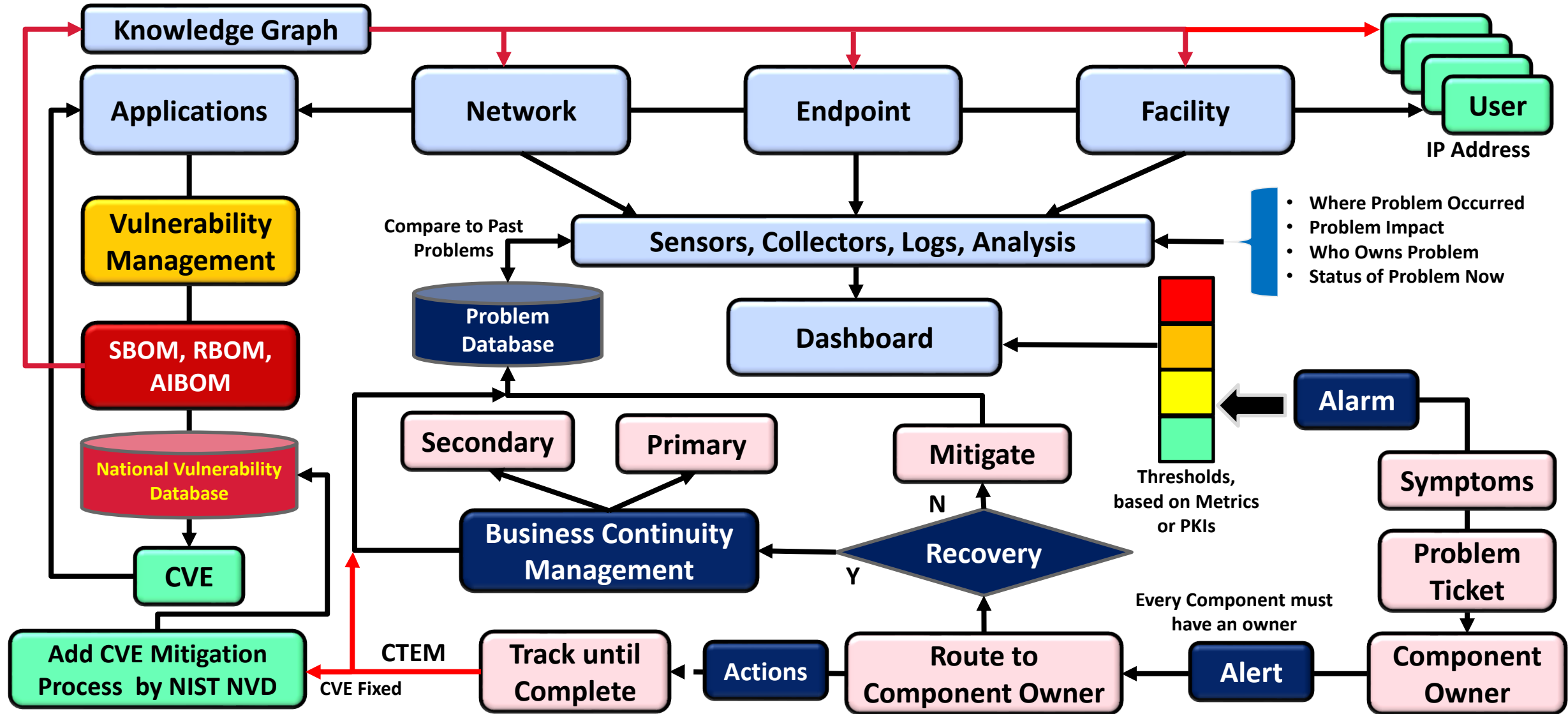
It then searches public vulnerability data bases to determine if active vulnerabilities are associated with the program product and any recommending changes that should be made prior to the product being introduced to the production environment (Patches, New Releases, etc.).

Integrating SBOMs within the testing environment will reduce your exposures to vulnerabilities and malware, so It is highly recommended and, in some cases, mandatory to adhere to laws (FDA, EO 14028, etc.).



