Zero Trust in Action

Architecting Secure Systems Beyond Perimeters

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Introduction

Introduction to Zero Trust

Zero Trust represents a security model moving beyond traditional perimeter defenses to continuous verification.

Why Zero Trust?

Rising insider threats and lateral movement risks, Attackers exploit implicit trust; Zero Trust eliminates this assumption.

Key Drivers

Cloud adoption, SaaS proliferation, Remote workforce, Regulatory compliance and Data protection mandates.

Business Impact

Reduces attack surface and breach impact, Balances security with use experience for productivity.

From Theory to Practice

The session emphasizes actionable strategies for implementing Zero Trust beyond theoretical concepts.

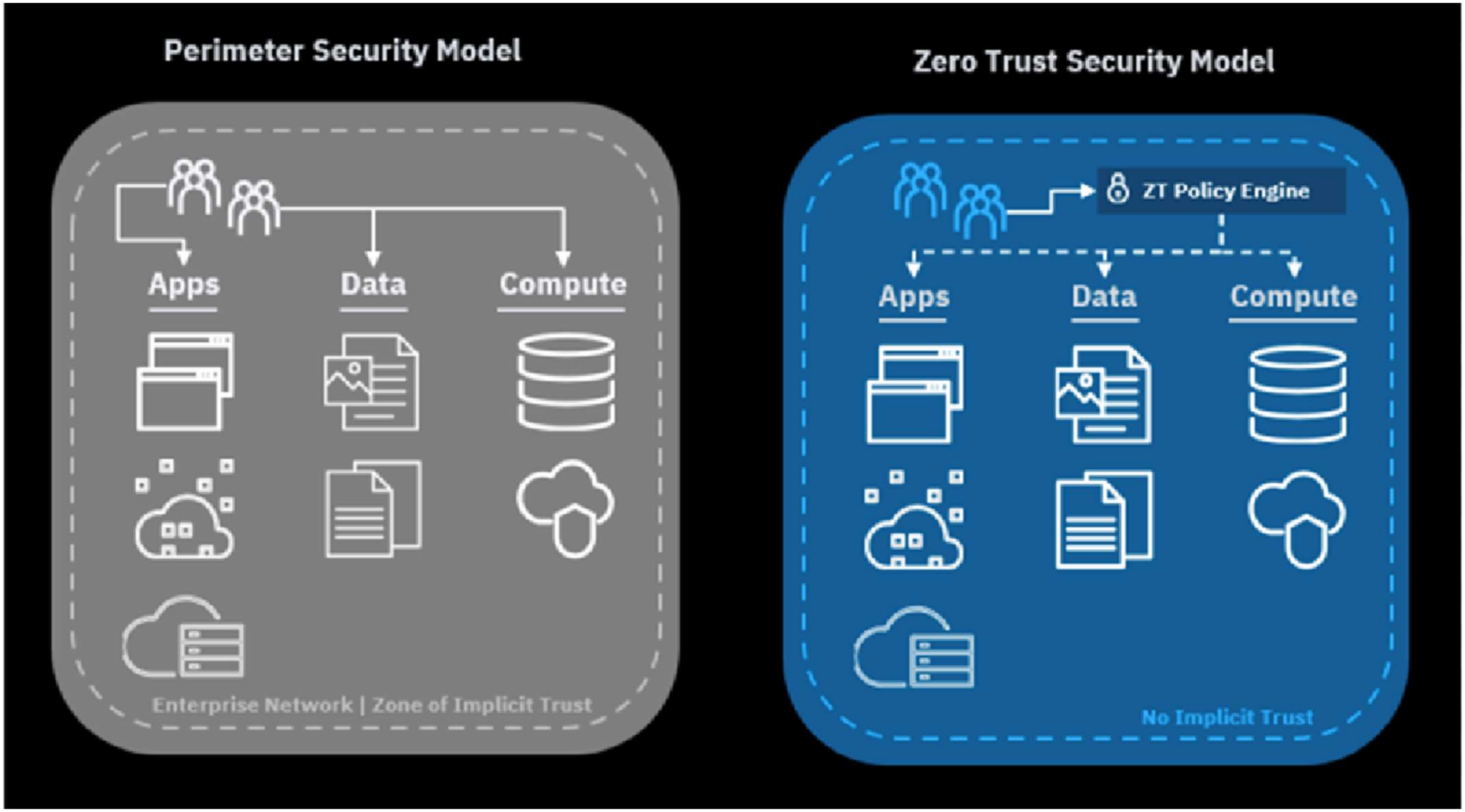
Perimeter Failure vs. Layered Security

Traditional Perimeter Defense

Crumbling castle walls represent outdated perimeter defenses struggling against modern threats in distributed environments.

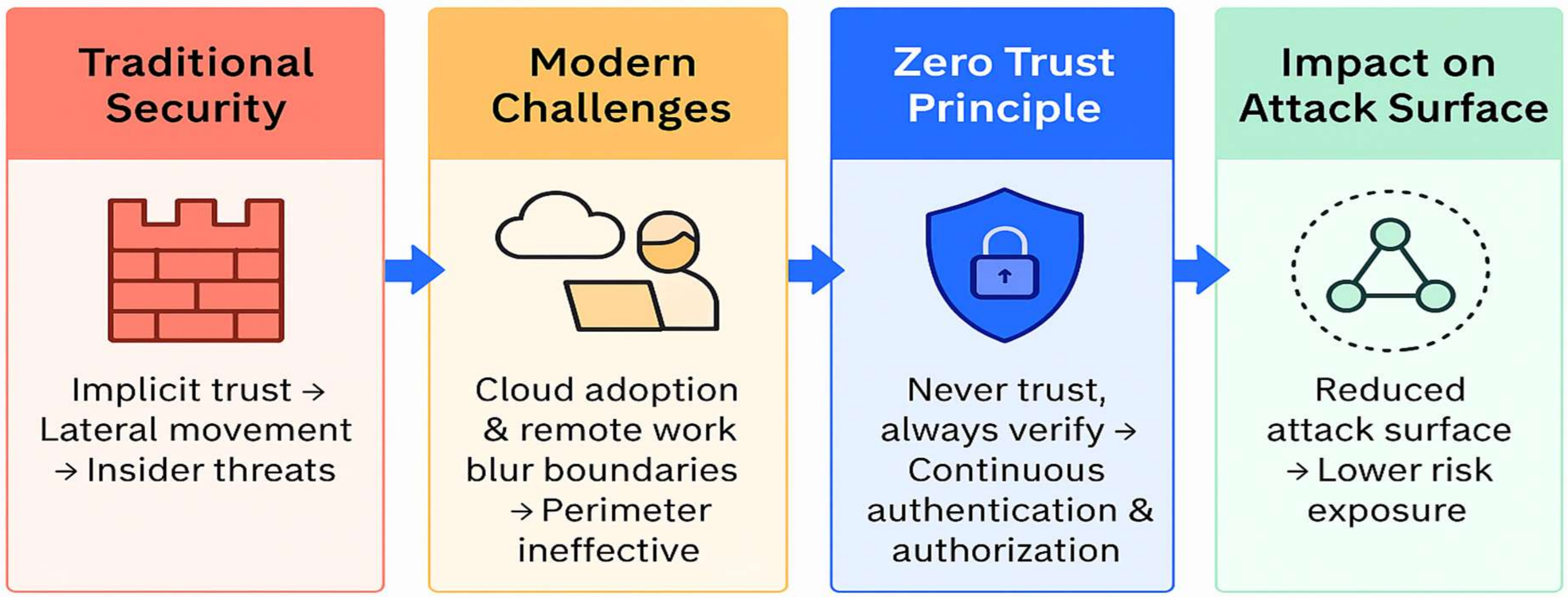
Layered Zero Trust Security

Futuristic airport security checkpoint illustrates layered verification and continuous identity checks in Zero Trust models.


