MICHIGAN STATE UNIVERSITY

Alpha Presentation

Hybrid Cyberattack Simulator

The Capstone Experience

Team Vectra AI

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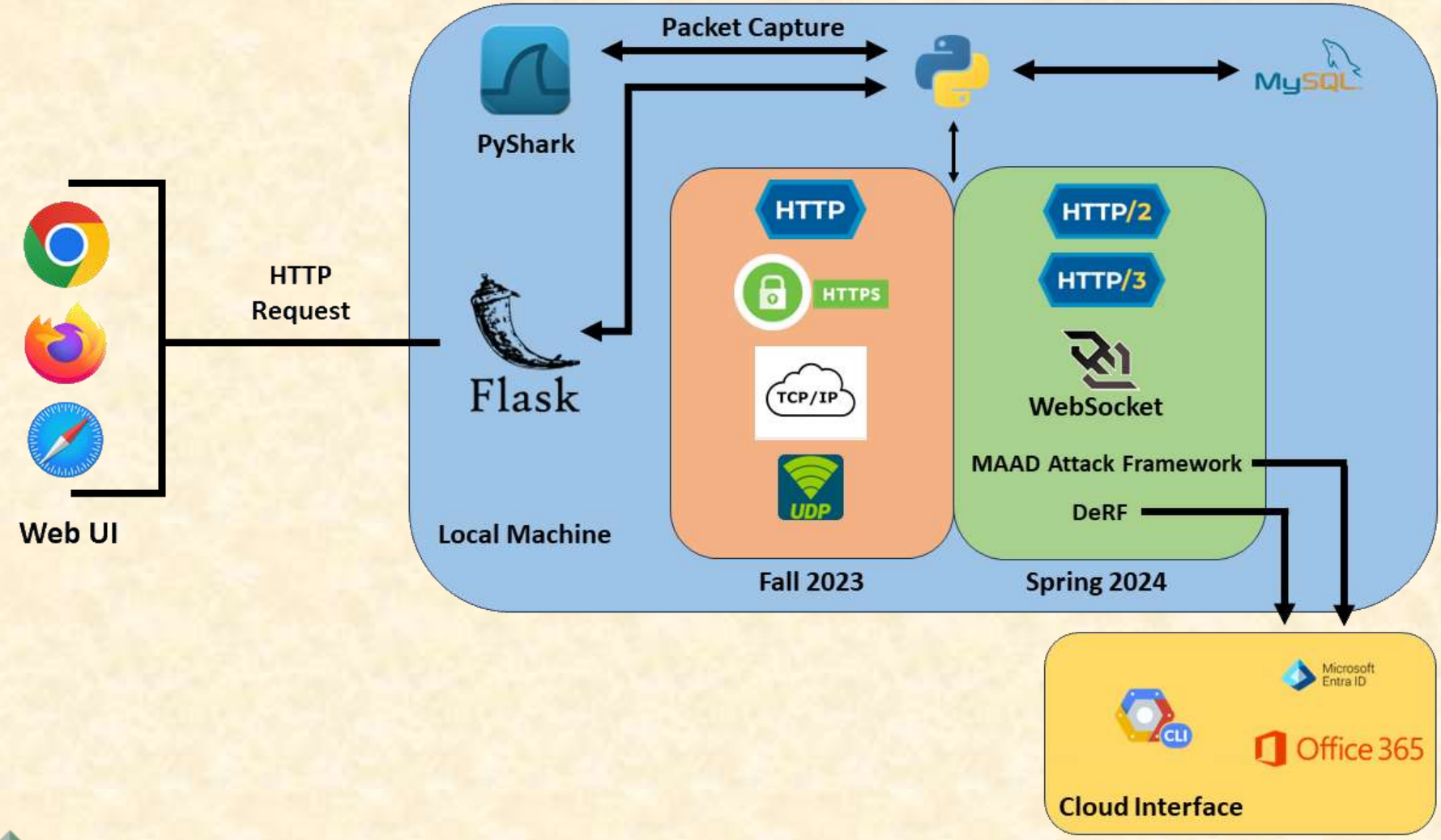
From Students…
…to Professionals