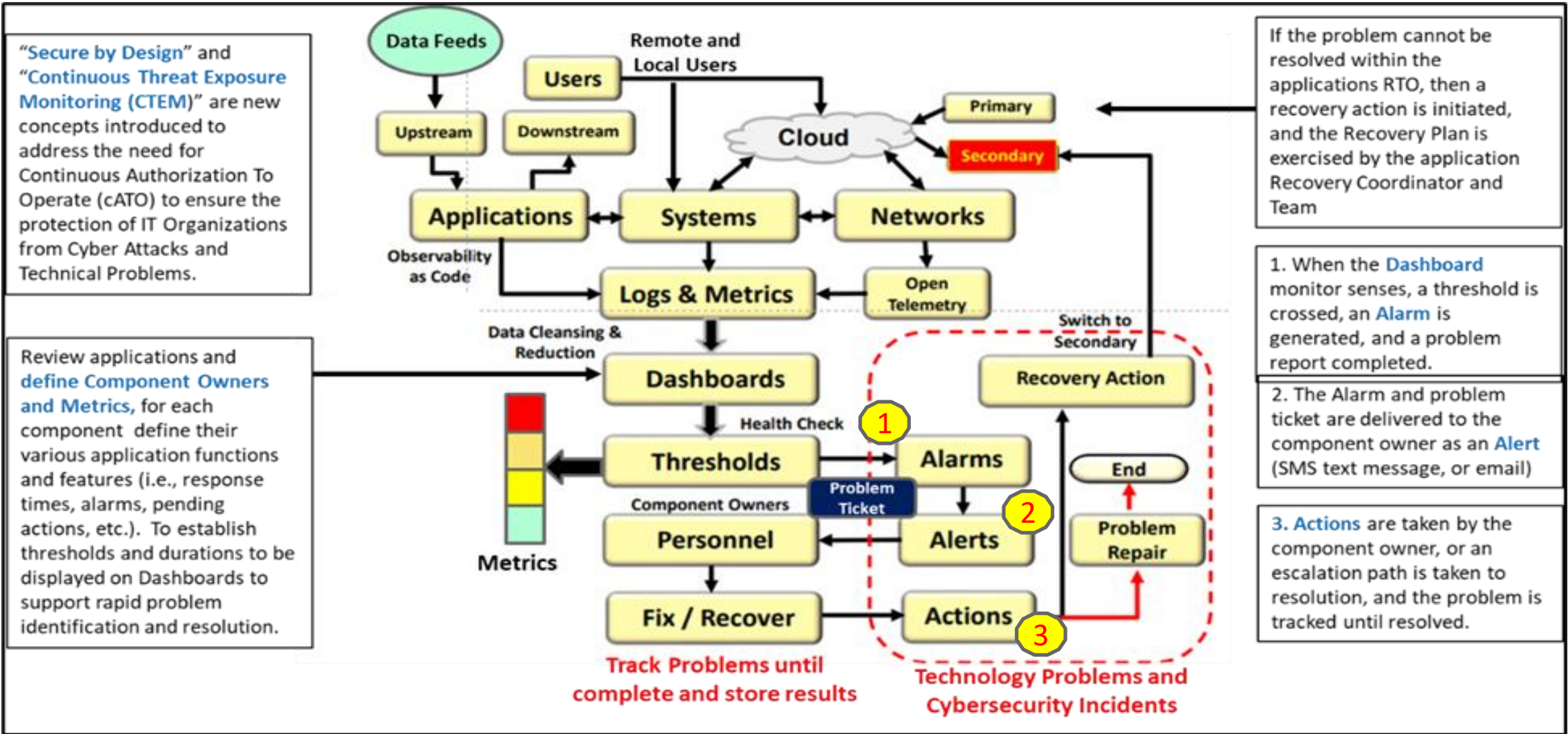
Tracking Problems through a Dashboard

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Problem / Incident recognition, reporting, and resolving

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If the problem cannot be resolved within the applications RTO, then a recovery action is initiated, and the Recovery Plan is exercised by the application Recovery Coordinator and Team

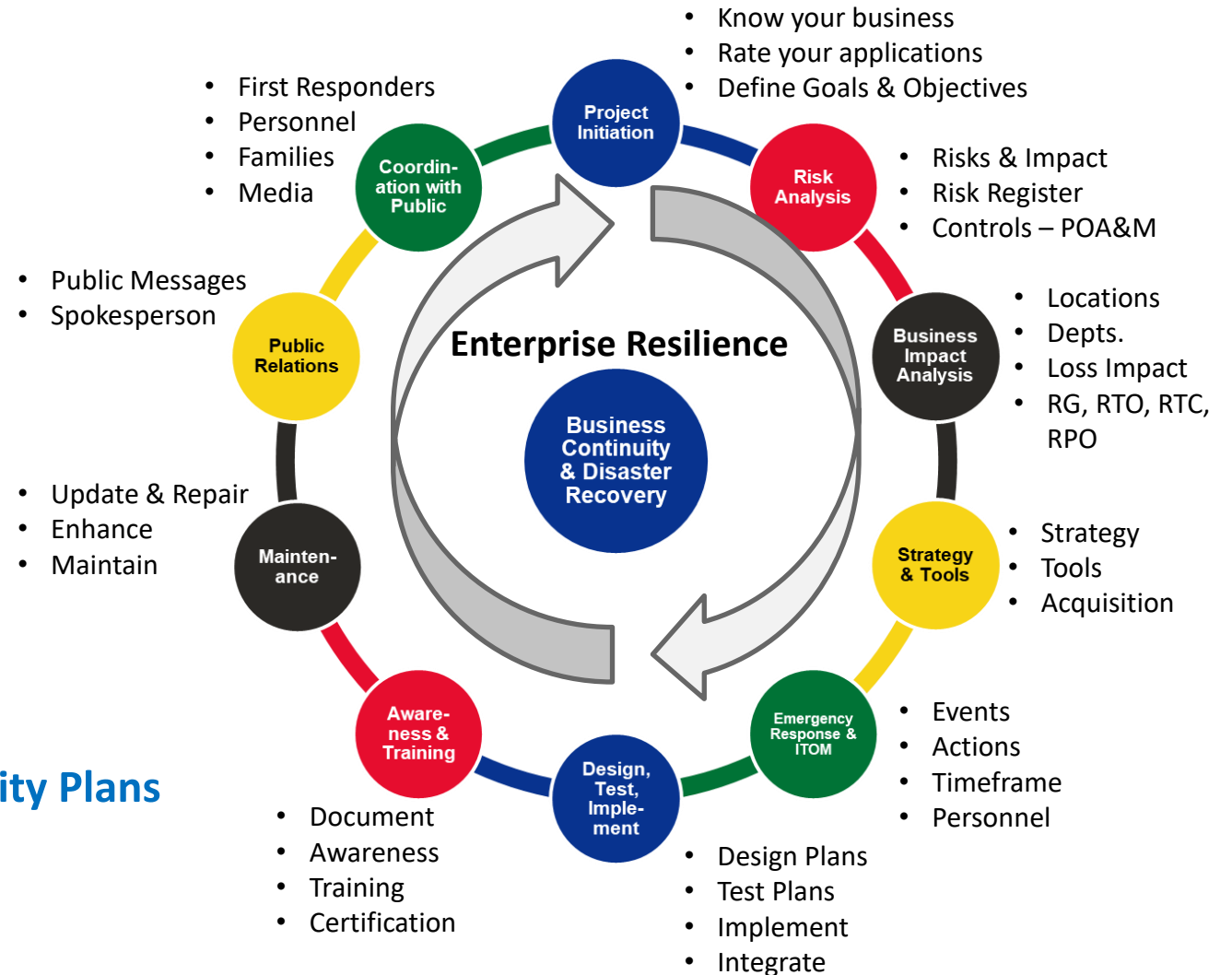
1. When the **Dashboard** monitor senses, a threshold is crossed, an **Alarm** is generated, and a problem report completed.

