

# Real-Time GIS: Best Practices



RJ Sunderman  
Product Engineer  
GeoEvent Extension  
[rjsunderman@esri.com](mailto:rjsunderman@esri.com)



C. Adam Mollenkopf  
Real-Time GIS  
Capability Lead  
[amollenkopf@esri.com](mailto:amollenkopf@esri.com)  
[@amollenkopf](https://twitter.com/amollenkopf)

# What are we going to discuss?

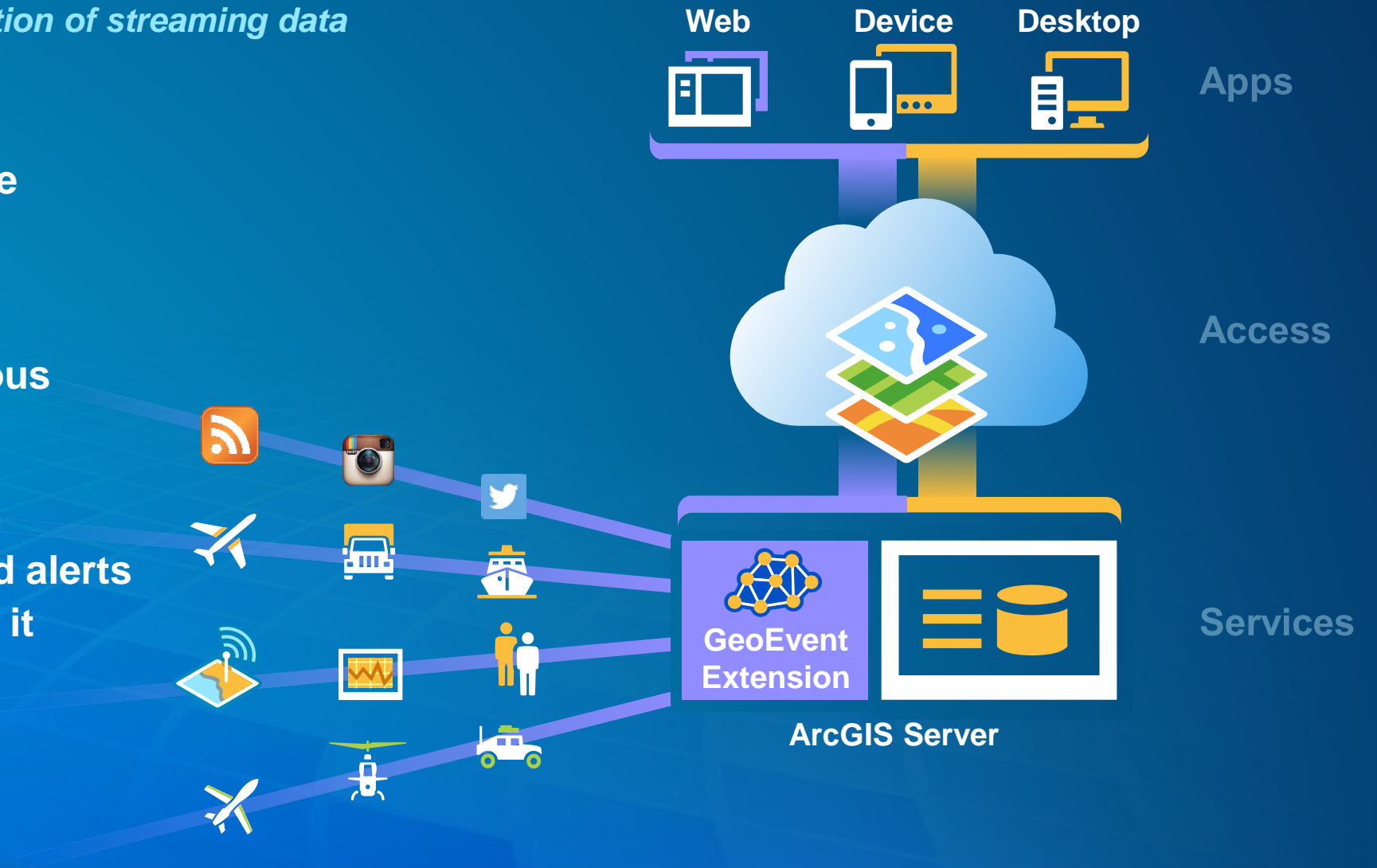
*Best Practices on*

- **Input and Output Connector usage**
- **Where, when, and why GeoEvent Definitions are created**
- **Feature Services and Stream Services workflows**
- **Performance**
- **High Availability & Scalability**

# Real-Time GIS

*Integration and exploitation of streaming data*

- Integrates real-time streaming data into ArcGIS
- Performs continuous processing and real-time analytics
- Sends updates and alerts to those who need it where they need it



The background is a solid blue color. On the left side, there are several overlapping geometric shapes in shades of purple and yellow. One of these shapes is a yellow map fragment showing a grid pattern, likely representing a geographic area. The text is positioned in the center-right of the slide.

# Best Practice:

How do I get my real-time data into ArcGIS?

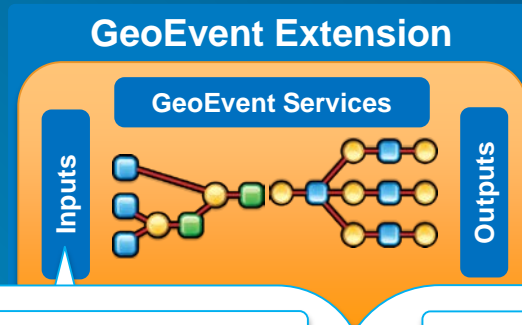


Use an existing connector

# How do I get my real-time data into ArcGIS?

Easily integrate real-time streaming data into ArcGIS using an Input Connector

## GeoEvent Extension



You can create your own connectors.

### Out of the Box

- Poll an ArcGIS Server for Features
- Poll an external website for GeoJSON, JSON, or XML
- Receive Features, GeoJSON, JSON, or XML on a REST endpoint
- Receive GeoJSON or JSON on a WebSocket
- Receive RSS
- Receive Text from a TCP or UDP Socket
- Subscribe to an external WebSocket for GeoJSON or JSON
- Watch a Folder for new CSV, GeoJSON, or JSON Files

### Esri Gallery



- ActiveMQ
- CAP
- CoT Cursor-on-Target
- esd Exploitation Support Data
- Instagram
- KML
- Kafka \*
- MQTT
- NMEA 0183
- RabbitMQ
- Sierra Wireless (RAP)
- Trimble (TAIP)
- Twitter

