Zero Trust – What Is It?
Associated Best Practices and Vendors

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Zero Trust - Agenda

- What is a Zero Trust Network (ZTN)?
  - What is it NOT?
- Importance of ZTN
- Elements of ZTN
- Important tenets of ZTN
- Some key vendors
- Implementing Zero Trust
- ZTN with IoT, IIoT, IT/OT and utilities industry
- Conclusion and Best Practices to follow

What is Zero Trust?

- A Zero Trust Network (ZTN) is based on the basic principle of **“never trust, always verify”.**
- ZTN is a model or guiding design principle. It is an overall strategy and framework to prevent unauthorized access, contain breaches, and reduce the risk of an attacker’s lateral movement through your network.
- ZTN is a general approach for leveraging various security technologies to enable perimeter enforcement and strict access controls.
- No one is trusted by default from inside or outside the network. Verification is required from everyone and everything trying to gain access to resources on the network.
- ZTN is a comprehensive approach to securing all access across your networks, applications, and environment.
  - secure access from users, end-user devices, APIs, the Internet of Things (IoT), microservices, containers, and more.

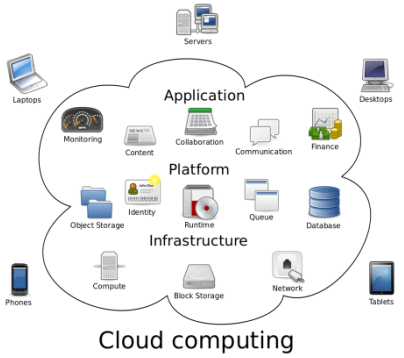
What Zero Trust is NOT

- ZTN is not a single point product that is a drop in solution to protect your castle.
  - It is an integrated ecosystem of several security solutions and tools from multiple vendors.
- ZTN is not a panacea. You need to remain vigilant. Never trust, always keep adding context and keep up-to-date who the user/device is and the defined appropriate interaction.
  - Add more authentication methods to counter credential based attacks.

- ZTN is not an overnight solution. It will take time to develop.
- ZTN is not limited to the traditional endpoints (PCs, servers, etc.). It extends to cover IoT devices.
- ZTN is not just to stop attackers at the perimeter. Traffic inside the perimeter should not be more trusted any more than outside traffic.
  - You can set how tightly access is restricted to verify access.

Importance of Zero Trust Network

- The network perimeter is no longer clearly defined. Organizations are migrating to the cloud.
  - applications and data stores are on-premises and in the cloud, with users accessing them from multiple devices and locations.
- Environments include cloud-based services, mobile workloads and a growing number of unmanaged devices.
- Increasing level of malware, cyber attacks and attack innovation
- Every device on a network is a potential attack or reconnaissance point.



Importance of Zero Trust Network

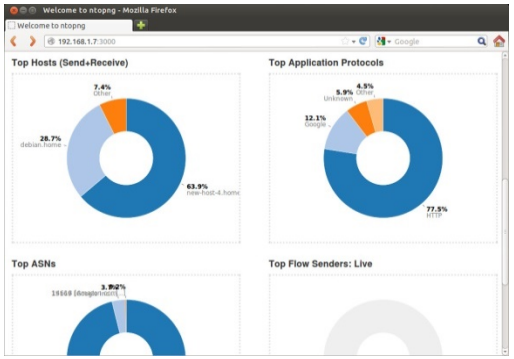
- Increasing number and diversity of endpoint devices opens up more attack vectors.
  - Different OS's, mobile, different communications standards, and legacy systems. Each have their own vulnerabilities.
- User, guest and contractor access expansion.
- Growing adoption of BYOD and IoT devices on the network.
- The growth of BYOD, guest and contractor access, and IoT has made it evident that the network is no longer composed of securely managed devices.
- Traditional security is designed to protect the perimeter, but threats can get inside the network undetected and free to move around.

Elements of Zero Trust

- The concept of a Zero Trust Architecture has been around for about a decade. Interest in ZTN picked up a little over a year ago. The momentum has been growing.
  - Cisco has seen discussions accelerate over last 12 months. Expects to see further growth in next 12 months.
- ZTN is achieved via integration, automation and orchestration of various security solutions. Security is a layered approach.
  - Need to consistently enforce policy based controls.
- Visibility into users, devices, components, and more across your entire environment.