Project Overview

- Vectra's AI models need relevant training data to maintain effectiveness
- Adding 3 new network protocols and advanced C2 configuration such as beaconless interaction and dynamic responses
- Also adding hybrid integration with third-party attack tools

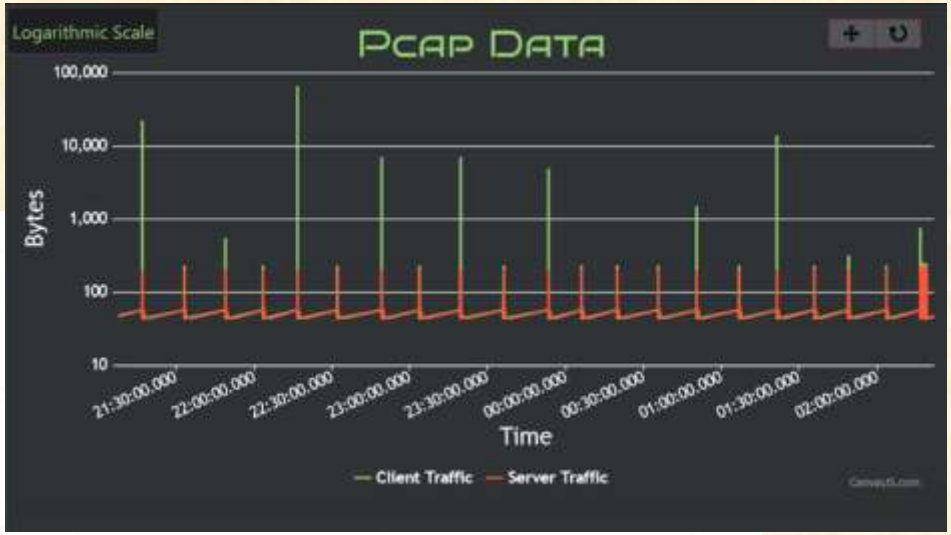
System Architecture

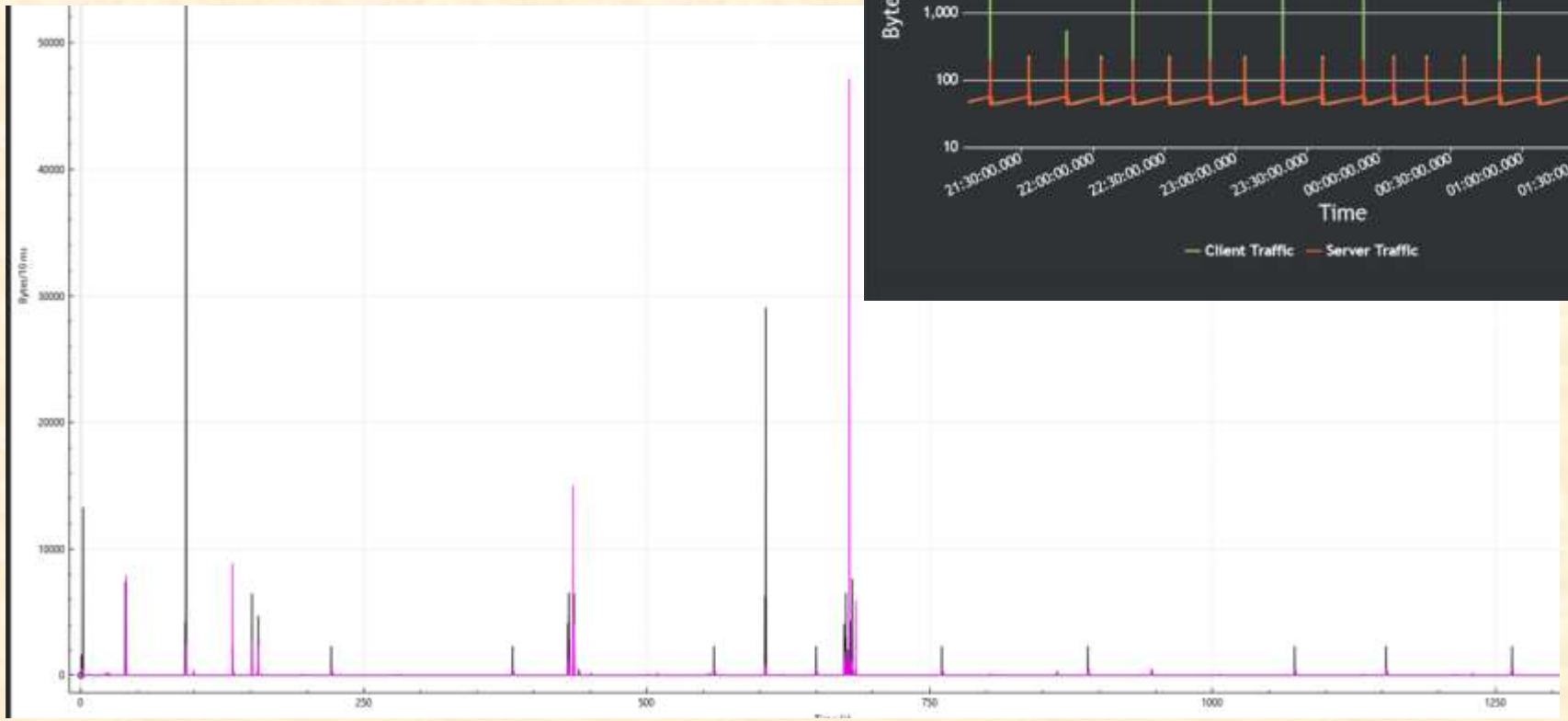


Project Risks

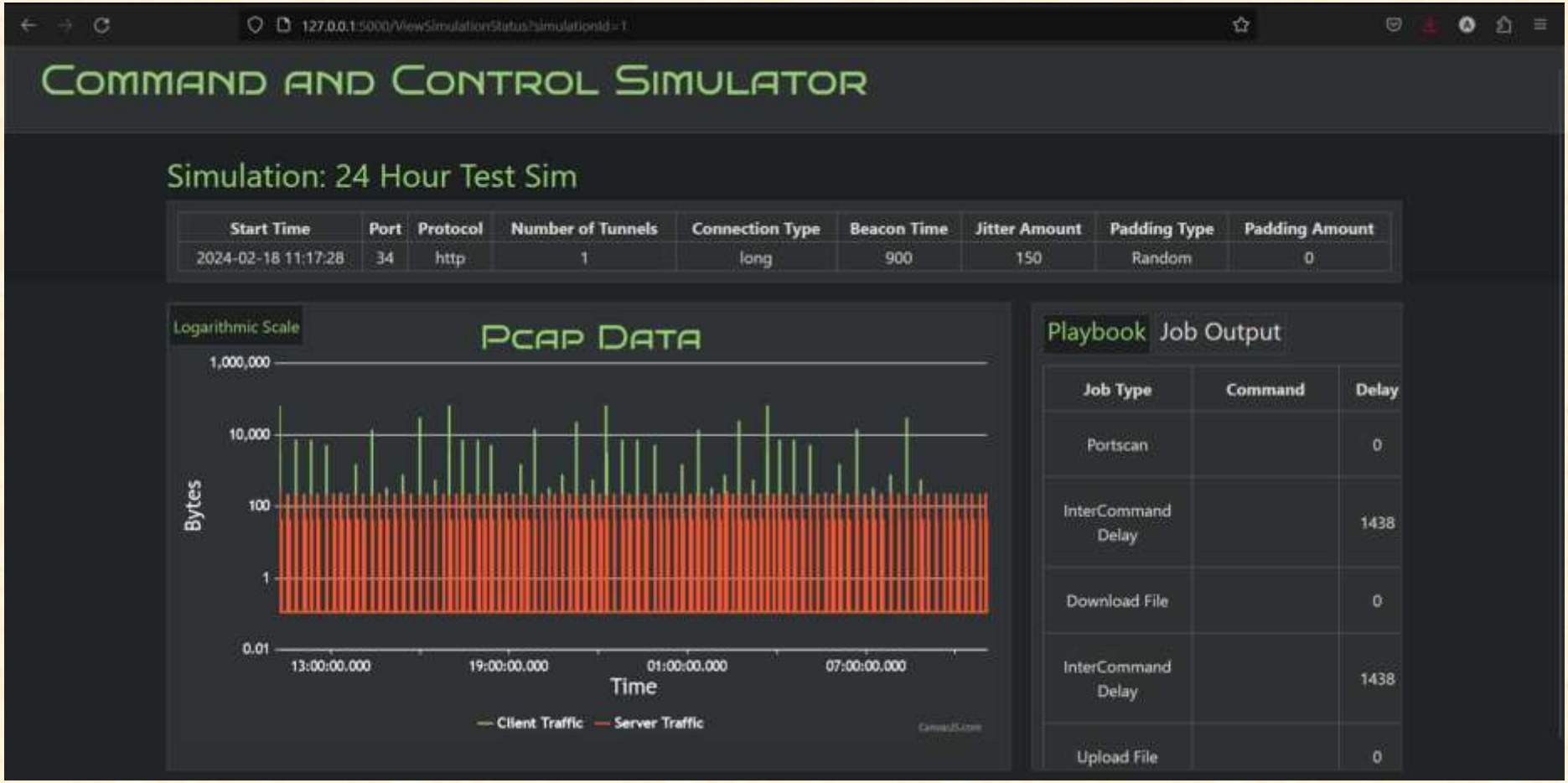
- Compatibility
  - Make sure all third-party apps work together
  - Using active libraries and using version control
- Generating Realistic Data
  - Generate realistic enough data for AI models to train on
  - Analyzing real world attacks and mimicking their outputs
- Performance Issues
  - Make large amounts of data in reasonable amounts of time
  - Spending time optimizing code; looking at distributed computing
- Portability
  - The program needs to be able to run on multiple OS without issue
  - Using cross-platform libraries and allowing API calls to server to abstract user operating system