### Partner Gallery

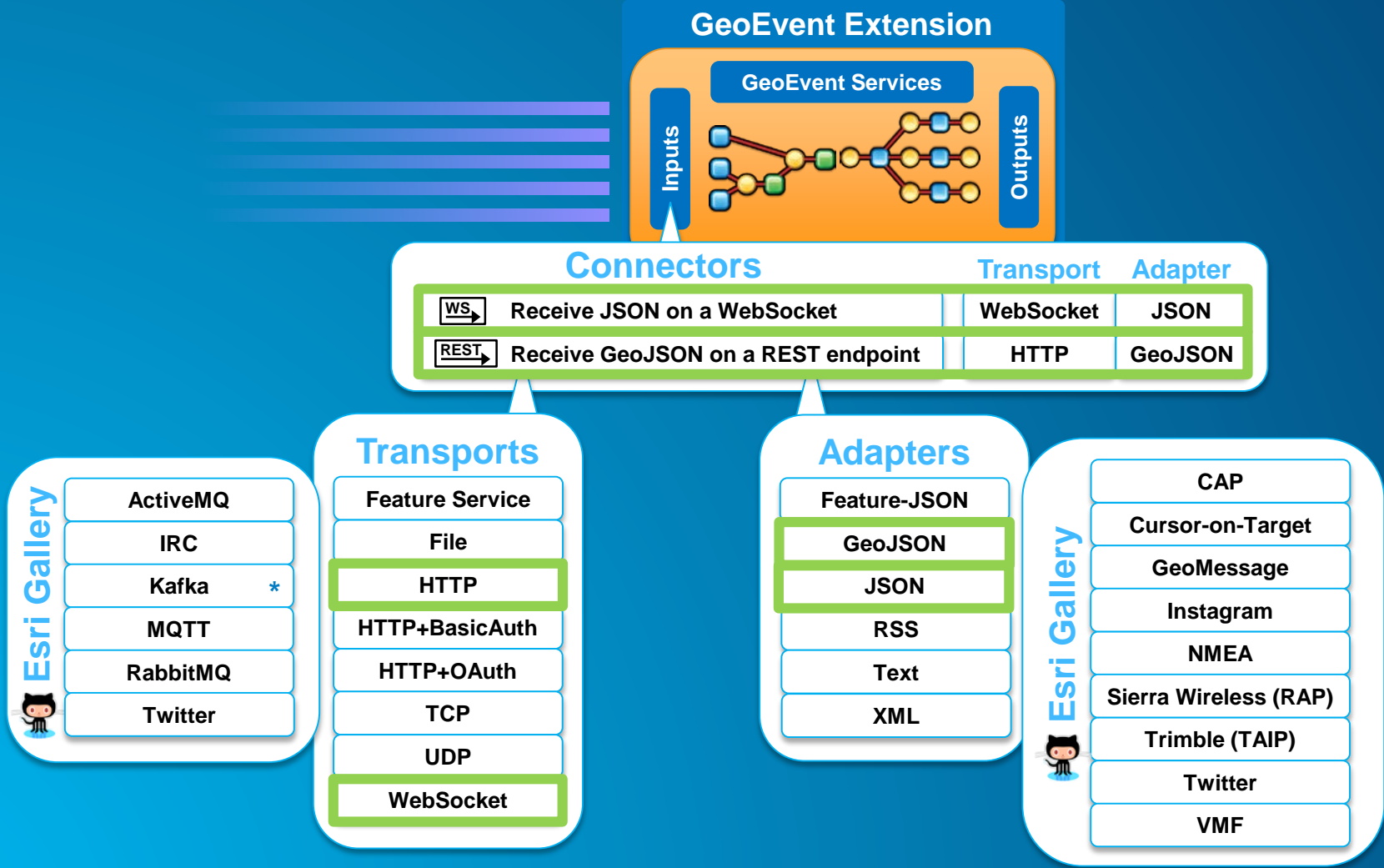
- CompassLDE
- enviroCar
- exactEarth AIS
- FAA (ASDI) \*
- GNIP \*
- Networkfleet \*
- OSIsoft \*
- Valarm
- Zonar \*



Input Connector = Adapter + Transport

# How do I get my real-time data into ArcGIS?

Easily integrate real-time streaming data into ArcGIS using an Input Connector







Adjust an existing connector

# How do I get my real-time data into ArcGIS?

*Easily integrate real-time streaming data into ArcGIS using an Input Connector*

**ArcGIS GeoEvent Manager** Services Site Logs

GeoEvent Components Settings

GeoEvent Definitions  
Tags  
GeoFences  
**Connectors**  
Configuration Store  
Data Stores

**Connectors**

Show: Inbound

Label	Type	Description	
Poll an ArcGIS Server for Features	inbound	Polls a feature service for features and converts them to GeoEvents.	
Poll an External Website for Geo-JSON	inbound	Polls an external website (URL) for Geo-JSON and converts it to GeoEvents.	
Poll an External Website for JSON	inbound	Polls an external website (URL) for JSON and converts it to GeoEvents.	
Poll an External Website for XML	inbound	Polls an external website (URL) for XML and converts it to GeoEvents.	
Receive Features on a REST Endpoint	inbound	Receives features as JSON and converts them to GeoEvents.	
Receive Geo-JSON on a REST Endpoint	inbound	Receives generic Geo-JSON on a REST endpoint and converts it to GeoEvents.	
Receive GeoJSON on a	inbound	Receives GeoJSON over a WebSocket and converts it to GeoEvents.	

- You can copy any of the out-of-the-box connectors and tailor their properties.

# How do I get my real-time data into ArcGIS?

*Easily integrate real-time streaming data into ArcGIS using an Input Connector*

**ArcGIS GeoEvent Manager** Services Site Logs

GeoEvent Components Settings

**Editing Connector - custom-external-geojson-poll-copy** Save Cancel

Name:\*

Label:\*

Description:

Type:  Input  Output

Adapter:

Transport:

Default Input Name:\*

**Configure Properties** ?

**Shown Properties**

- URL
- GeoEvent Definition Name (Existing)
- HTTP Method

**Update Property Definition** X

Source: HTTP (Transport)

Type: String

Description: Base URL that the REST Transport will connect to

Name: clientURL

Label:

Source Default Value: [no default value defined]

Overwrite Default Value:

Default Value:

Save Cancel



# How do I get my real-time data into ArcGIS?

*Easily integrate real-time streaming data into ArcGIS using an Input Connector*

The screenshot displays the ArcGIS GeoEvent Manager interface. The main window is titled "Editing Connector - custom-external-geojson-poll-copy". The "Name" field is "custom-external-geojson-poll-copy" and the "Label" is "Poll USGS for earthquakes recorded". The "Description" is "Polls the USGS geoJSON feed for all". The "Type" is set to "Input". The "Adapter" is "GeoJSON".

The "Transport" dropdown menu is open, showing the following options: HTTP, FeatureService, File, HTTP, HTTP-BasicAuthentication, HTTP-OAuth1 (selected), TCP, UDP, and WebSocket. The "Default Input Name" dropdown menu is also open, showing the same options, with HTTP-OAuth1 selected.

The "Configure Properties" section is visible at the bottom, with "Shown Properties" including: URL, GeoEvent Definition Name (Existing), and HTTP Method. The "Properties" section includes: Receive New Data Only, Frequency (in seconds), Header Parameter Name:Value List, Post From, Post Parameters, Post Body, and Post body MIME Type.

# How do I get my real-time data into ArcGIS?

*Easily integrate real-time streaming data into ArcGIS using an Input Connector*



Configure a new connector using an out-of-the-box adapter / transport

Type:  Input  Output

Adapter:  Generic-JSON

- Generic-JSON**
- GeoJSON
- JSON
- RSS
- Text
- Xml

Transport:  FeatureService

- FeatureService**
- File
- HTTP
- HTTP-BasicAuthentication
- HTTP-OAuth1
- TCP
- UDP
- WebSocket

# How do I get my real-time data into ArcGIS?

*Easily integrate real-time streaming data into ArcGIS using an Input Connector*



Download a connector, adapter, or transport from an Esri repository

ArcGIS GeoEvent Gallery

Welcome to the ArcGIS GeoEvent Gallery. Here you'll find the latest content available for ArcGIS GeoEvent Extension for Server.