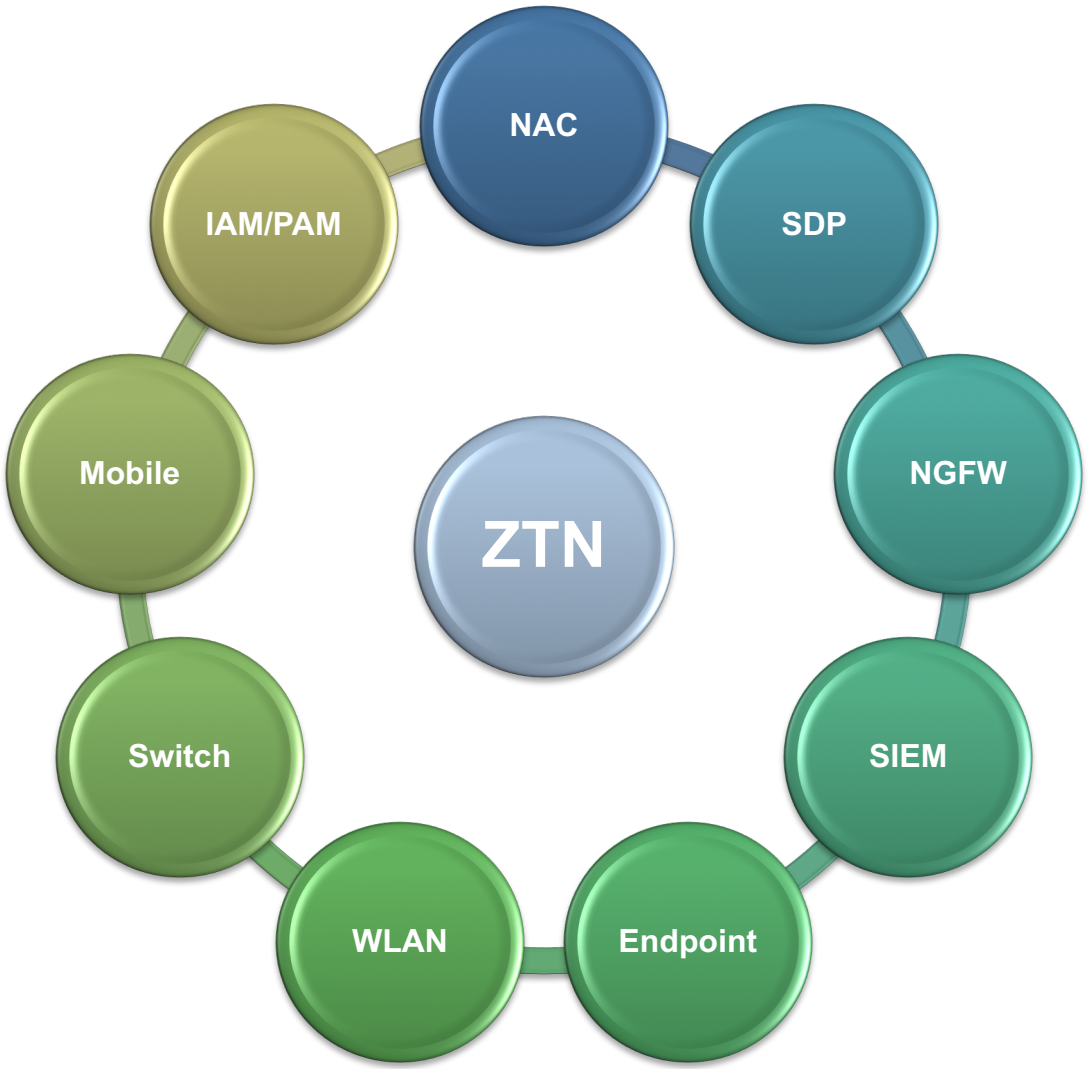
Elements of Zero Trust

- Strict identity verification process. Only authenticated and authorized users and devices can access applications and data.
- Segmentation and granular access policies for all connecting endpoints must be defined, implemented, and enforced.
- Least-privilege access: “information on a need-to-know basis”.
- All network traffic should be inspected and logged. Encryption across all communications.
- Dynamic policy, trust assignments and segmentation.



Zero Trust Network Ecosystem

- Leverage your ecosystem.
- There is no one single specific technology for ZTN.
- ZTN is a holistic approach to network security incorporating several different principles and technologies.
- Core technologies for ZTN: NAC, SDP, NGFW, SIEM, Endpoint, WLAN, Switch, Mobile and IAM/PAM.
- Other security solutions can be integrated for ZTN, i.e. email, SWG, CASB, and more



Key Tenets of Zero Trust

"Never Trust, Always Verify"