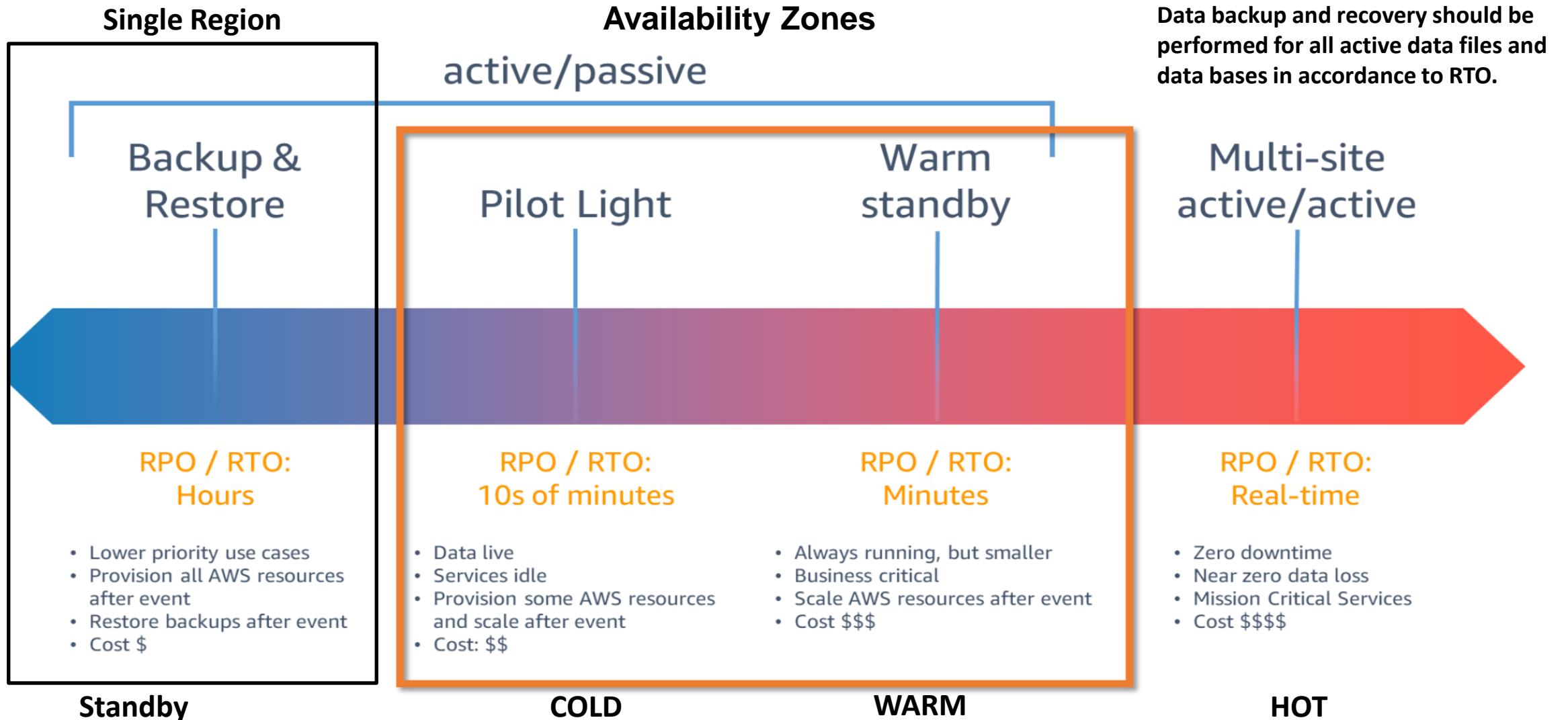
2. The Alarm and problem ticket are delivered to the component owner as an **Alert** (SMS text message, or email)

3. **Actions** are taken by the component owner, or an escalation path is taken to resolution, and the problem is tracked until resolved.

Ten Step Process to establish BCM/DR Practice

1. Project Initiation and Management
2. Risk Evaluation and Controls Improvement
3. Business Impact Analysis
4. Developing Business Continuity Strategies
5. Emergency Response and Operations
Restoration (Backup, Vaulting, Restoration)
6. Designing and Implementing Business
Continuity Plans
7. Awareness and Training
8. Maintaining and Exercising Business Continuity Plans
9. Public Relations and Crisis Communications
10. Coordinating with Public Authorities