Group Content

	Relevance	Title	Owner	Rating	Views	Date
		Connector - Hadoop for GeoEvent (ArcGIS 10.2.x)				
Hadoop for GeoEvent includes a connector to log events to a Hadoop HDFS file system.						
		Connector - Verizon Networkfleet for GeoEvent				
Verizon Networkfleet for GeoEvent includes a connector to receive Networkfleet data.						
		Connector - Twitter for GeoEvent				
Twitter for GeoEvent includes connectors for sending and receiving Tweets.						
		Connector - KML Connector for GeoEvent (ArcGIS 10.2.x)				
The KML Connector for GeoEvent sends event data to KML.						
		Connector - NMEA 0183 for GeoEvent (ArcGIS 10.2.x)				
The NMEA 0183 Connector for GeoEvent includes a connector for receiving data feeds from marine electronic devices.						
		Connector - ActiveMQ for GeoEvent (ArcGIS 10.2.x)				
ActiveMQ for GeoEvent includes connectors for sending and receiving messages correspondingly.						

## solutions-geoevent-java

The solutions-geoevent-java repository includes custom connectors for use with ArcGIS GeoEvent Processor for Server.

### Adapters

- Common Alert Protocol (CAP) Adapter
- CoT Adapter
- Exploitation Support Data (ESD) Adapter
- Geomessage Adapter
- regex Text Adapter

### Processors

- Bearing Processor
- Buffer Processor
- Ellipse Processor
- Event Volume Control Processor
- Field Grouper Processor
- Query Report Processor
- Range Fan Processor
- Symbol Lookup Processor
- unitConverter Processor
- Update Only Processor

### Transports

- IRC Transport
- TCP Squirt Transport



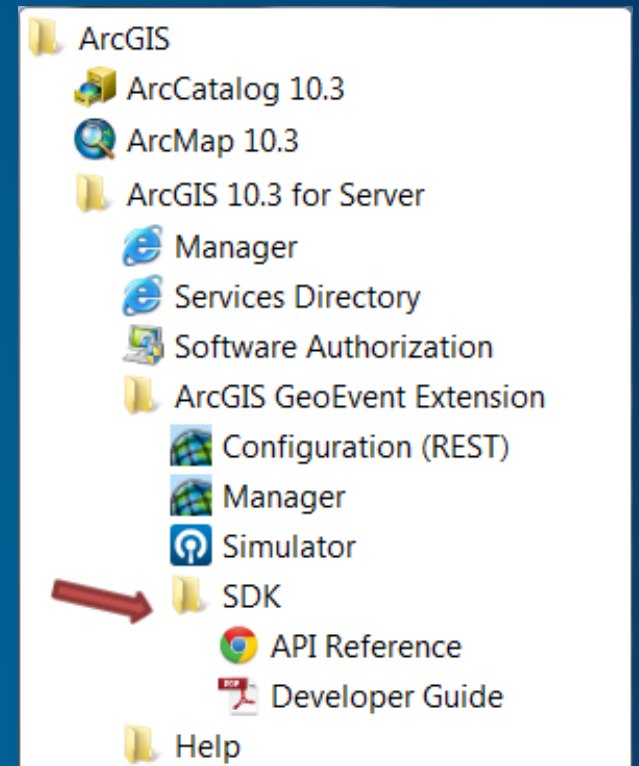
• <http://links.esri.com/geoevent-gallery>

• <https://github.com/Esri/solutions-geoevent-java>

# How do I get my real-time data into ArcGIS?

*Easily integrate real-time streaming data into ArcGIS using an Input Connector*

- Use an existing inbound connector available out-of-the-box
- Copy and customize an out-of-the-box connector to meet your needs
- Configure a new connector using available adapters and/or transports
- Download connectors, adapters, and/or transports from Esri Galleries and GitHub repositories
  - Source code is available from GitHub for customization or to use as a reference
- Develop your own adapter / transport using the GeoEvent SDK
  - The SDK and a Developer's Guide are included in the GeoEvent extension product's installation folder

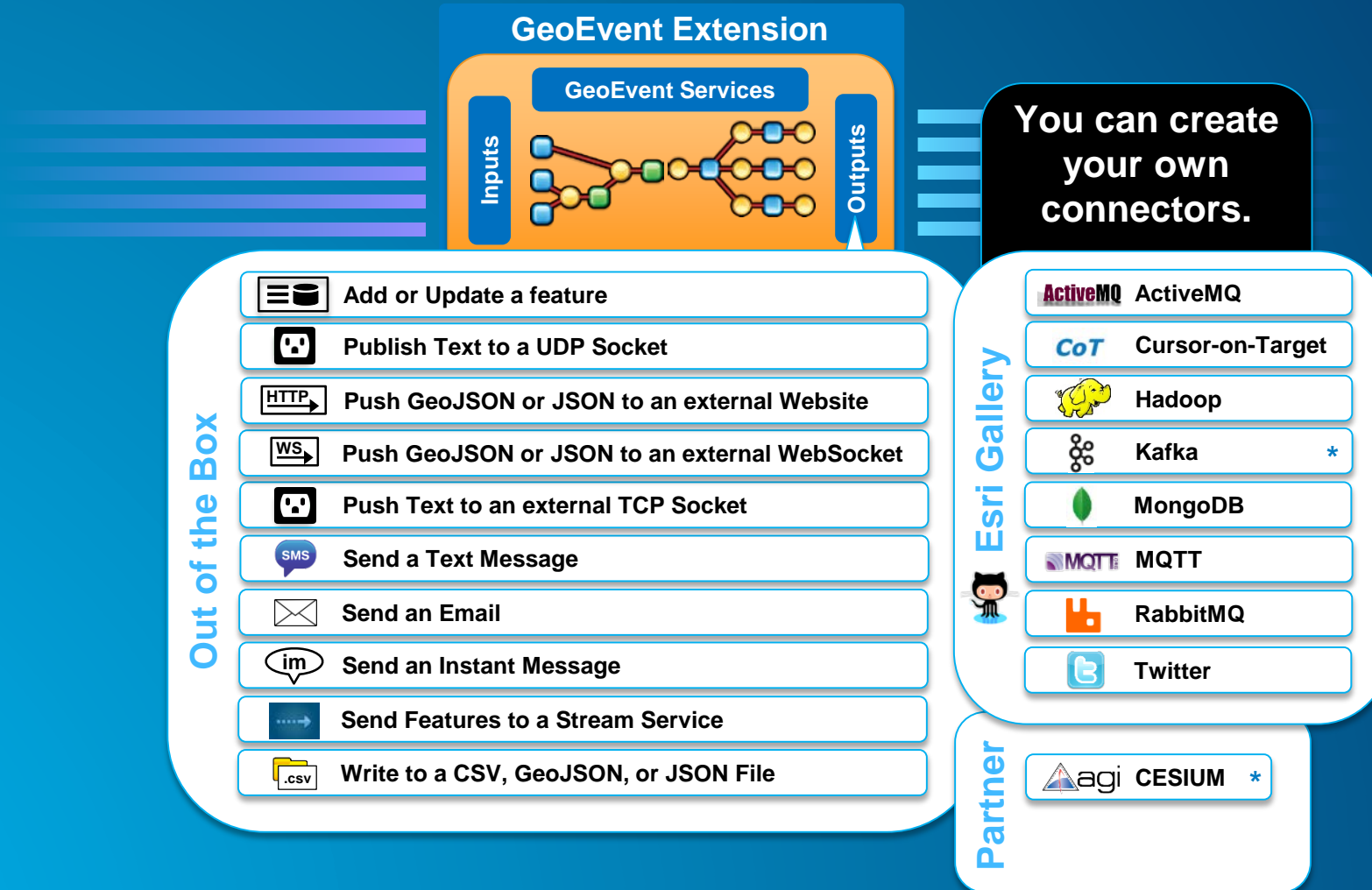


# Best Practice:

How do I update & alert those  
who need it where they need it?