Realistic Data versus Ours

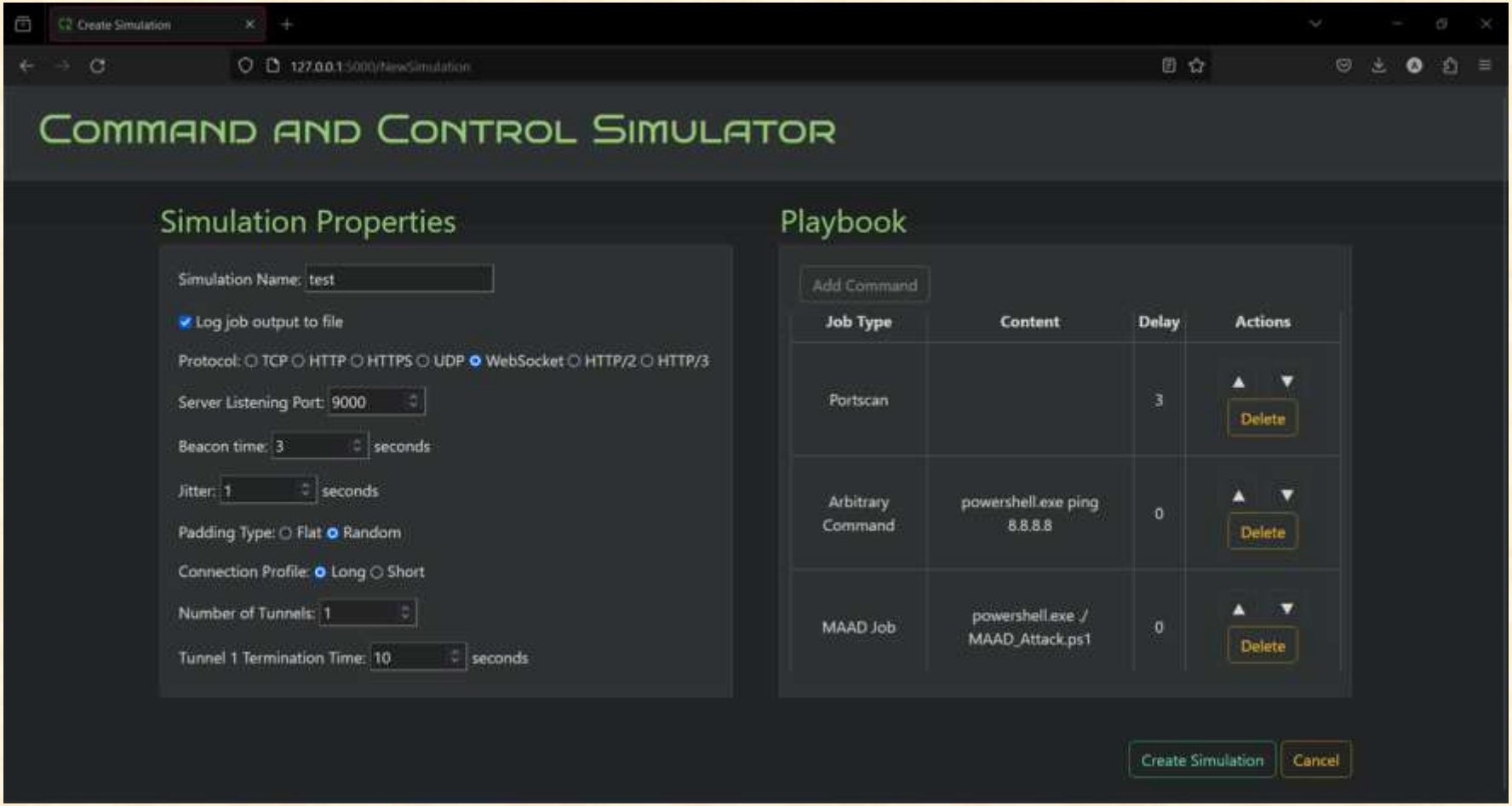




Result of 24 Hour Job



Configuring a WebSocket Job



The Client Terminal in Action

```
{'status': 'success'}
Job Result Successfully Sent to Server

Handling job Exfiltrate Data
Sending job response to server for job Exfiltrate Data
Connection is present
Connection<ConnectionKey(host='127.0.0.1', port=9000, is_ssl=False, ssl=None, proxy=None, proxy_auth=None, proxy_headers_hash=None)>
<ClientResponse(http://127.0.0.1:9000/job_result) [200 OK]>
<CIMultiDictProxy('Content-Type': 'application/json; charset=utf-8', 'Content-Length': '21', 'Date': 'Tue, 20 Feb 2024 00:46:04 GMT', 'Server': 'Python/3.12 aiohttp/3.9.1')>

Local address: 127.0.0.1, Local port: 63557
Beacon sent
{'status': 'success'}
Job Result Successfully Sent to Server

Handling job Encrypt File System
Sending job response to server for job Encrypt File System
Connection is present
Connection<ConnectionKey(host='127.0.0.1', port=9000, is_ssl=False, ssl=None, proxy=None, proxy_auth=None, proxy_headers_hash=None)>
<ClientResponse(http://127.0.0.1:9000/job_result) [200 OK]>