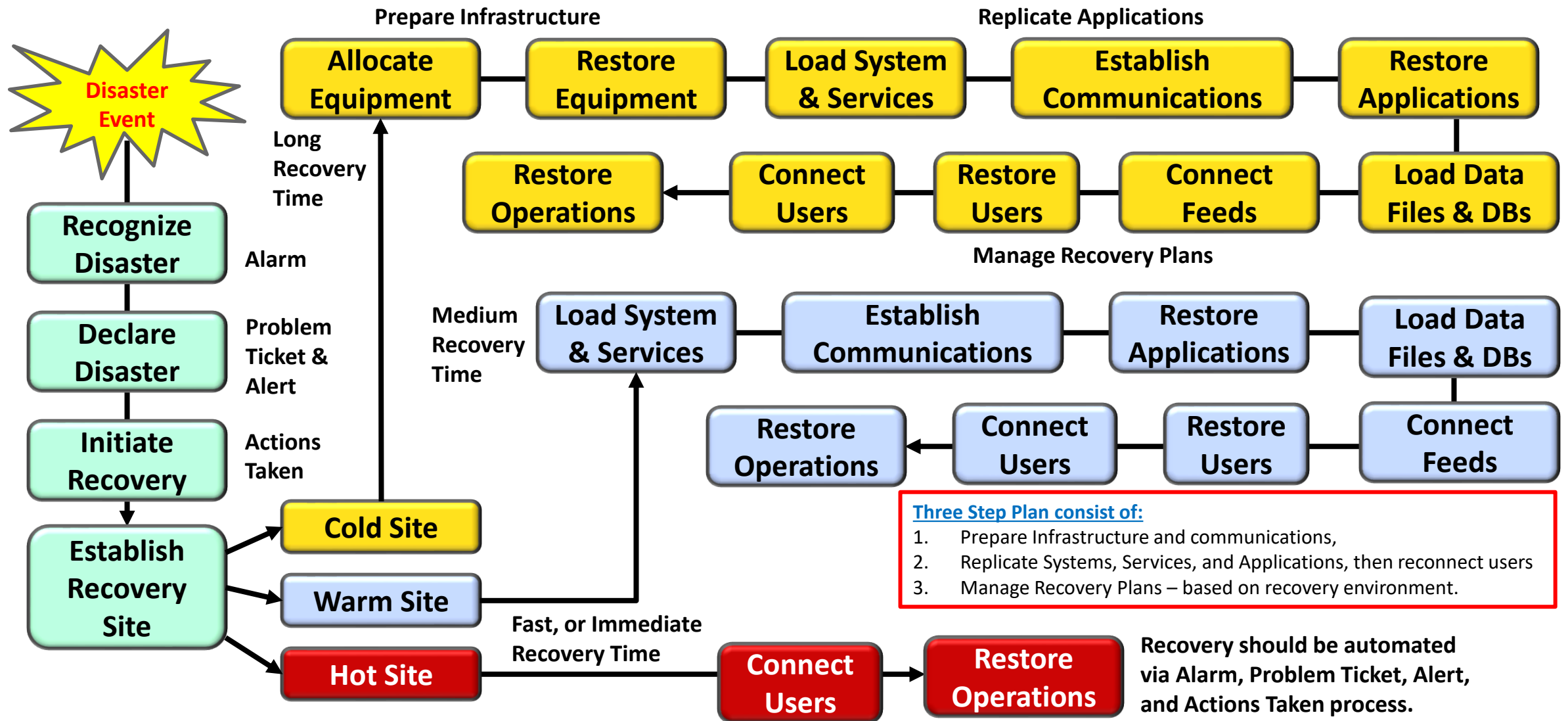
Resilience Patterns and Recovery Groups

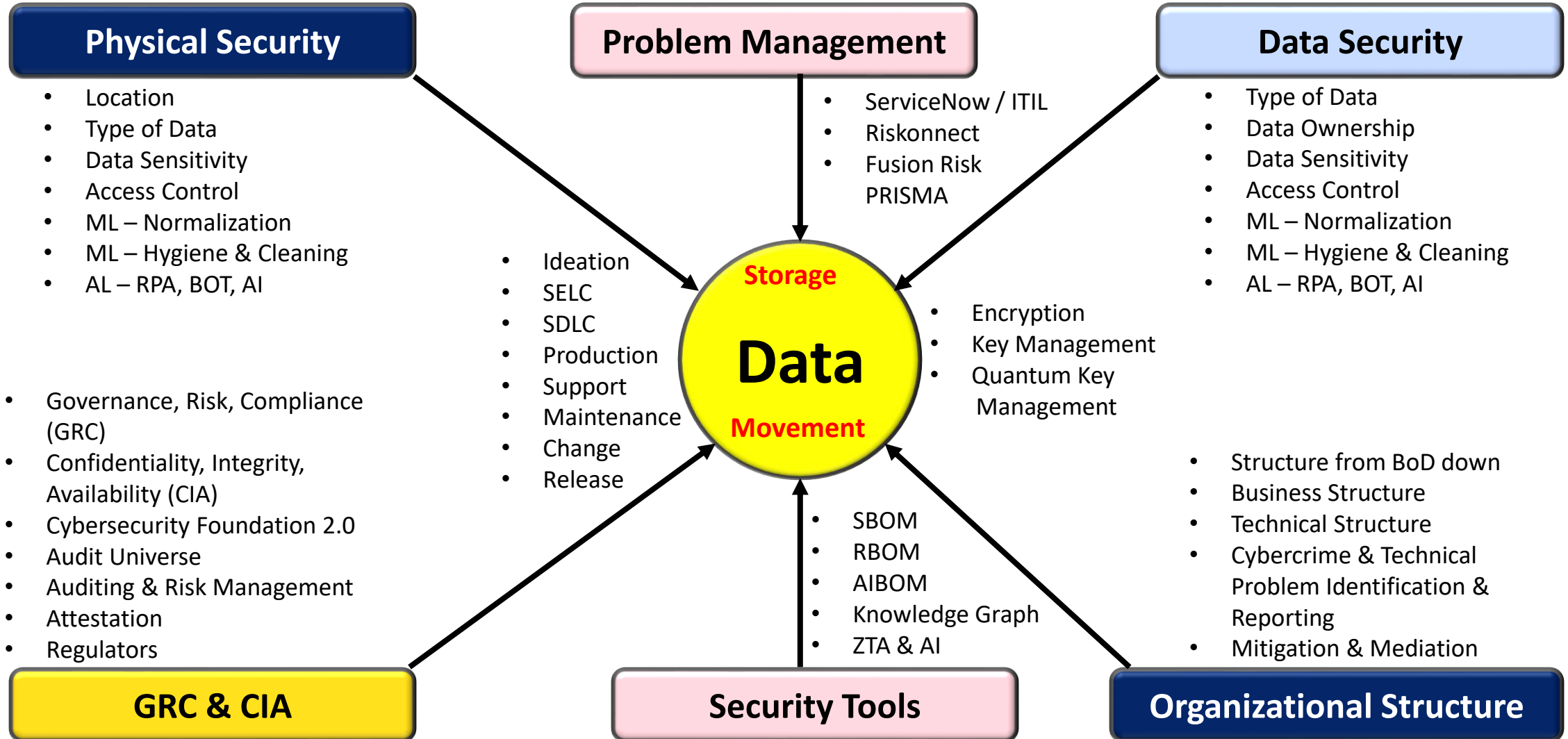
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Resiliency Patterns	Single Region	Multiple Regions		
	In-Region	Active Standby (Pilot Light)	Active-Passive (Warm Standby)	Active-Active (Multi-Site)
Pattern Profile	<ol style="list-style-type: none"> 1. TRANSACTIONAL TRAFFIC - handled by primary region only 2. No multi-region INFRASTRUCTURE 3. APPLICATION code only available in single region 4. Multi-region RECOVERY not supported 	<ol style="list-style-type: none"> 1. TRANSACTIONAL TRAFFIC - handled by primary region only 2. INFRASTRUCTURE available on stand-by 3. APPLICATION provisioned, but in shutdown state 	<ol style="list-style-type: none"> 1. TRANSACTIONAL TRAFFIC - handled by primary region only 2. INFRASTRUCTURE available on standby 3. Minimal APPLICATION footprint running in 2nd region (all components are spun up and available with min. capacity, where application) 	<ol style="list-style-type: none"> 1. TRANSACTIONAL TRAFFIC - handled by primary region only 2. INFRASTRUCTURE always available in both regions 3. APPLICATION stack running active/active multi-region
Reserve Capacity			Required RESERVE CAPACITY	Required RESERVE CAPACITY