# How do I update and alert those who need it where they need it?

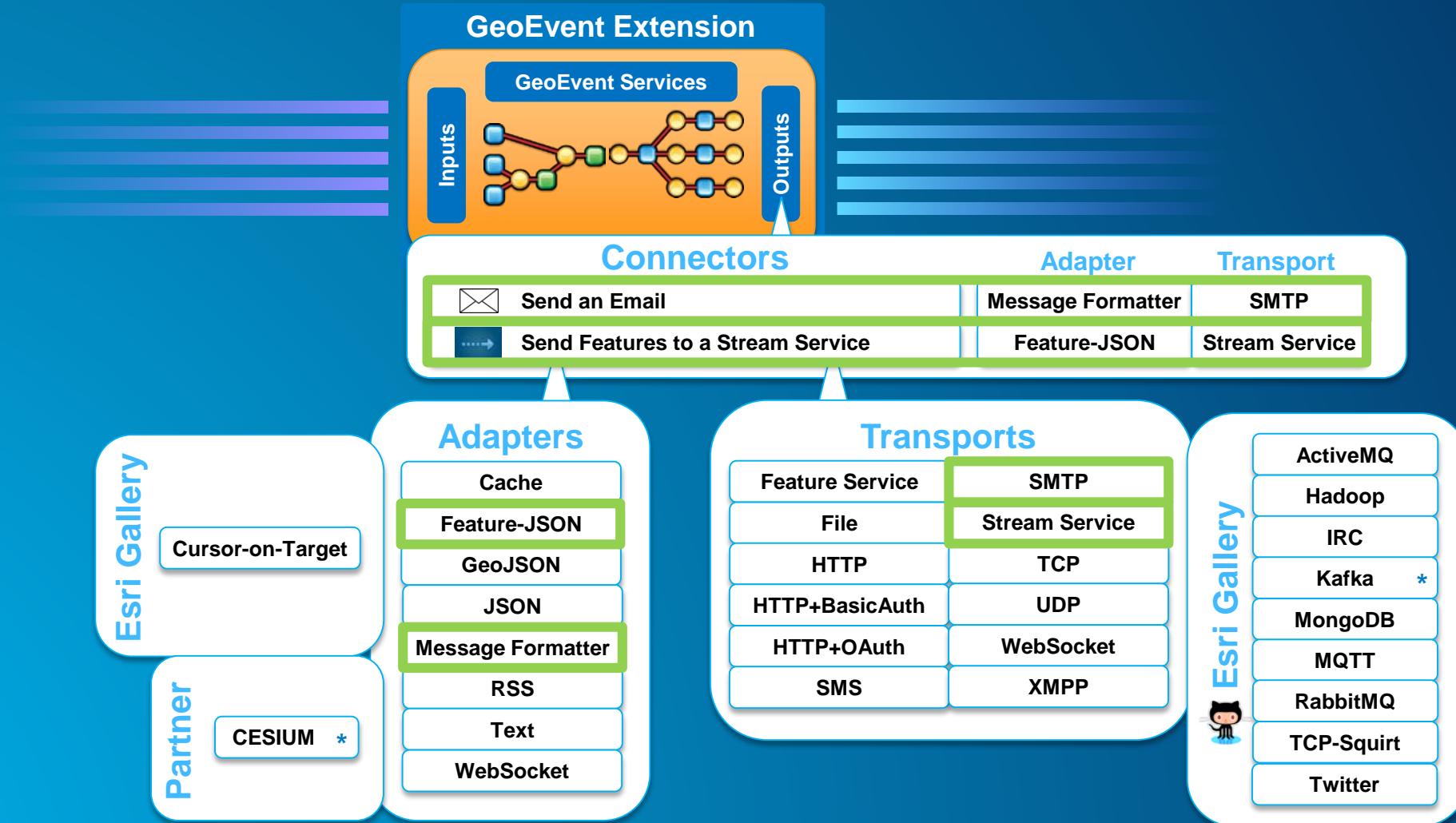
*Easily disseminate notifications, alerts, and updates using an Output Connector*





# How do I update and alert those who need it where they need it?

*Output Connector = Adapter + Transport*





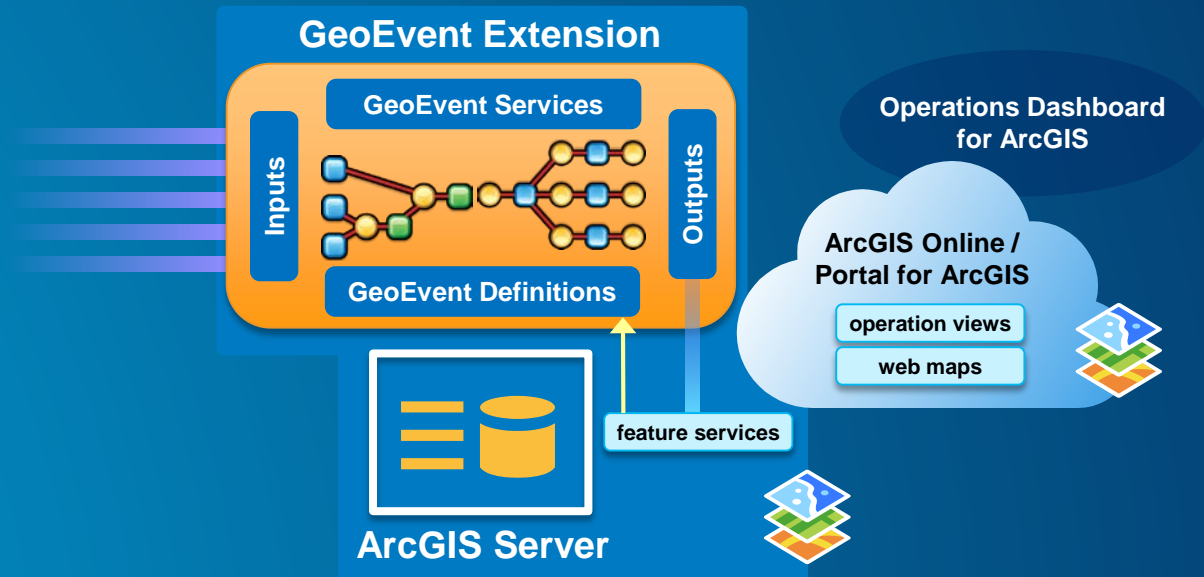
# Best Practice:

When and why are GeoEvent Definitions created?