Perimeter Security Model
Apps
Data
Compute
Enterprise Network | Zone of Implicit Trust
Zero Trust Security Model
ZT Policy Engine
Apps
Data
Compute
No Implicit Trust

Why Zero Trust?

The Need for Zero Trust



Traditional Security

Implicit trust → Lateral movement → Insider threats

Modern Challenges

Cloud adoption & remote work blur boundaries → Perimeter ineffective

Zero Trust Principle

Never trust, always verify → Continuous authentication & authorization

Impact on Attack Surface

Reduced attack surface → Lower risk exposure

Case Study

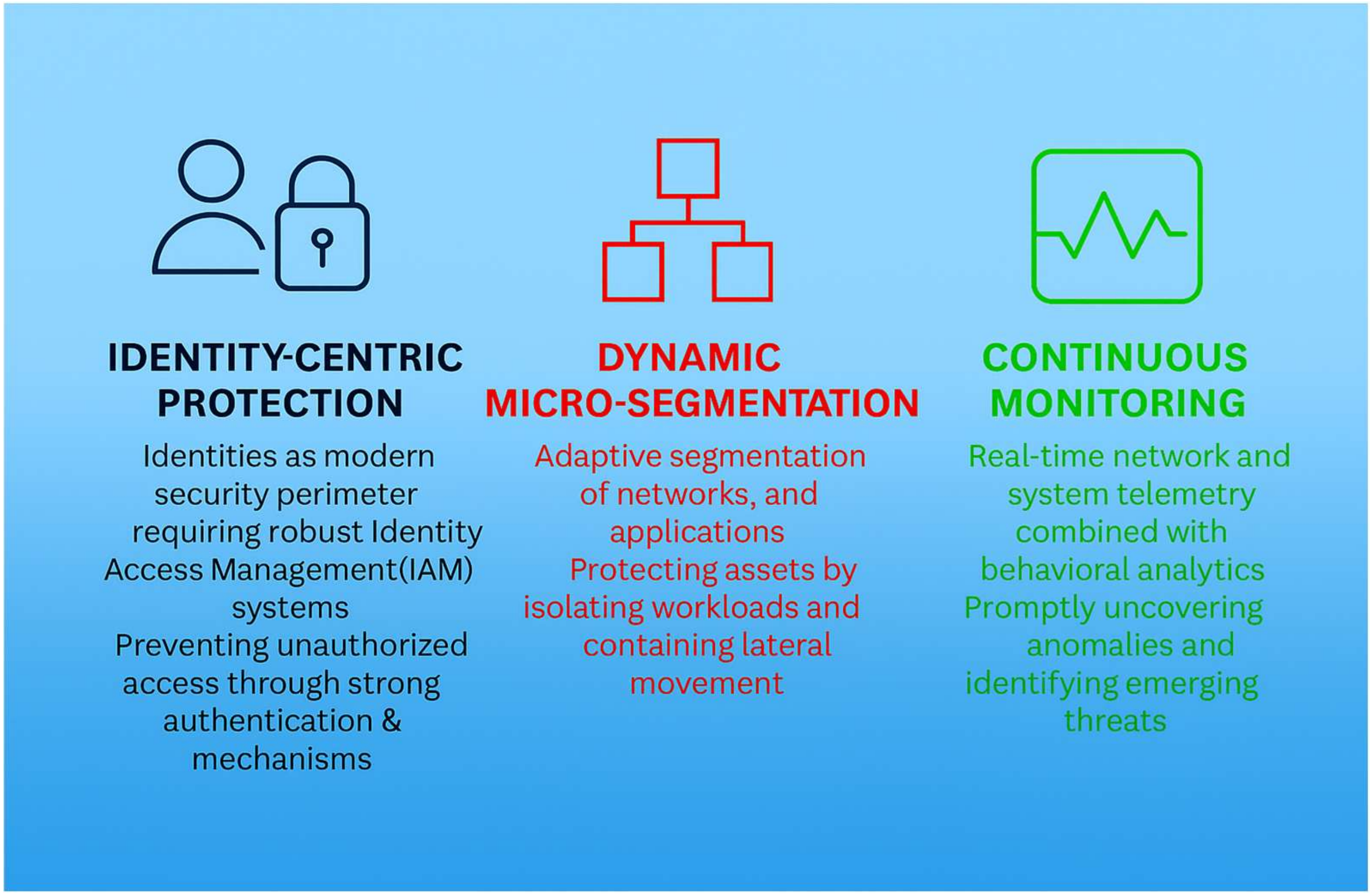
Case Study 1: Healthcare Sector Ransomware Attack
Date: February 2024
Industry: Healthcare
What Happened: Attackers exploited compromised credentials and weak access controls to infiltrate systems.
Impact: Exfiltration of terabytes of sensitive patient data and disruption of critical services.
Lesson: Lack of identity-centric security and continuous verification enabled lateral movement.