Cross-Region Maintenance	None	<ol style="list-style-type: none"> 1. Maintain PERSISTENT DATA REPLICATION infrastructure 2. APPLICATION CODE maintained for currency in BOTH REGIONS 3. Operate Production from stand-by region periodically 	<ol style="list-style-type: none"> 1. Maintain PERSISTENT DATA REPLICATION infrastructure 2. APPLICATION CODE maintained for currency in BOTH REGIONS 3. Operate Production from stand-by region periodically 	<ol style="list-style-type: none"> 1. Maintain 2-WAY PERSISTENT DATA REPLICATION 2. APPLICATION CODE maintained for currency in BOTH REGIONS 3. Operate Production from stand-by region periodically
Recovery Steps	<ol style="list-style-type: none"> 1. ACQUIRE INFRASTRUCTURE 2. BUILD OUT infrastructure 3. DEPLOY application 4. RECOVER / RECREATE DATA 5. REDIRECT TRAFFIC to region 2 	<ol style="list-style-type: none"> 1. SCALE INFRASTRUCTURE 2. STARTUP application 3. FAILOVER TRAFFIC 	<ol style="list-style-type: none"> 1. AUTO- SCALE INFRASTRUCTURE 2. FAILOVER TRAFFIC 	<ol style="list-style-type: none"> 1. RECOVERY achieved through automated redirect of traffic
Recovery Group (RG)	RG7	RG 4-6	REG 1-3	RG 0
Recovery Time Design (RTD)	Days+	Hours (<8 hrs)	Minutes (<15 mins)	Real-Time (<5mins)
Recovery Point Design (RPCD)	Hours (<8 Hrs)	Minutes (<15 mins)	Minutes (<15 mins)	Real-Time (< 0 mins)
Cloud Based Recovery Group Specifications	Preferred Patterns			