# When and why are GeoEvent Definitions created?

*Authoring GeoEvent Definitions – Importing from a feature service*

- Connect an **output** to your feature
- Import the schema of your feature as a **GeoEvent Definition**
- Configure an **input** to receive real-time data
- Author and publish a **GeoEvent Service**
- Visualize your real-time feature



# When and why are GeoEvent Definitions created?

*Authoring GeoEvent Definitions – Creating using GeoEvent Manager*



You own GeoEvent Definitions you either import or create manually using the GeoEvent Manager

The screenshot displays the ArcGIS GeoEvent Manager interface. The main window has a title bar with 'ArcGIS GeoEvent Manager' and navigation tabs for 'Services', 'Site', and 'Logs'. Below the title bar are tabs for 'GeoEvent', 'Components', and 'Settings'. The 'GeoEvent' tab is active, showing a form for creating a new GeoEvent Definition. The 'GeoEvent Definition Name' is 'ASDI-Flights' and the 'Owner Name' is 'admin'. There are 'Save' and 'Cancel' buttons. Below the form is a table for 'Fields for ASDI-Flights' with columns for 'Name' and 'Type'. A 'New Field' button is visible. A 'New Field' dialog box is open, prompting the user to specify the name of the new field. The dialog box has fields for 'Field Name', 'Type' (set to 'String'), and 'Cardinality' (set to 'One'). It also has sections for 'Available Tags' (containing 'TRACK\_ID') and 'Added Tags'. There are 'Create' and 'Cancel' buttons at the bottom of the dialog box.

**ArcGIS GeoEvent Manager** Services Site Logs

GeoEvent Components Settings

Save Cancel

GeoEvent Definition Name: \* ASDI-Flights

Owner Name: admin

Fields for ASDI-Flights

New Field Reorder Fields

Name	Type
------	------

**New Field**

Specify the name of the new field.

Field Name: ?

Type: ? String

Cardinality: ? One

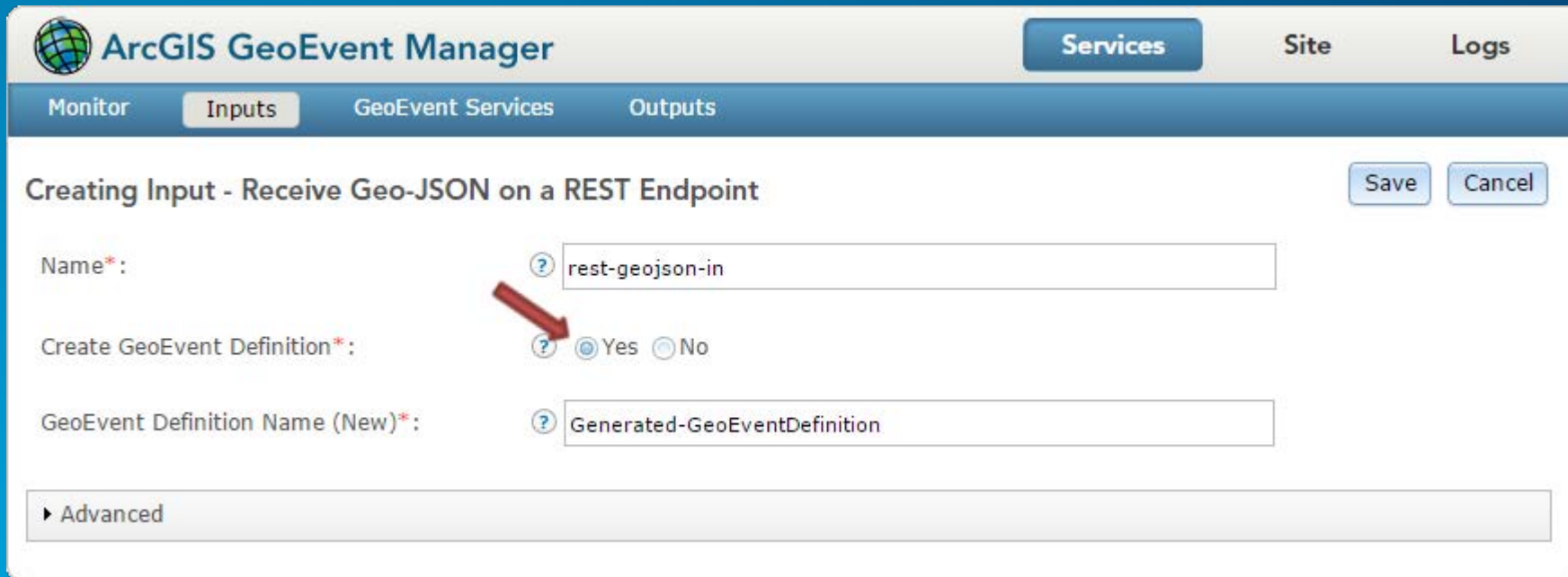
? Available Tags Added Tags

TRACK\_ID

Create Cancel

# When and why are GeoEvent Definitions created?

*Auto-generated GeoEvent Definitions – Created by an inbound connector*



The screenshot shows the ArcGIS GeoEvent Manager interface. The main window title is "ArcGIS GeoEvent Manager" with tabs for "Services", "Site", and "Logs". Below this is a sub-menu with "Monitor", "Inputs", "GeoEvent Services", and "Outputs". The "Inputs" tab is active, and the dialog title is "Creating Input - Receive Geo-JSON on a REST Endpoint". There are "Save" and "Cancel" buttons in the top right. The form contains three fields: "Name\*" with the value "rest-geojson-in", "Create GeoEvent Definition\*" with radio buttons for "Yes" (selected) and "No", and "GeoEvent Definition Name (New)\*" with the value "Generated-GeoEventDefinition". A red arrow points to the "Yes" radio button. At the bottom, there is an "Advanced" section with a right-pointing arrow.

- The adapter will make a best-guess based on data discovered in the first event received
- You can copy and tailor auto-generated GeoEvent Definitions to meet your needs
  - But you should not edit an event definition owned or created by an adapter

# When and why are GeoEvent Definitions created?

*Managed GeoEvent Definitions – Created by a processor from within a GeoEvent Service*

- **A *managed* GeoEvent Definition is created when a processor adds or removes a field from a GeoEvent**

- Field Calculator
- Geotagger
- Field Enricher
- Buffer Creator (etc...)

- **Publishing changes to a GeoEvent Service signals the owning processor to delete its *managed* GeoEvent Definition**

- **This can present you with issues you need to work around...**

- Field Mapping
- Stream Services
- Custom Processors



**Be aware of the GeoEvent Definition associated with your GeoEvent(s) at every stage of your event processing**

*For more information see 'Understanding GeoEvent Definitions' blog:*  
<http://tinyurl.com/o83wjcv>