Case Study 2: Research & Development Network Breach
Date: April 2024
Industry: Technology/Research
What Happened: Attackers bypassed MFA using session hijacking and exploited VPN vulnerabilities.
Impact: Breach of sensitive research environments; containment required emergency segmentation.
Lesson: Perimeter defenses and firewall rules were insufficient; Zero Trust segmentation could have minimized impact.

Case Study 3: Critical Infrastructure Attack
Date: May 2024
Industry: Energy
What Happened: Attackers leveraged implicit trust in network connectivity to move laterally.
Impact: Threatened national energy supply; required isolation of systems to prevent catastrophic failure.
Lesson: Zero Trust segmentation and continuous monitoring would have contained the breach.

Core Principles and Typical Architecture of Zero Trust

Identity, Segmentation, and Monitoring



IDENTITY-CENTRIC PROTECTION

Identities as modern security perimeter requiring robust Identity Access Management(IAM) systems

Preventing unauthorized access through strong authentication & mechanisms

DYNAMIC MICRO-SEGMENTATION

Adaptive segmentation of networks, and applications

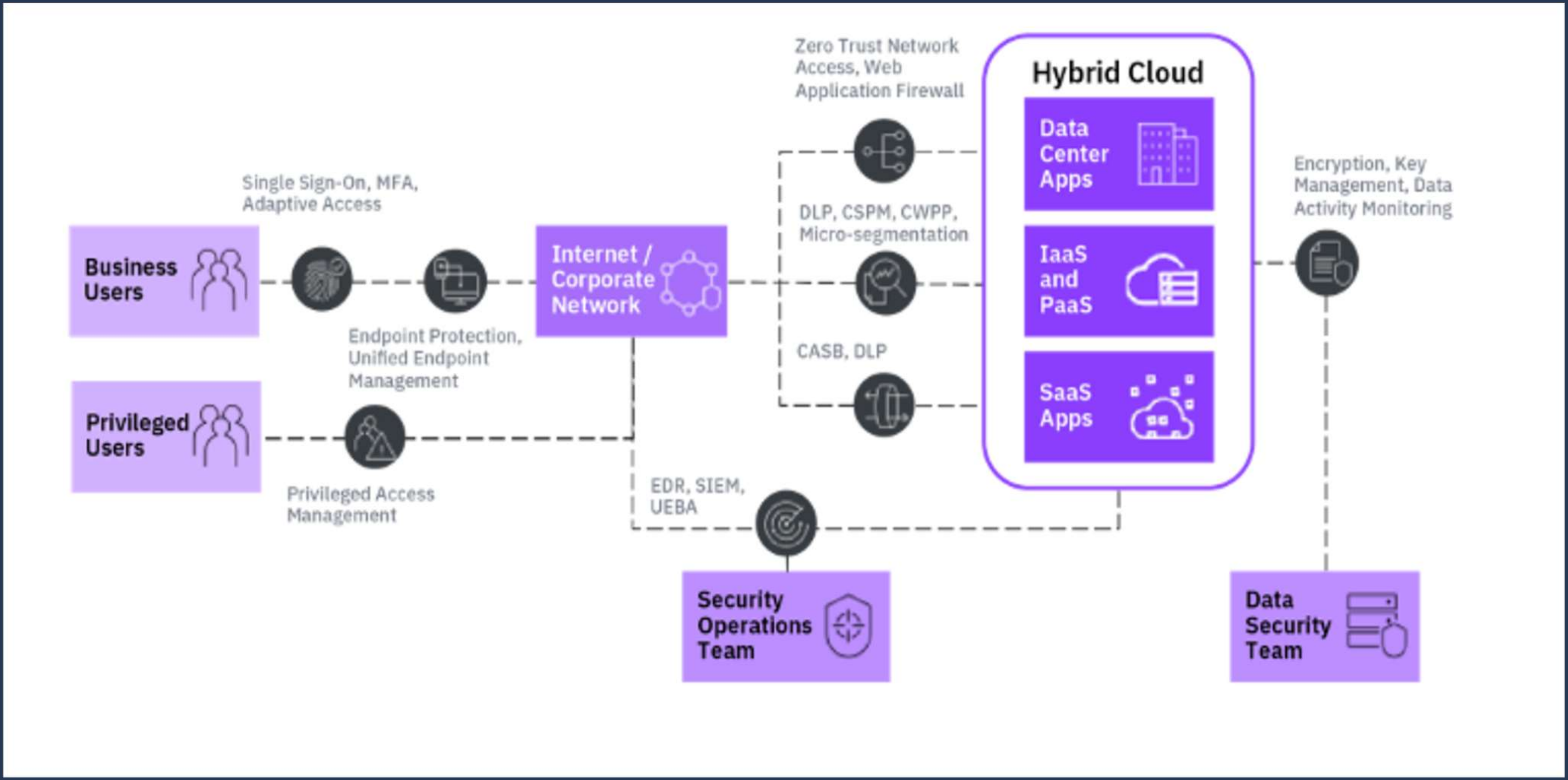
Protecting assets by isolating workloads and containing lateral movement