Sequence of Events to enact a Recovery Operation

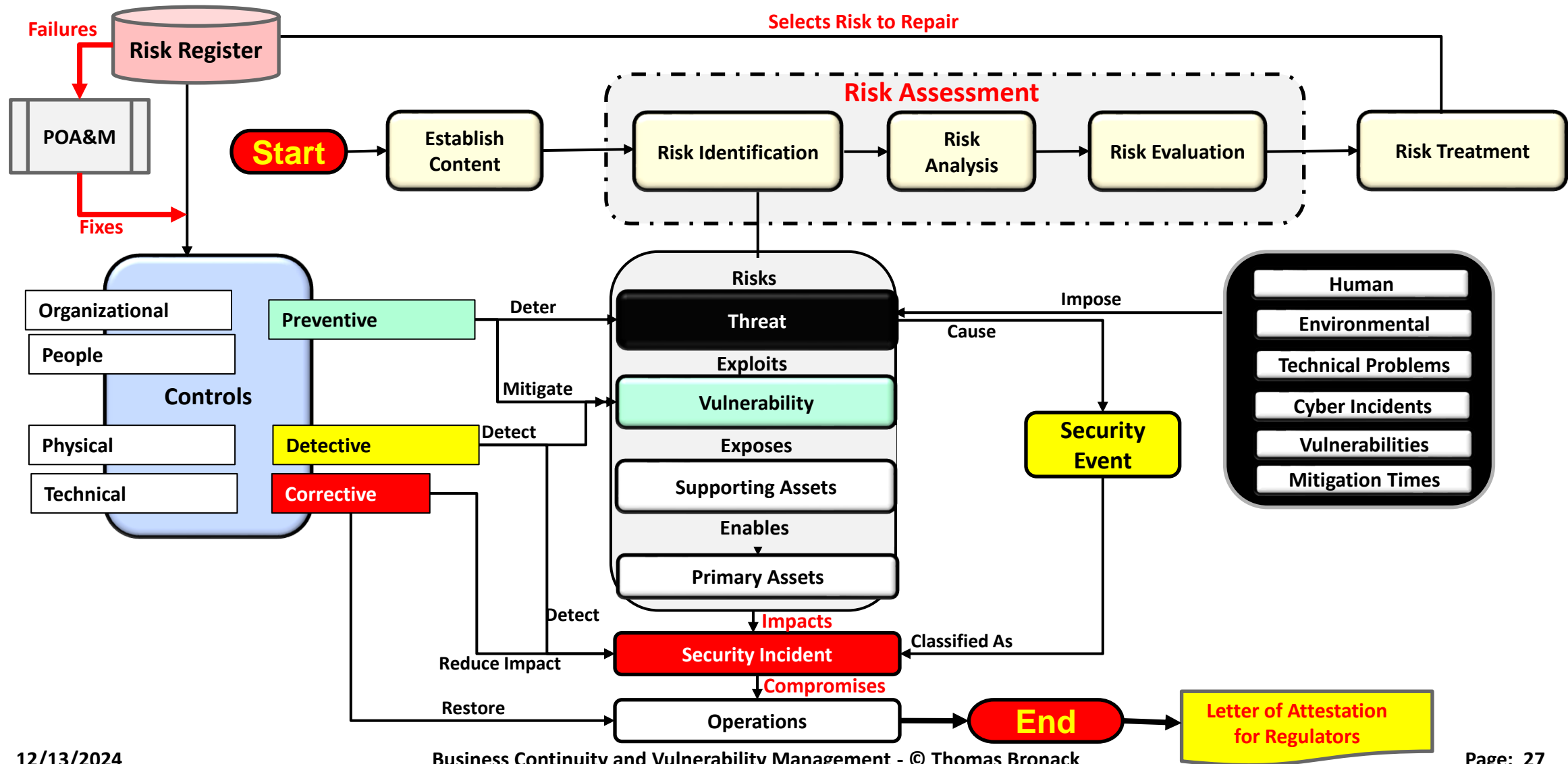
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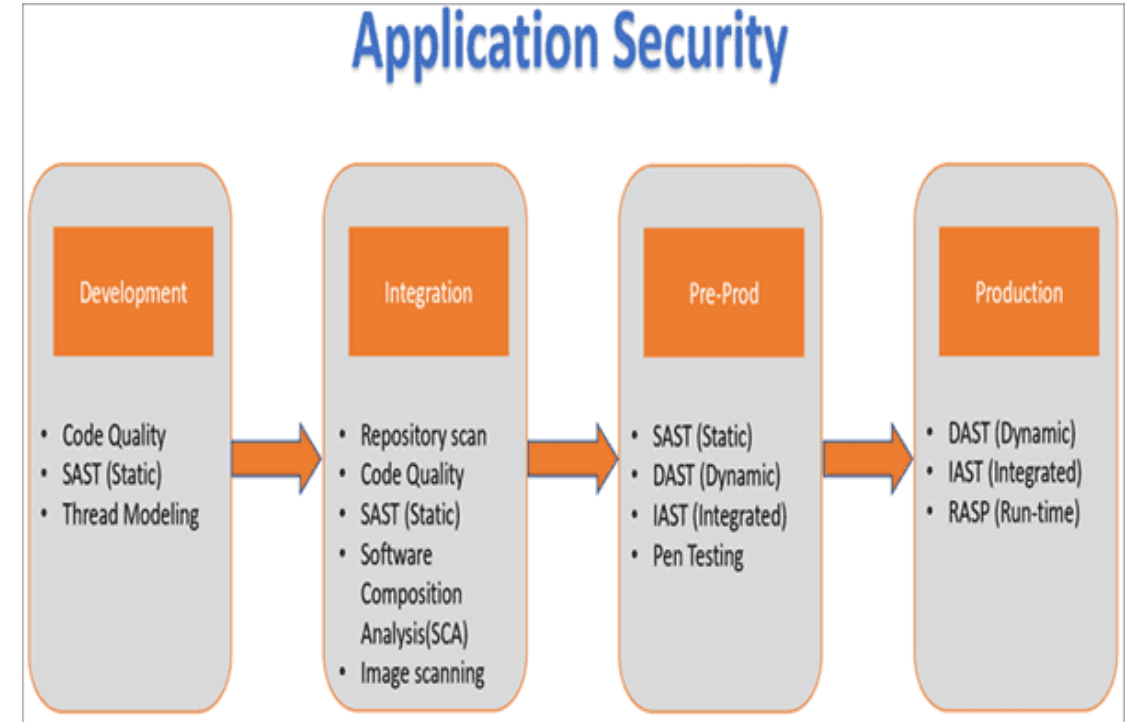
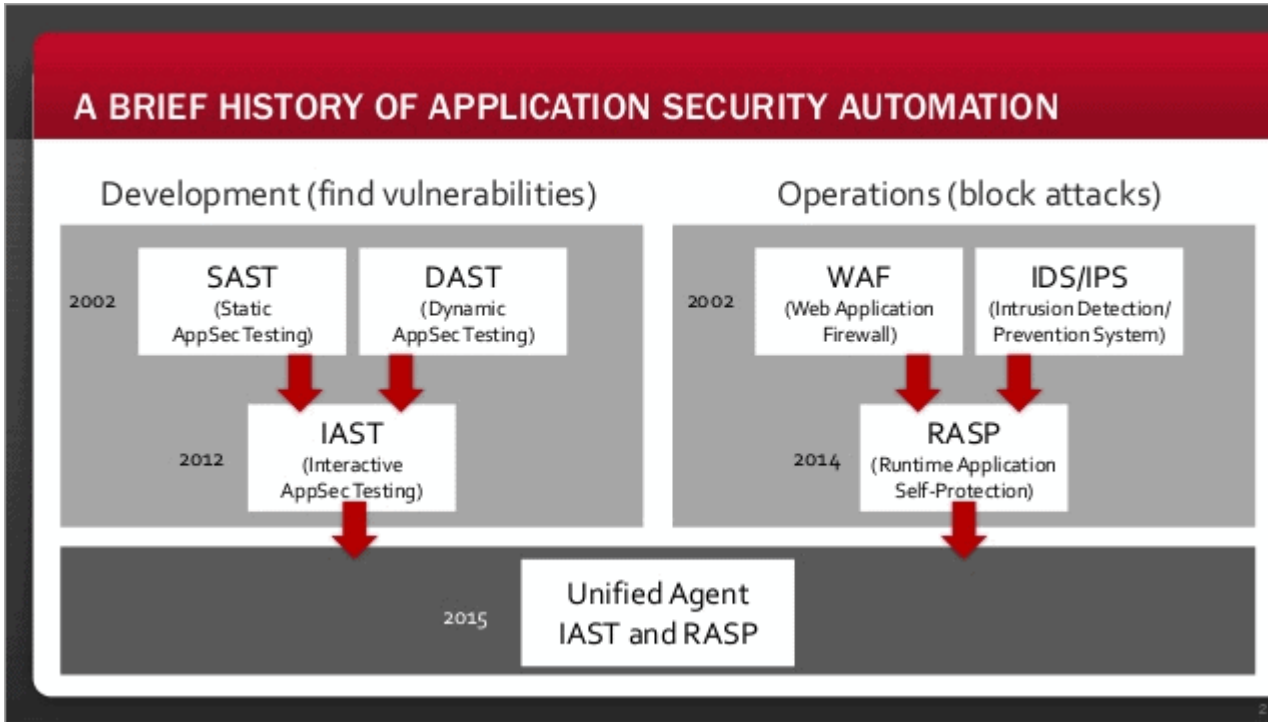


