TopGen

A Universal Platform for Web, DNS, Email, and More

DELIVERING EFFECTIVE TRAINING means you must provide a controlled, but realistic, environment where you can run exercises. For the sake of security, however, that environment is often disconnected—or air gapped—from unsecured networks, such as the public Internet. Without access to the Internet, how can you make sure your training environment provides the realism it needs to ensure your trainees get the best possible experience?

Internet Content for Virtual Networks

The Software Engineering Institute offers a tool called TopGen that provides a solution to the problem of providing Internet content for networks that are isolated from the working Internet for security purposes.

TopGen provides multiple co-hosted virtual application-layer services, such as HTTP, DNS, and email. In other words, TopGen is the default route of last resort to a simulated Internet's applications.

How TopGen Works

TopGen is designed to work with another SEI tool—GreyBox—which acts as a realistic Internet backbone service. However, TopGen can work with any replicated Internet backbone. When connected to GreyBox or another service, you have a complete Internet solution where TopGen provides the content servers on the backbone you're running.

Any destination not otherwise available and known to the simulated Internet backbone routers is forwarded to TopGen. TopGen then answers if it supports that service as one of the many web, DNS, or email—IMAP or SMTP—servers whose addresses it has on its internal loopback address.

Create Better Simulations

You can connect multiple different enclaves of an exercise to SEI's GreyBox simulation, or to your own Internet simulation, in geographic locations relevant to the given scenario.

Although TopGen serves all application-layer services—such as websites—the path over which you appear to reach them differs from one site to another. If you were to run a traceroute from a simulated user container to different destinations, they would appear to be located in different geographic locations. All application traffic is ultimately routed into the TopGen node, but each router is responsible for a geographically relevant subset of the whole Internet's IP address space, so paths taken to reach individual websites reflect their real-world location.

When used with GreyBox's DNS server, traffic in the air-gapped environment acts virtually identically to how it would on the actual Internet.
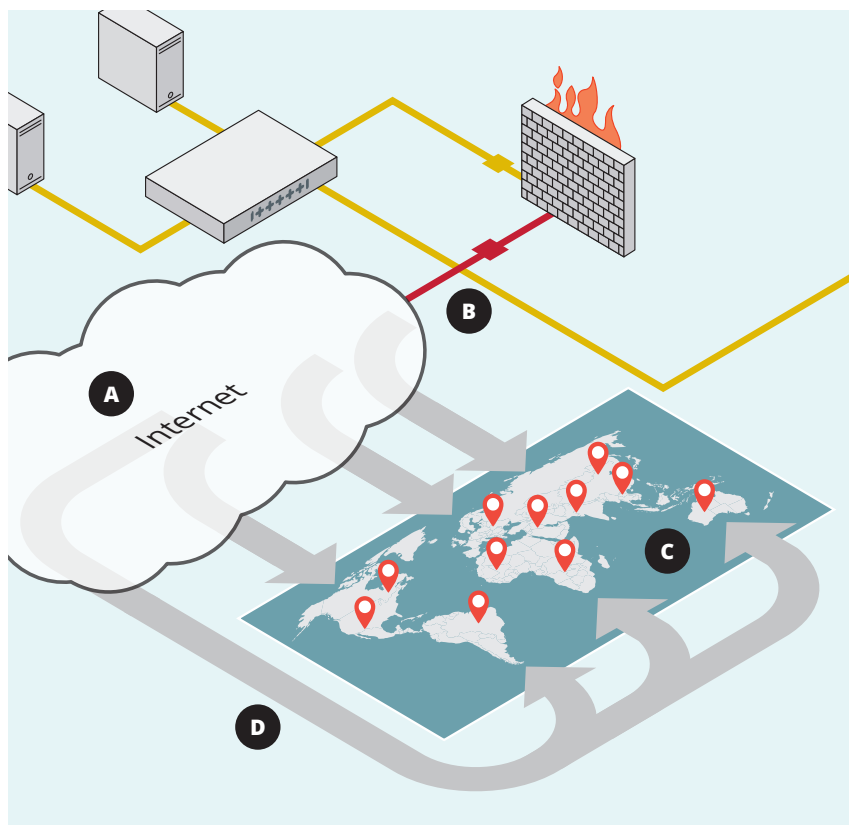
TopGen Highlights

A. Because the GreyBox Internet backbone emulation package provides TopGen connectivity, connections to web sites travel to the correct Tier 1 Internet providers via BGP

B. TopGen solves the problem of providing Internet content for air-gapped networks by replicating the top 500 servers on the World Wide Web

C. TopGen responds to requests from live users and non-player characters with simulated servers that appear to originate from different locations across the world.

D. Live users as well as non-player characters create traffic by sending requests to TopGen.

Explore Our Tools Online

SEI cyber training tools can be used to create cybersecurity training to help students learn in near-real-world situations without risking organizational assets.

See the latest information about these tools on our website at **sei.cmu.edu/go/cwd-tools**.

About the SEI

The Software Engineering Institute is a federally funded research and development center (FFRDC) that works with defense and government organizations, industry, and academia to advance the state of the art in software engineering and cybersecurity to benefit the public interest. Part of Carnegie Mellon University, the SEI is a national resource in pioneering emerging technologies, cybersecurity, software acquisition, and software lifecycle assurance.