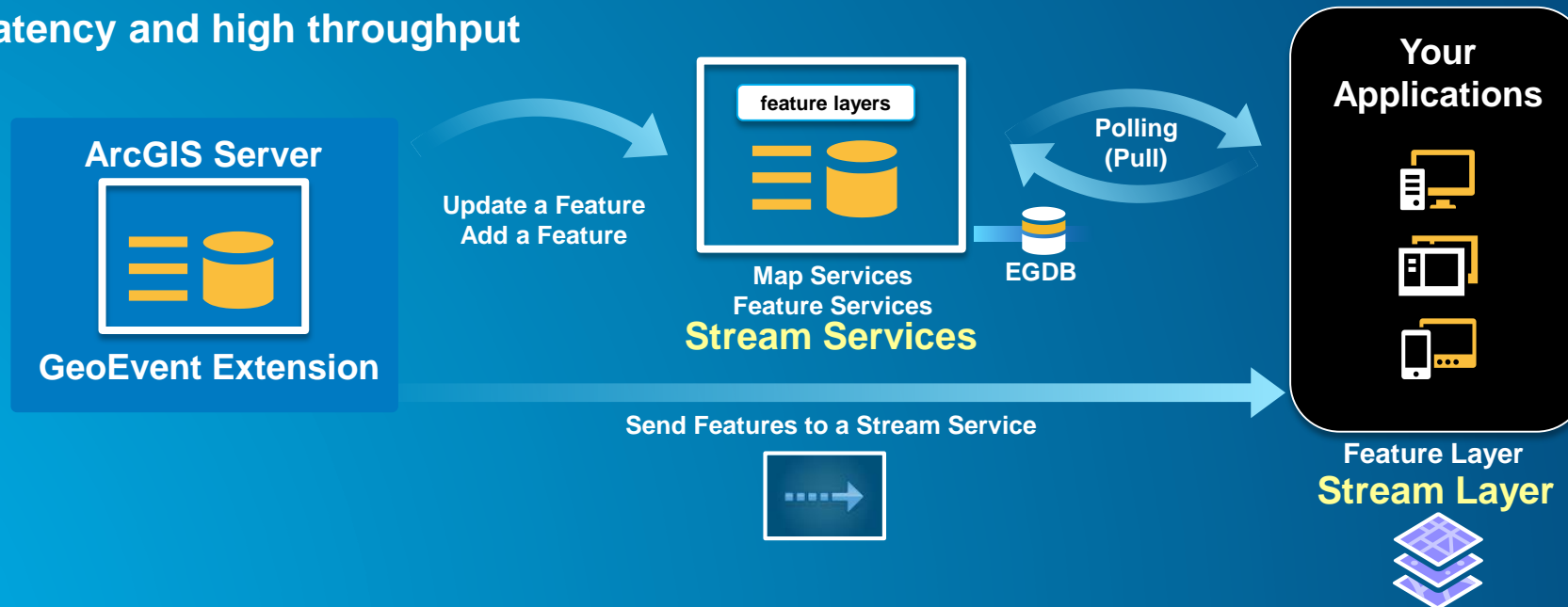
# Best Practice:

When should I use a Feature Service  
vs. a Stream Service?

# When should I use Feature Services vs. Stream Services?

*Two patterns*

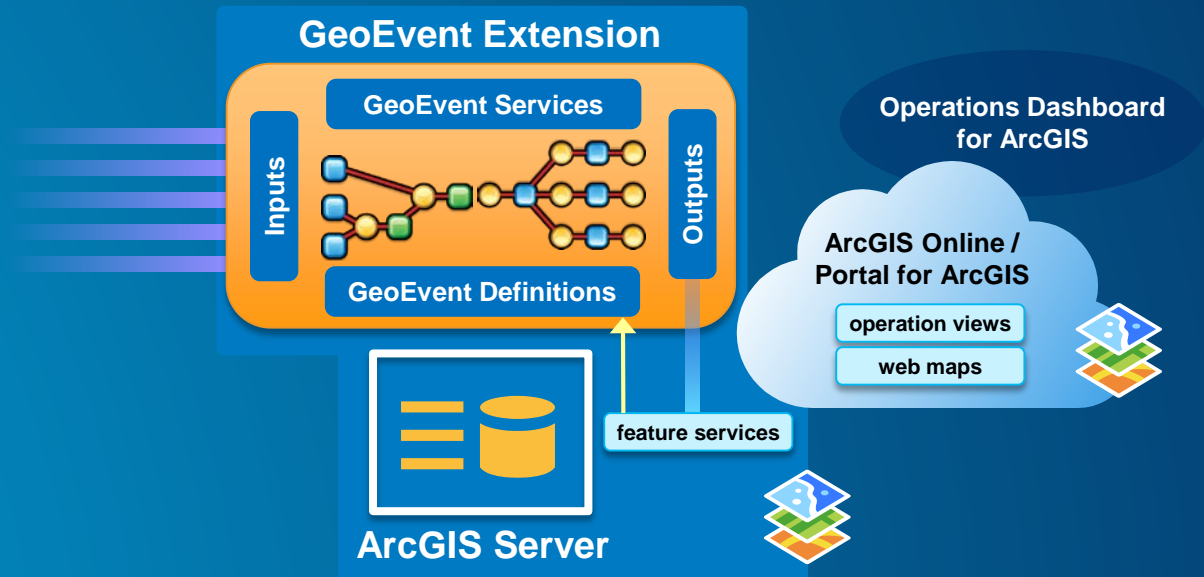
- Feature layers **pull** from feature services
  - Web apps poll to get periodic updates
  - Must be backed by an enterprise geodatabase (EGDB)
- Stream layers **subscribe** to stream services
  - Web apps subscribe to immediately receive data
  - Low latency and high throughput



# What is the recommended workflow for working with Feature Services?

## *Feature Service workflow*

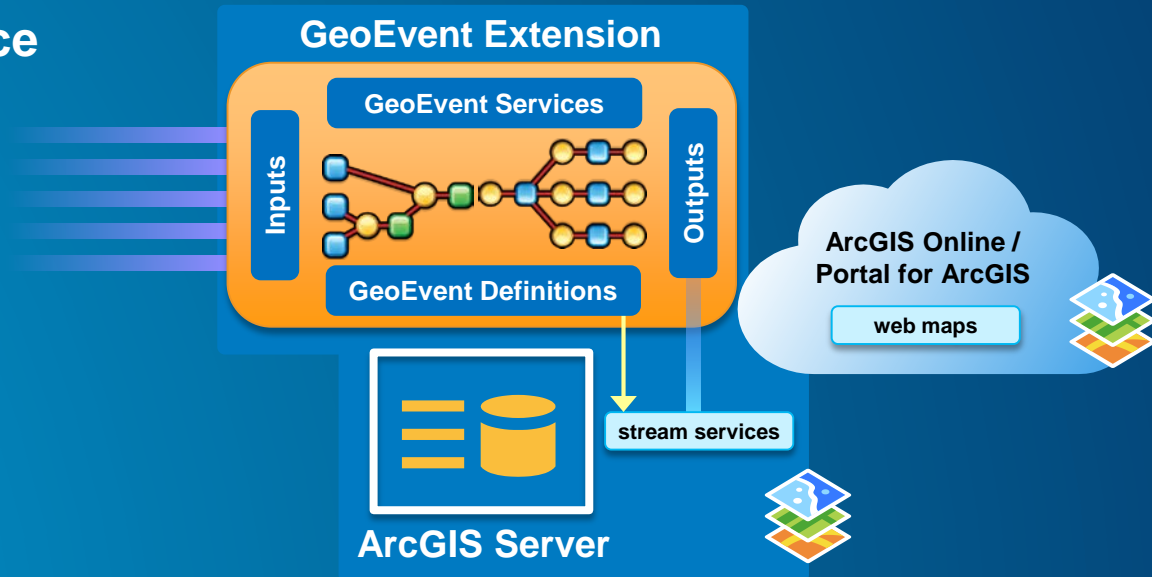
- Connect an **output** to your feature
- Import the schema of your feature as a **GeoEvent Definition**
- Configure an **input** to receive real-time data
- Author and publish a **GeoEvent Service**
- Visualize your real-time feature



