Real-Time HTTP URL Blocking

Background

A major Internet Service Provider (ISP) in India needed a real-time URL blocking solution to comply with government regulations issued by the Department of Telecommunications (DoT). The ISP received blocklists from DoT and had to enforce these restrictions without altering its existing network infrastructure, introducing downtime, or modifying routing policies.

Given the high network throughput (20-40 Gbps), asymmetric routing across multiple gateway routers, the customer faced significant challenges in implementing a traditional inline filtering solution.

Business Challenge

The organization struggled with several key issues:

- **Real-Time HTTP URL Blocking:** The ISP needed to dynamically block HTTP URLs per government directives and provide users with a custom block page, informing them that access to the requested URL was restricted per DoT guidelines.
- **High-Bandwidth Network (20-40 Gbps):** The solution had to operate at speeds of up to 40 Gbps without introducing latency or impacting customer experience. Traditional inline solutions could bottleneck performance or require hardware upgrades, which were not feasible.
- **No Changes to Core Network Architecture:** The ISP could not introduce an inline device or modify the existing datacenter layout. Any solution had to passively monitor traffic without affecting the network topology.
- **No Routing Table Modifications:** The ISP was not permitted to modify routing policies or enforce filtering at the gateway routers. Additionally, they could not restart routers, making traditional BGP-based or DNS-based filtering ineffective.
- **Asymmetric Routing Across Four Gateways:** The ISP had four separate gateway routers, and network traffic followed an asymmetric routing pattern, meaning that requests and responses could traverse different paths. A solution was required that could function seamlessly without relying on symmetric routing.

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Summary

Industry/Organization

Internet Service Provider (ISP)

Challenges

- Real-Time URL Blocking: Enforce DoT directives and display a custom block page.
- High-Bandwidth Support (20-40 Gbps): Operate at high speeds without latency or hardware upgrades.
- No Network Architecture Changes: Passive monitoring without modifying the data center layout.
- No Routing Modifications: Works without altering routing policies or restarting routers.
- Handles Asymmetric Routing: Functions seamlessly across four gateway routers with different traffic paths.

Solution

Underscore's Safe Internet Access

Benefits

- 100% compliance with DoT regulations.
- 40 Gbps real-time filtering without performance degradation.
- No impact on existing network architecture or routing policies.
- Operational efficiency through centralized management and automation.

Solution Implemented

After an in-depth analysis of the ISP's requirements, we proposed our SAFE INTERNET ACCESS (SIA) solution, designed specifically for real-time HTTP URL blocking without inline deployment or routing modifications.

Deployment Approach: Passive Tap Mode

- **SIA was deployed in Tap Mode**, where it passively monitored network traffic through mirrored ports from the gateway routers.
- This allowed the solution to analyze HTTP requests in real-time and enforce DoT-mandated URL blocks without interfering with network operations.

How SIA Works in Tap Mode

- **Traffic Mirroring:** The ISP mirrored traffic from gateway routers to the SIA appliance.
- **Real-Time URL Inspection:** SIA continuously analyzed HTTP requests, comparing requested URLs against the DoT blocklist.
- **Instant Blocking with Custom User Notification:**
  - If a restricted URL was detected, SIA issued a TCP Reset to terminate the session.
  - A custom block page was displayed to the user, explaining that access was restricted based on government guidelines.
- **Centralized Blocklist Management:** The SIA Central Manager allowed administrators to update the blocklist in real time and distribute it across all gateways.

Results

With SIA in place, the ISP achieved:

- **Seamless Real-Time URL Blocking**
  - Blocks HTTP URLs in real time, ensuring compliance with DoT mandates.
  - Delivers a custom user-friendly block page instead of generic error messages.
- **High-Performance Filtering (Up to 40 Gbps)**
  - Optimized for high-speed networks, capable of handling traffic at 40 Gbps without introducing latency.
  - Fine-tuned to analyze and enforce blocking decisions in real time.
- **No Changes to Core Network Architecture**
  - Deployed in Tap Mode, eliminating the need for inline integration.
  - No changes to datacenter layout or existing routing configurations.
- **Zero Impact on Router Configurations & Uptime**
  - No modifications to routing tables on any of the four gateway routers.
  - No need to restart routers, ensuring zero downtime.
- **Resilient to Asymmetric Routing**
  - Works effectively even when traffic follows asymmetric paths, ensuring consistent blocking across all gateways.
- **Fail-Safe Operation Without Network Disruption**
  - Since SIA operates in passive mode, it does not introduce a single point of failure.
  - No fail-open scenario—if the SIA device is unavailable, network traffic flows normally without disruption.
- **Centralized & User-Friendly Management**
  - SIA Central Manager enables real-time updates of the DoT blocklist across all gateways.
  - Intuitive web-based GUI allows IT teams to manage policies efficiently.

Conclusion

By deploying **SAFE INTERNET ACCESS (SIA)**, the ISP successfully met government compliance requirements while maintaining network integrity and performance. The solution ensured real-time HTTP URL blocking, delivered a user-friendly block notification, and operated seamlessly without architectural changes or routing modifications.

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About Underscore:

Unlocking Cyber Resilience in the digital realm. Our robust platform combines proactive prediction, powerful forecasting, prioritizing risk, providing unparalleled real-time insights to keep you ahead of threats and assuring business continuity.

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