

Game Server Networking with Envoy

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\$ bash whoami

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Agenda

- Game Server Networking
- Envoy Basics
- Envoy Uses in Gaming
- Envoy Internals

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Game Server Networking Goals

Scale

Performance

Availability

Security

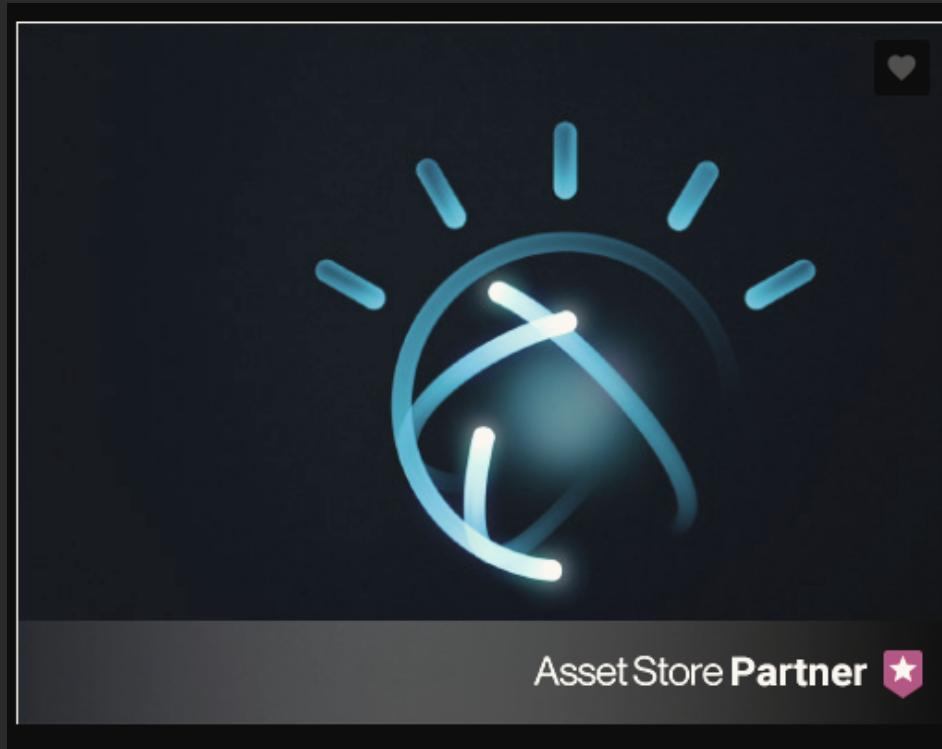
Fleet Upgrades

Speech Feature Rollouts



<https://blogs.unity3d.com/2018/02/20/bringing-the-power-of-ai-to-developers-with-the-ibm-watson-unity-sdk/>

Speech Feature Rollouts



<https://assetstore.unity.com/packages/tools/ai/ibm-watson-unity-sdk-108831>

Speech Feature Rollouts



Envoy

- Intelligent proxy deployed as a sidecar
- Intercept & manages network traffic
- Security/Identity
- TLS termination
- Low memory footprint
- Language Agnostic



Summary

The network should be transparent to applications. When network and application problems do occur it should be easy to determine the source of the problem.

www.envoyproxy.io/docs/envoy/v1.7.0/intro/what_is_envoy

Envoy's Role in Istio



Listener

- One to many number of listeners per Envoy process
- Proxies event when connection is made to listeners
- Configured with network or listener filters
- Listener binding
 - Freebind
 - Transparent
- TCP only (UDP soon)

Clusters

- Collection of similar hosts for Envoy connections
- Determined through various service discovery systems
- Can be configured either from a static list or dynamic API
- Warmed on initial boot

Filters

- Listener
 - Original Destination
 - TLS Inspector
- Network (Layer 3 & 4)
 - Rate limiting
 - Mongo
 - TCP Proxy
- HTTP
 - Fault injection
 - Router

Serializing/Deserializing

- Envoy Custom Codecs...

xDS APIs

- Route Discovery Service (RDS)
- Endpoint Discovery Service (EDS)
- Cluster Discovery Service (CDS)
- Listener Discovery Service (LDS)
- Aggregated Discovery Service (ADS)

Route Discovery Service

```
{  
  "validate_clusters": "...",  
  "virtual_hosts": [],  
  "internal_only_headers": [],  
  "response_headers_to_add": [],  
  "response_headers_to_remove": [],  
  "request_headers_to_add": []  
}
```

Endpoint Discovery Service

```
{  
  "cluster_name": "...",  
  "endpoints": [],  
  "policy": "..."  
}
```

Cluster Discover Service

```
{  
    "name": "...",  
    "alt_stat_name": "...",  
    "type": "...",  
    "eds_cluster_config": "...",  
    "connect_timeout": "...",  
    "per_connection_buffer_limit_bytes": "...",  
    "lb_policy": "...",  
    "hosts": [],  
    "health_checks": [],  
    "max_requests_per_connection": "...",  
    "circuit_breakers": "...",  
    "tls_context": "...",  
    "common_http_protocol_options": "...",  
    "http_protocol_options": "...",  
    "http2_protocol_options": "...",  
    "dns_refresh_rate": "...",  
    "dns_lookup_family": "...",  
    "dns_resolvers": [],  
    "outlier_detection": "...",  
    "cleanup_interval": "...",  
    "upstream_bind_config": "...",  
    "lb_subset_config": "...",  
    "ring_hash_lb_config": "...",  
    "common_lb_config": "...",  
    "transport_socket": "...",  
    "metadata": "...",  
    "protocol_selection": "...",  
    "upstream_connection_options": "...",  
    "close_connections_on_host_health_failure": "...",  
    "drain_connections_on_host_removal": "..."  
}
```

Listener Discover Service (LDS)

```
{  
  "name": "...",  
  "address": "{...}",  
  "filter_chains": [],  
  "use_original_dst": "...",  
  "per_connection_buffer_limit_bytes": "...",  
  "metadata": "...",  
  "drain_type": "...",  
  "listener_filters": [],  
  "transparent": "...",  
  "freebind": "...",  
  "tcp_fast_open_queue_length": "..."  
}
```

Aggregated Discovery Service (ADS)

- Single sequenced delivery of configuration
 - Istio 1.0 style
- Combines CDS/RDS/EDS
- Bidirectional stream
- gRPC style only

Backup

Envoy Threading Model