Risk Management with ISO 27000: 2022

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Application Security Testing – Dev/Sec/Ops



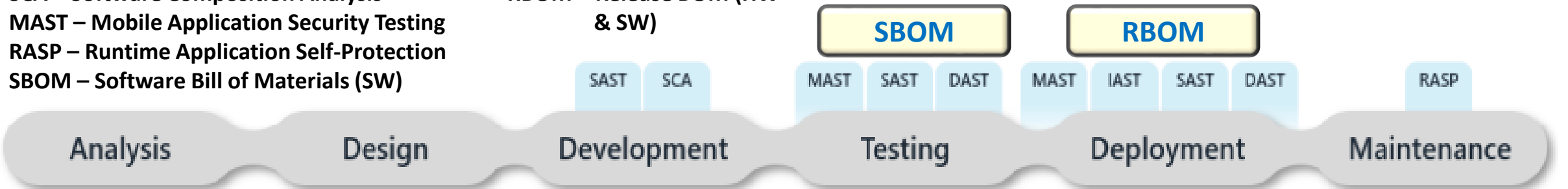
SCA – Software Composition Analysis

MAST – Mobile Application Security Testing

RASP – Runtime Application Self-Protection

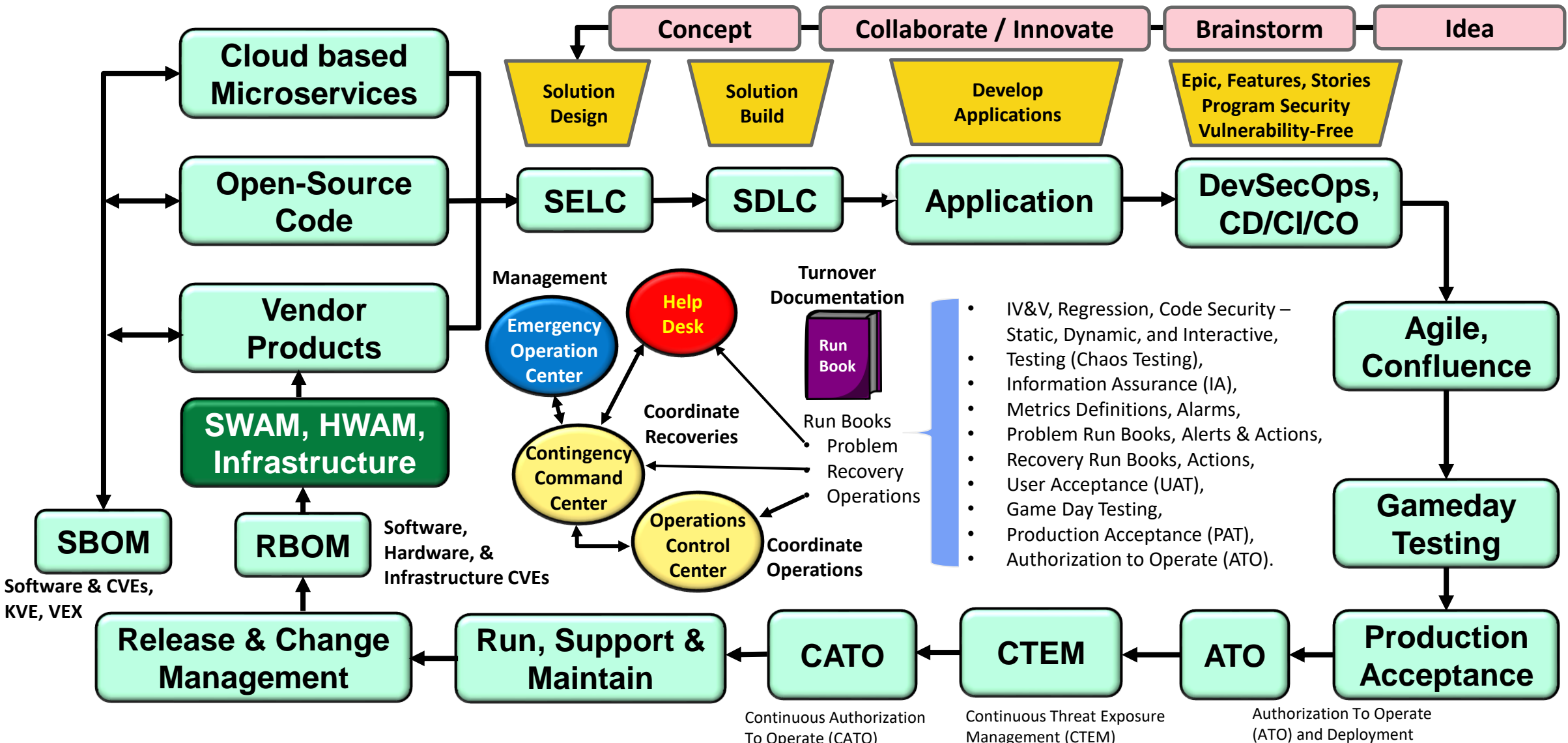
SBOM – Software Bill of Materials (SW)

RBOM – Release BOM (HW & SW)