CONTINUOUS MONITORING

Real-time network and system telemetry combined with behavioral analytics

Promptly uncovering anomalies and identifying emerging threats

Typical ZTA Architecture



Zero Trust Network Access, Web Application Firewall

Hybrid Cloud

Data Center Apps

IaaS and PaaS

SaaS Apps

Single Sign-On, MFA, Adaptive Access

DLP, CSPM, CWPP, Micro-segmentation

Encryption, Key Management, Data Activity Monitoring

Business Users

Internet / Corporate Network

Endpoint Protection, Unified Endpoint Management

CASB, DLP

Privileged Users

Privileged Access Management

EDR, SIEM, UEBA

Security Operations Team

Data Security Team

Industry Adoption and Trends

Adoption Statistics and Market Movement

Growing Industry Adoption

Over 70%* of organizations now integrate Zero Trust principles into their cybersecurity frameworks, showing rapid acceptance. *Gartner 2024 survey report

Remote Access Deployments

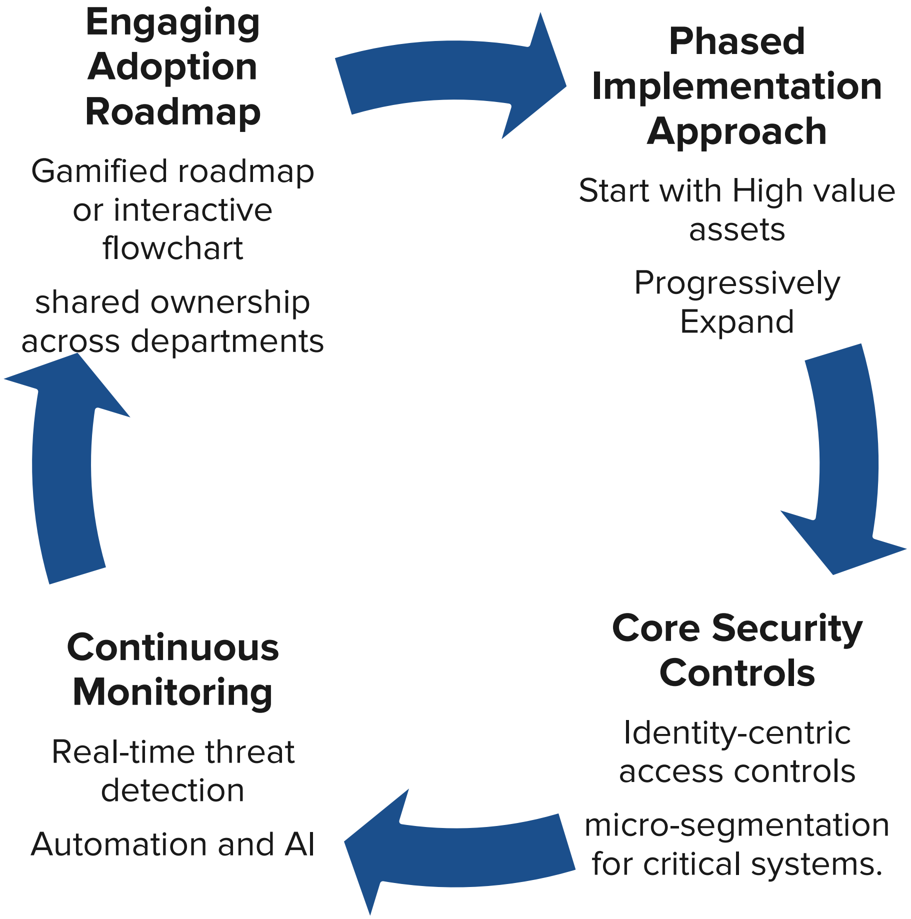
By 2025, 70%* of new remote access deployments will implement Zero Trust principles for enhanced security. *Gartner report

Audience Engagement Prompt

Poll or interactive prompt encourages audience to reflect on their organization's position in the adoption curve.

Implementation Roadmap

From Theory to Practice



Engaging Adoption Roadmap

Gamified roadmap or interactive flowchart

shared ownership across departments

Phased Implementation Approach

Start with High value assets

Progressively Expand

Core Security Controls

Identity-centric access controls

micro-segmentation for critical systems.