# What is the recommended workflow for working with Stream Services?

## *Stream Service workflow*

- Configure an **input** to receive real-time data
- Define a **GeoEvent Definition**
- When creating an **output** publish a **Stream Service** and connect the output to it
- Author and publish a **GeoEvent Service**
- Visualize your real-time stream service
  - Use an ArcGIS Online WebMap
  - Use a custom JavaScript web app



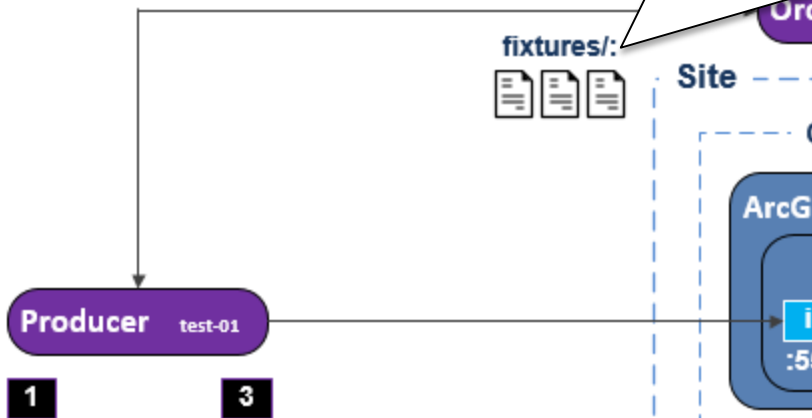
The background features a vibrant blue gradient. On the left side, there are several overlapping geometric shapes: a large purple triangle pointing upwards, a yellow triangle pointing downwards, and a dark purple triangle pointing downwards. These shapes are layered, with the yellow one appearing to be in front of the purple ones. The overall composition is modern and abstract.

# Performance

# How do I measure Performance?

## performance-test-harness-for-geoevent

**Test Harness Orchestrator**  
runs a series of fixtures that specify  
- the GeoEvent host(s) and input / output TCP port  
- timed tests with a rate and a stagger distribution  
- 100 events per second for 60 seconds with a stagger of 100ms  
- and where to record the results, a.k.a. report file



```
Command Prompt - runLocalTCPProducer.bat
C:\geoevent-test-harness>runLocalTCPProducer.bat
C:\geoevent-test-harness>"C:\Program Files\Java\jdk1.7.0_45\bin\java" -jar performance-test-10.3.0.jar -n producer -p tcp -c local
Listening for a connection from the orchestrator.
```

```
Karaf
C:\geoevent-4281>
ArcGIS GeoEvent
Hit '<tab>' for
and '<cmd>' for
Hit '<ctrl-d>' to
GeoEvent>root>
```

```
<Fixtures>
  <Report type="CSV">
    <ReportFile>reports/throughput-1000to3000step1000.csv</ReportFile>
  </Report>

  <DefaultFixture>
    <DefaultSharedConfig protocol="TCP" <!-- also supports WS (Web Socket), RMQ (RabbitMQ)-->
      <Properties>
        <Property name="hosts">host1</Property>
      </Properties>
    </DefaultSharedConfig>

    <ProducerConfig commandPort="5010">
      <Properties>
        <Property name="port">5565</Property>
      </Properties>
    </ProducerConfig>

    <ConsumerConfig commandPort="5020" timeoutInSec="5">
      <Properties>
        <Property name="port">5575</Property>
      </Properties>
    </ConsumerConfig>

    <Simulation>
      <TimeTest eventsPerSec="1000" totalTimeInSec="30" staggeringInterval="10" />
    </Simulation>
  </DefaultFixture>

  <Fixture name="1000 e/s">
    <ProducerConfig>
      <Properties>
        <Property name="simulationFile">simulations/county_envelopes_points_1000.csv</Property>
      </Properties>
    </ProducerConfig>
    <Simulation>
      <TimeTest eventsPerSec="1000"/>
    </Simulation>
  </Fixture>

  ...

  <Fixture name="3000 e/s">
    <ProducerConfig>
      <Properties>
        <Property name="simulationFile">simulations/county_envelopes_points_3000.csv</Property>
      </Properties>
    </ProducerConfig>
    <Simulation>
      <TimeTest eventsPerSec="3000"/>
    </Simulation>
  </Fixture>
</Fixtures>
```