Application Construction and entry to Production

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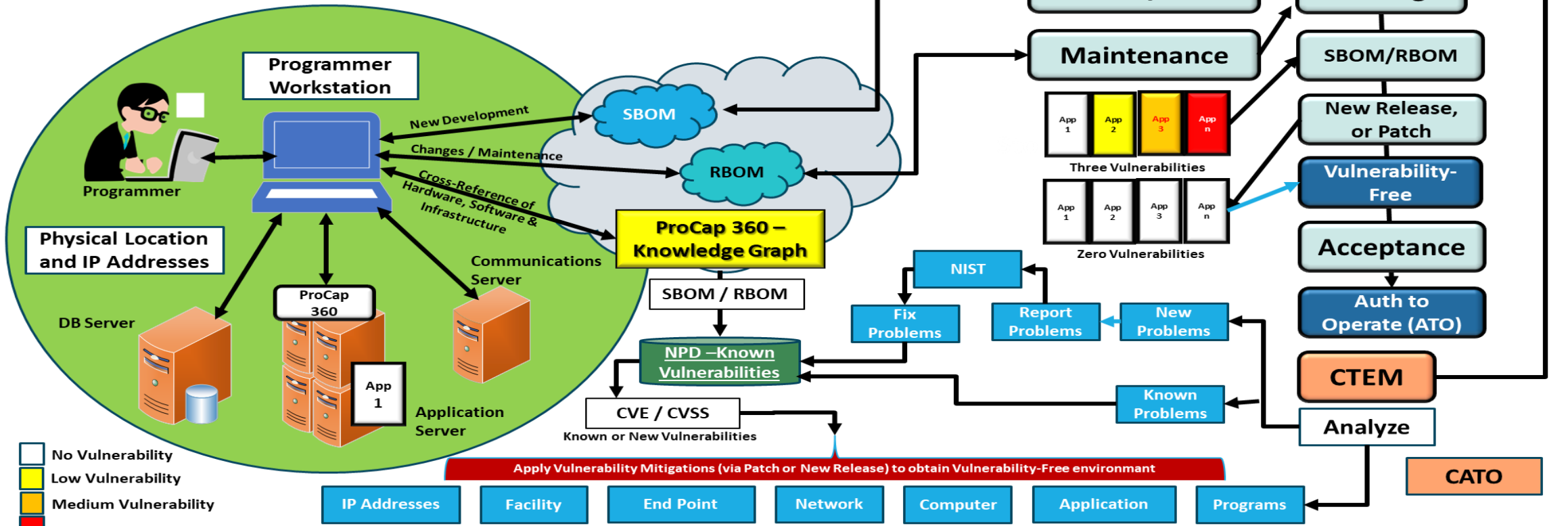
Service deliver/support using Vulnerability Management

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From idea to Production Product or Service Delivery



SBOM - for New Development
 RBOM - for Maintenance and Change Management



- No Vulnerability
- Low Vulnerability
- Medium Vulnerability
- High Vulnerability

Monitoring, Supporting, and Managing the Production Environment via CTEM



Providing an enhanced Customer Experience (CX)

The Customer Experience Pyramid is an empirical research based framework, which is quite useful in directing the organizations through their CX Transformation journey.

The CX Pyramid entails 2 core dimensions:

- 1 Focus Areas** – the organizational spheres that must change to enable provision of amazing digital Customer Experiences.
- 2 Strategic Building Blocks** – the strategies that define how this change can take place to deliver exceptional Customer Experiences.

Let's discuss the Focus Areas of the CX Pyramid first. The 4 Focus Areas crucial in a business to change in order to deliver top-quality digital Customer Experiences at scale are:



The CX Pyramid is instrumental in designing and delivering delightful Customer Experiences.

Project Overview

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Start

End



Recommend

Evaluate

Analyze

Improve

Deploy

Introduce Concept:

- Needs Analysis
- Vulnerability Assessment
- Tools Review
- Metrics Defined
- Provide SOW Recommendation to Management
- Gain Management Approval
- Schedule Start and End Dates
- Contracts and Payment Schedule

Define Project and Scope:

- Risk Analysis
- Tools Review
- Tool Testing
- Vulnerability Management
- SBOM Usage
- RBOM Usage
- AIBOM Usage
- Business Continuity Management
- Verify Results
- Awareness and Training
- Continuous Threat Exploitation Management (CTEM)

Conduct Needs and Risk Analysis

- Define Weaknesses, Exceptions and Gaps
- Recommend Controls
- Recommend Improvements
- Define Benefits
- Develop Report and Presentation

Provide Report and Presentation

- Review Findings
- Projected Weaknesses
- Benefits to be obtained
- Enhanced security
- Savings
- Provide Plan of Action & Milestones (POA&M)
- Gain Management Approval

Conduct Project Activities:

- Initiate Project
- Assemble Team
- Prepare Team
- Assign Tasks
- Commence Work
- Provide Status
- Resolve Issues
- Complete Project
- Metrics Improved
- Costs vs Benefits
- Projected ROI
- Toil Reduction
- Financial Savings

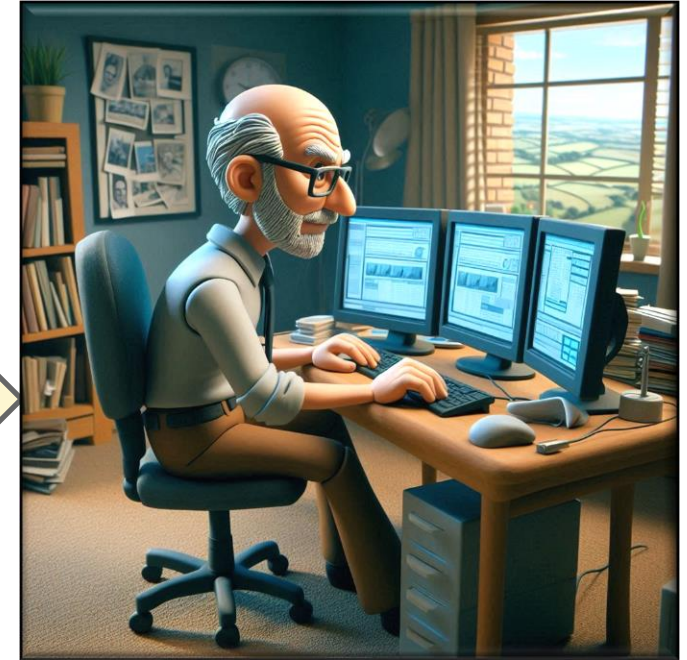
Reaching out to assist our clients

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- Discuss
- Define
- Propose
- Achieve

Quality Service at
a Reasonable
Price



If you find the information included in this presentation of value and want to explore methods to improve the reliability of your enterprise and IT environment, please contact me to discuss your needs and request our assistance.

We look forward to our future relationship.

Thomas Bronack, CBCP
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