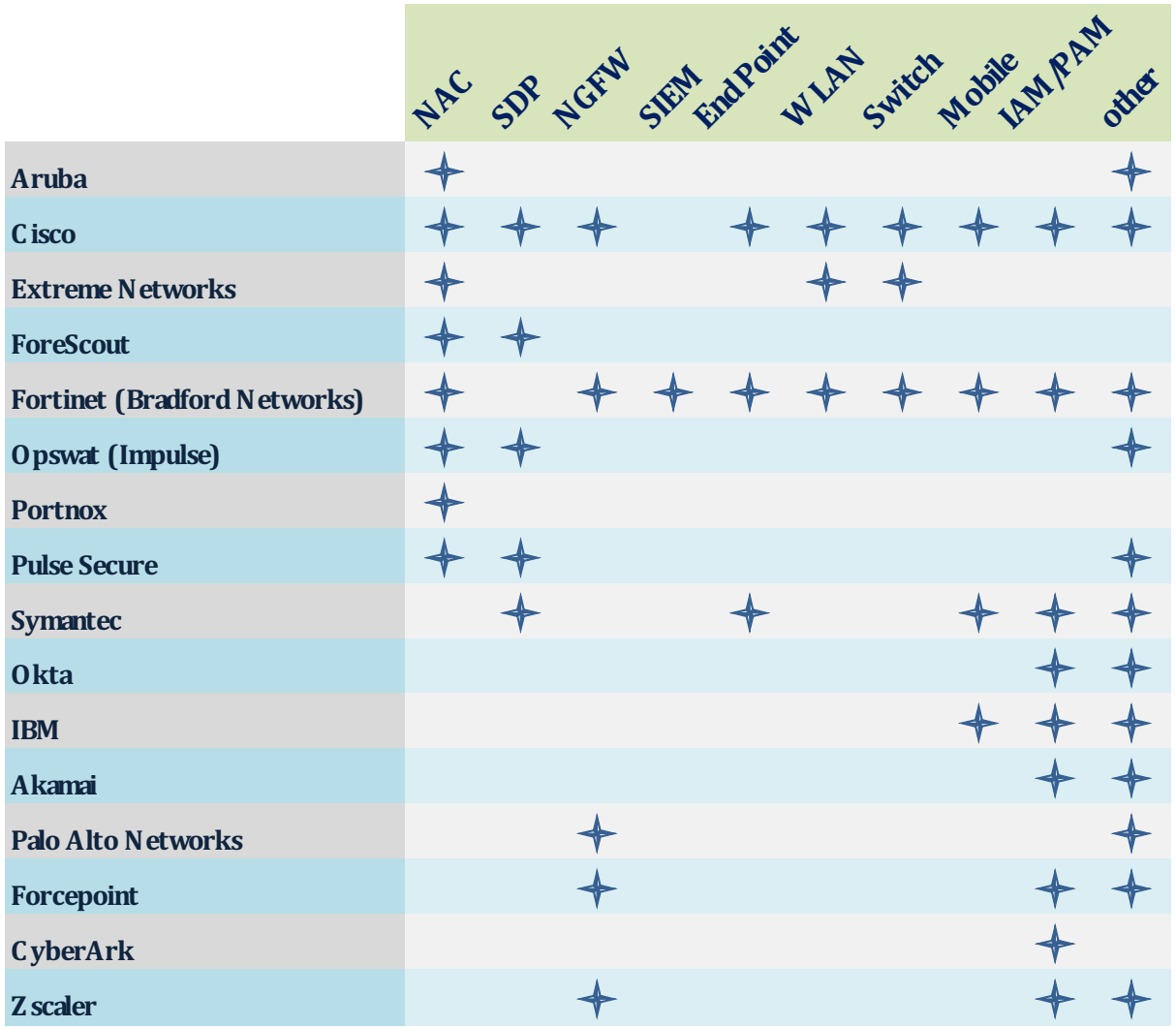
- NAC is a foundational network security defense. It provides visibility, monitoring and control. NAC orchestrates and integrates a variety of network and security infrastructure. It provides flexible endpoint policy management.
- Classification of users and endpoints is the basis of visibility and determining secure access policies.
- SDP protect users as they access workloads and applications. It is complimentary to NAC.
  - Future trend: NAC vendors expected to integrate SDP as a feature.
- IAM/PAM is crucial for strict identity verification, regardless of whether the user or device are sitting within or outside of the network perimeter.

Key Tenets of Zero Trust

- Segmentation is the practice of breaking up security perimeters into small zones to maintain separate access for separate parts of the network. Microsegmentation provides finer granularity.
  - Segmentation restricts east-west attacks.
  - Separate authorizations for each zone
- Least privilege access reduces pathways typically used by malware and attackers and reduces the chances of internal data exfiltration.
- Risk adaptive security controls - User Entity Behavior Analytics (UEBA).
- Assume that there are attackers both within and outside of the network. No users or machines should be automatically trusted.
  - Beware the insider threat.