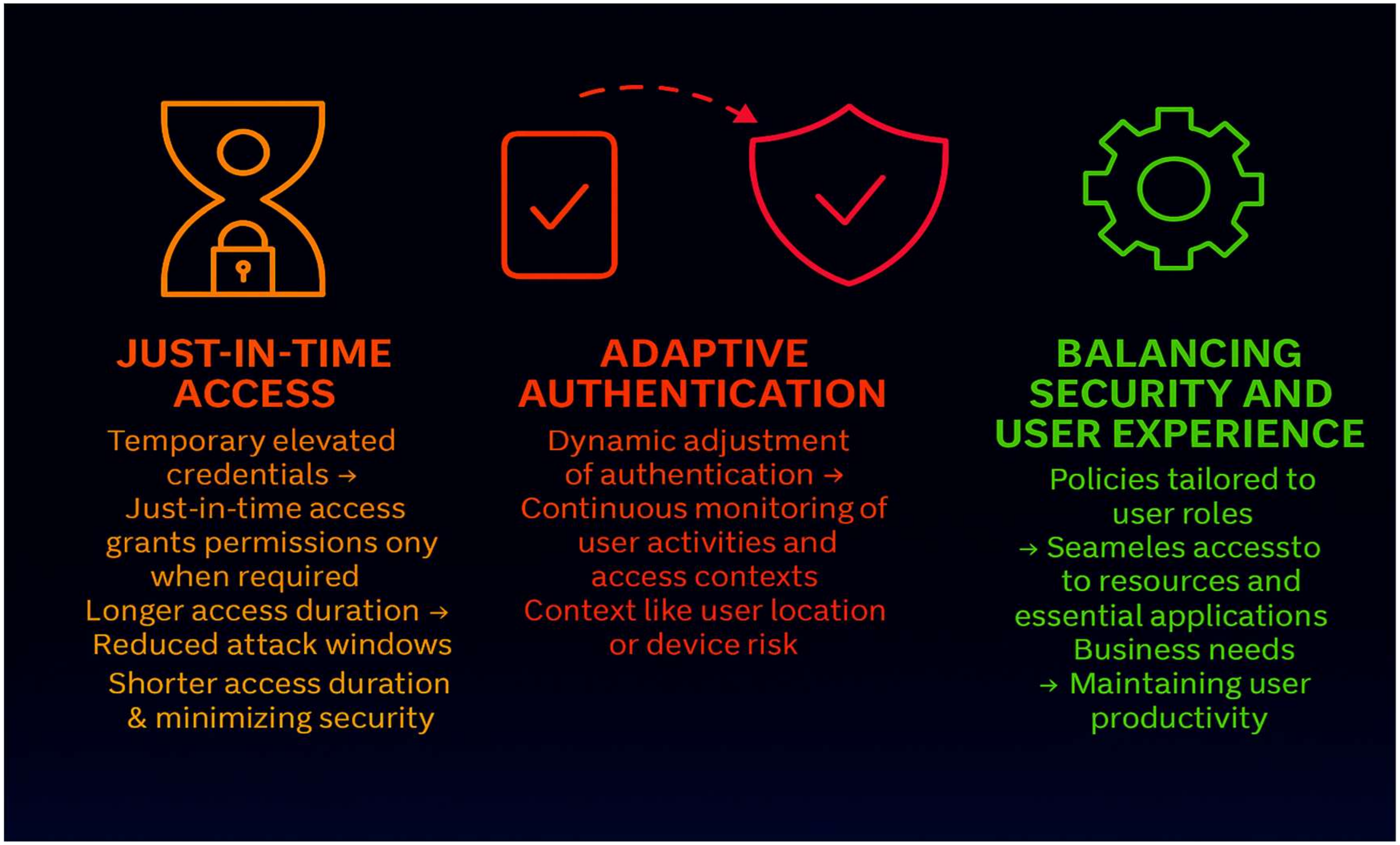
Continuous Monitoring

Real-time threat detection

Automation and AI

Balancing Security and User Experience

Strategies for Seamless Access



JUST-IN-TIME ACCESS

Temporary elevated credentials →
Just-in-time access grants permissions ony when required
Longer access duration →
Reduced attack windows
Shorter access duration & minimizing security

ADAPTIVE AUTHENTICATION

Dynamic adjustment of authentication →
Continuous monitoring of user activities and access contexts
Context like user location or device risk

BALANCING SECURITY AND USER EXPERIENCE

Policies tailored to user roles
→ Seameles accessto to resources and essential applications
Business needs
→ Maintaining user productivity

Common Pitfalls and Future Outlook

Avoiding Implementation Mistakes

Common Implementation Pitfalls

Overcomplicated policies and neglecting identity lifecycle management cause inefficiencies and security gaps.

Strategies to Avoid Mistakes

Simplify policy frameworks, ensure identity governance, and leverage automation for better scalability.

Future of Zero Trust

AI-driven threat detection and automated policy enforcement make security adaptive and proactive.

Reference Open-source Software

Keycloak

Provides single sign-on (SSO), multi-factor authentication (MFA), identity federation (SAML, OIDC), and fine-grained authorization (via policies).

Pomerium

identity-aware reverse proxy that provides secure access to internal applications without the need for corporate VPN.

OpenZiti

Creates secure, overlay networks (zero trust networks) where applications are hidden (dark) and access is granted only after stringent identity and context checks.