<CIMultiDictProxy('Content-Type': 'application/json; charset=utf-8', 'Content-Length': '21', 'Date': 'Tue, 20 Feb 2024 00:46:05 GMT', 'Server': 'Python/3.12 aiohttp/3.9.1')>

Local address: 127.0.0.1, Local port: 63557
Beacon sent
{'status': 'success'}
Job Result Successfully Sent to Server

Handling job Arbitrary Command
Files found, no need to download
b'\r\n'
b'Pinging 8.8.8.8 with 32 bytes of data:\r\n'
b'Reply from 8.8.8.8: bytes=32 time=14ms TTL=55\r\n'
b'Reply from 8.8.8.8: bytes=32 time=14ms TTL=55\r\n'
b'Reply from 8.8.8.8: bytes=32 time=15ms TTL=55\r\n'
b'Reply from 8.8.8.8: bytes=32 time=15ms TTL=55\r\n'
b'\r\n'
b'Ping statistics for 8.8.8.8:\r\n'
b'    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),\r\n'
b'Approximate round trip times in milli-seconds:\r\n'
b'    Minimum = 14ms, Maximum = 15ms, Average = 14ms\r\n'

Sending job response to server for job Arbitrary Command
Connection is present
Connection<ConnectionKey(host='127.0.0.1', port=9000, is_ssl=False, ssl=None, proxy=None, proxy_auth=None, proxy_headers_hash=None)>
<ClientResponse(http://127.0.0.1:9000/job_result) [200 OK]>
```

What’s left to do?

- Webshells
- REST API
- Malleable Profile
- HTTP/3
- Graph Job Start Times on Web UI

Questions?