Key Vendors Supporting ZTN

No one vendor has all the components for a complete solution.



Key Vendors Supporting ZTN

- Many vendors are promoting their ZTN capabilities via integration of their product portfolios. Most vendors offer a ZTN platform or program focusing on their specific strength.
- NAC, NGFW, SDP and IAM/PAM are the foundations for vendors.
- ZTN vendors partner with other companies for integrating technologies they do not have or which a customer has licensed. Customers are able to leverage security technologies they have purchased.
- One vendor must be the leader for a ZTN deployment. There can be only one quarterback on the field.
  - Ex. Portnox offers NAC, but partners with Palo Alto and Okta who provide ZTN platforms
- Notable acquisitions:
  - Symantec – Luminate Security for SDP (Feb. 2019)
  - Cisco – DUO Security for verification with MFA (Oct. 2018)
  - Fortinet – Bradford Networks for NAC (June 2018)
  - OPSWAT – Impulse for NAC and SDP (Dec. 2019)

Implementing Zero Trust

- Evaluate all risk factors surrounding the user/endpoint and their authenticating device.
- Determine access needs – which user or device needs access to what in your organization. Implement restrictions to secure core privileges on applications, devices and endpoints.
- Implement strong network controls that segment and isolate data and resources. This includes on-premises, web-based and cloud-based systems.
- Deploy Multi-Factor Authentication (MFA).
- Classification of users and endpoints is the basis of visibility and determining secure access policies.
  - Classification of device identity is based upon discovered characteristics such as OS, device type, and business function.

Implementing Zero Trust: Onboarding Considerations

- ZTN vendors offer automated onboarding tools.
- Ease of deployment: facilitates configuration settings, integrations and basic customization of guest, BYOD and other secure access rules.
- Important to identify and enable automatic and custom classification of both managed and unmanaged endpoint devices
- NAC uses IEEE 802.1X standard which requires an agent on the endpoint. Most IoT devices are non-802.1X compliant. NAC agentless technology is used for unmanaged devices. Different methods for profiling and verification.

Complications

- Unclassified: if classification is not possible it is “unknown”
  - Will require periodic review, assessment, classification and policy adjustment
  - Device profiles can be customized to enable similar device verification and access
- Non-compliant devices
  - Enable automated remediation prior to verification and granting access
  - Unsanctioned devices from specific manufacturers may be blacklisted

Zero Trust with IoT, IIoT, IT/OT and Utilities Industry

- An effective ZTN strategy means you must vet every device; ensure it is trustworthy; grant access; and then isolate, secure, and control every device touching the network at all times.
- According to Frost & Sullivan, there will be 45.4 billion connected devices by 2023. The high growth of IoT poses challenges to enterprise networks since these are mostly non-802.1X compliant. Some NAC vendors estimate that more than half of all endpoint devices in an organization are IoT.
- IT and OT have developed independently. Convergence offers benefits of improved efficiencies, it also exposes previously isolated systems to cyber attacks.
- NAC vendors have made implementation easier with improved tools and automation specifically addressing IT/OT convergence.
  - Ex. Cisco, ForeScout, Fortinet and Pulse Secure
- ZTN vendors are focusing on the specific needs of IoT, IIoT, and IT/OT.
- Example: OPSWAT has supported ZTN for IIoT, especially utilities.
  - Solutions include Secure Device Access, Cross-Domain Solutions , File Upload Security, Malware Analysis, and email security. Acquisition of Impulse adds NAC and SDP.

Conclusion and Best Practices to follow

- ZTN principle of “never trust, always verify” protects against lateral threat attacks
- ZTN strategy is a holistic approach. Layered security.
- Define key policies: guests, endpoint compliance, apps/resources
- Focus on core integrations: NAC, switch, wireless, NGFW, SDP, SIEM, endpoint, mobile, IAM/PAM
- Set endpoint compliance rules: cert., malware, system Scan, patches, settings
- Explore advanced features: VPN/NAC integration, mobility, threat response and UEBA
- Implement least privilege access, segmentation, MFA, and risk-adaptive security controls.
- Know what is on your network. Monitor and log the flow of data.
- Strict identity and device verification must be maintained for anyone and anything attempting to access network resources.
- Classify, verify and segregate: unknown, unmanaged and IOT devices.
- One ZTN vendor should lead your efforts to leverage and integrate your ecosystem.
- Rome was not built in a day. A global ZTN is not achieved overnight.
  - Prioritize your most sensitive assets. Implement ZTN in increments.

Thank You

Questions and Answers

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