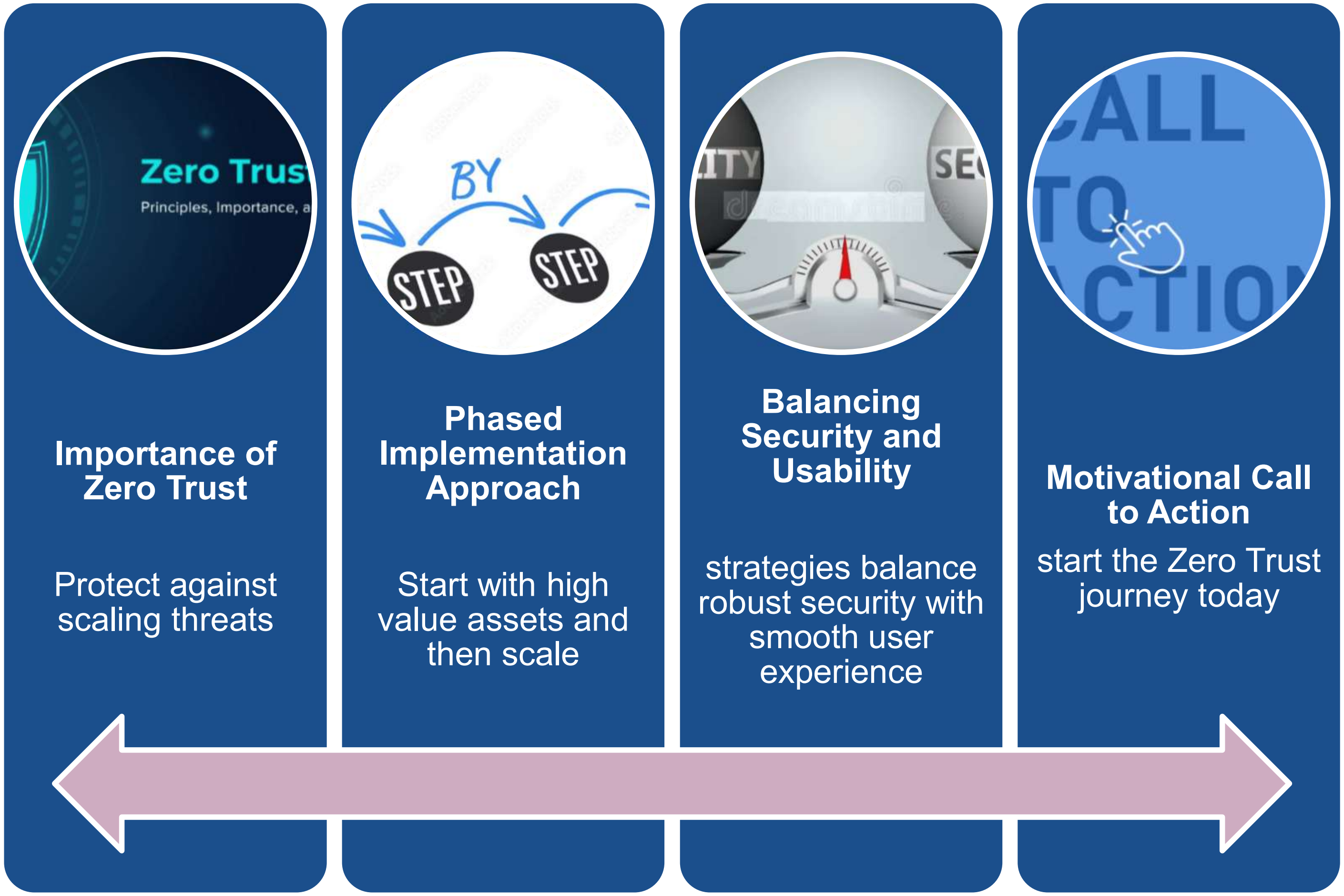
ELK Stack (Elasticsearch, Logstash, Kibana) and PLG Stack (Promtail, Loki, Grafana)

Essential for aggregating, analyzing, and visualizing logs and telemetry from all ZTA components (Keycloak, Wazuh, network devices, endpoints.

Note: Open-source software mentioned here is intended for reference use only.

Conclusion and Call to Action

Next Steps for Your Organization



Importance of Zero Trust

Protect against scaling threats

Phased Implementation Approach

Start with high value assets and then scale

Balancing Security and Usability

strategies balance robust security with smooth user experience

Motivational Call to Action

start the Zero Trust journey today

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Thank you