<https://github.com/Esri/performance-test-harness-for-geoevent>

throughput-100to5000step100.xml

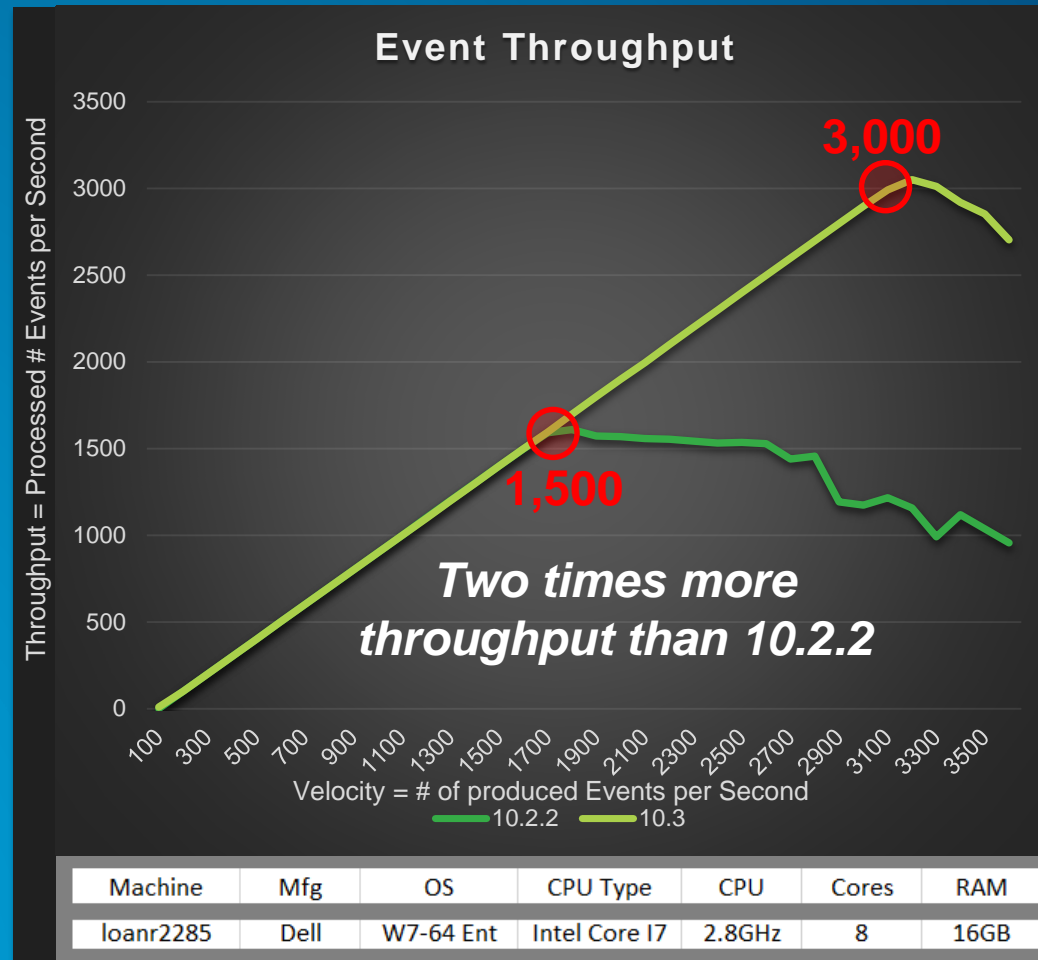
0818416
3673192
3563843

consumer -p tcp -c local



# Throughput Performance Benchmark @ 10.3

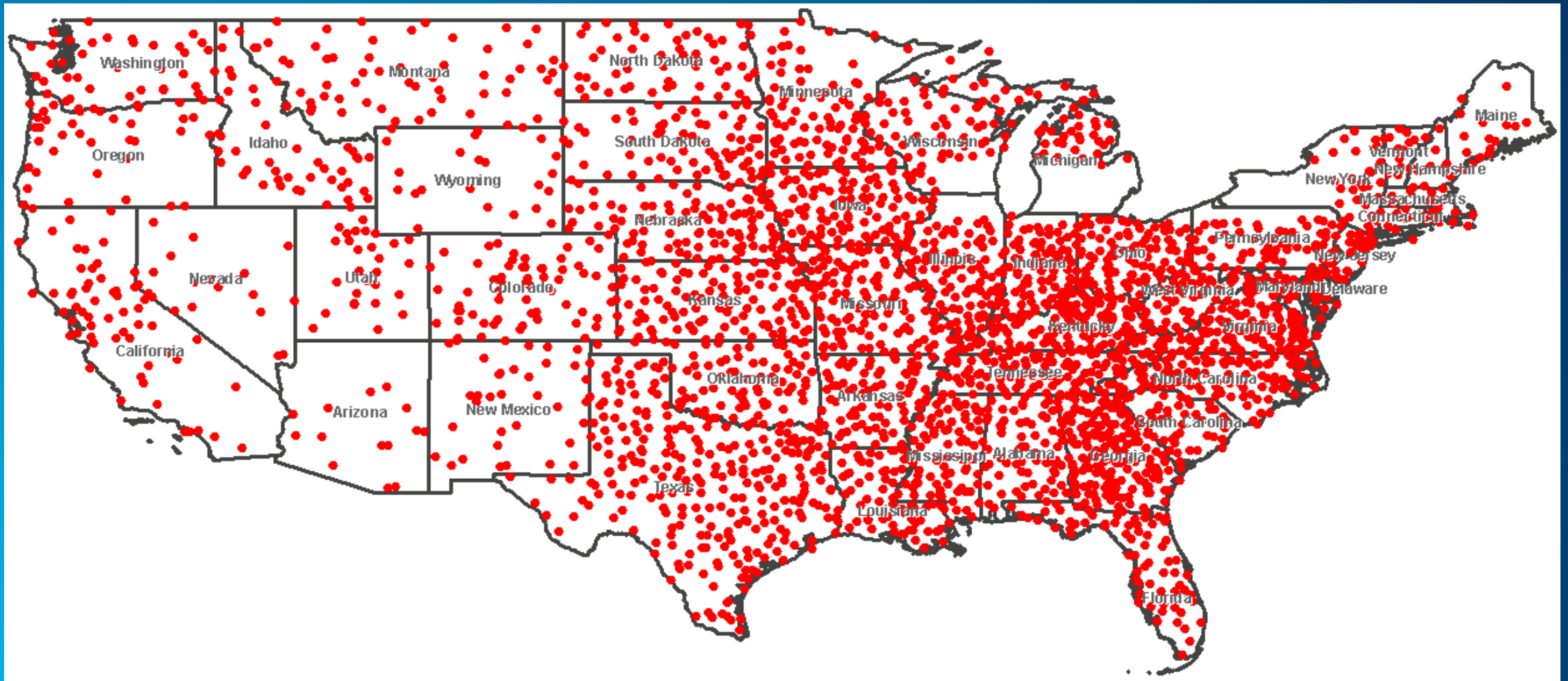
*Two times more throughput than 10.2.2*



As captured on primary benchmarking machine using ArcGIS 10.3

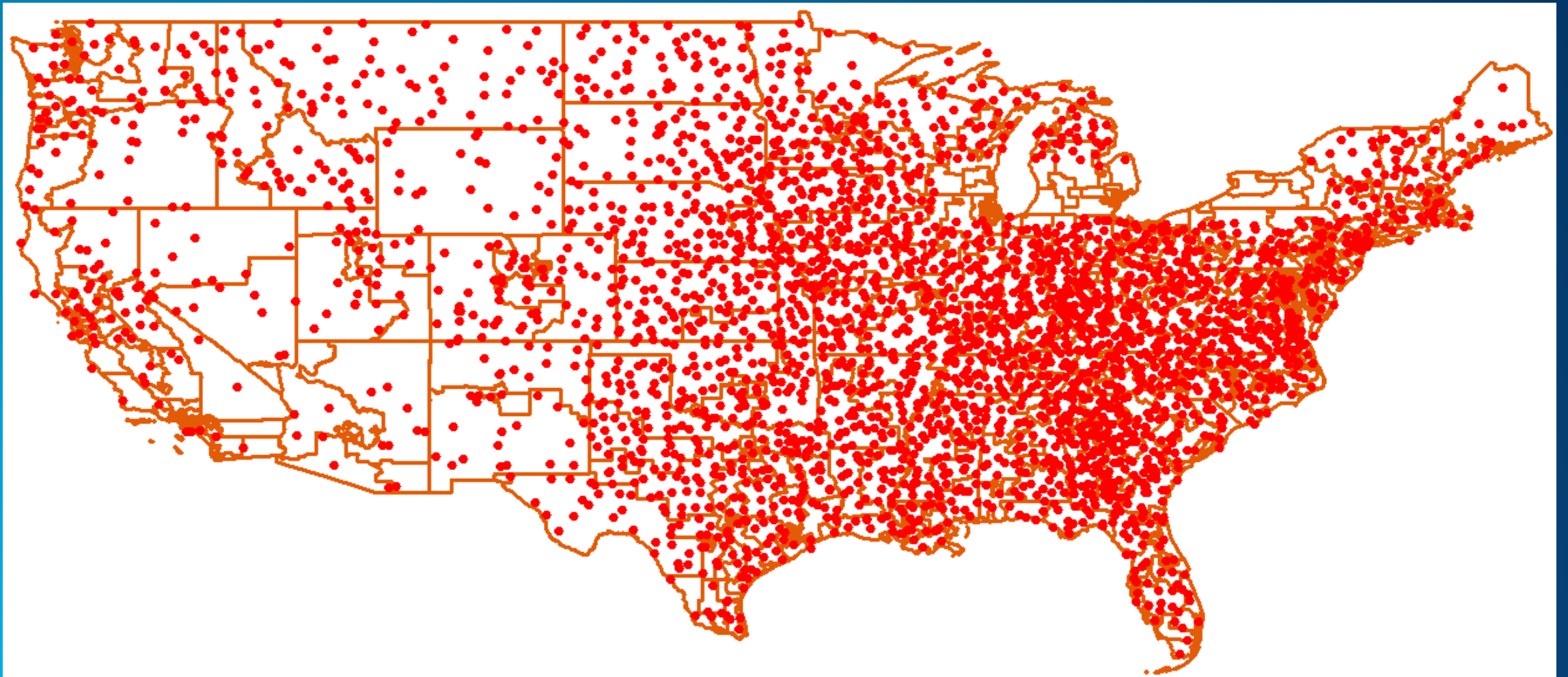
# Geofencing Performance Benchmark @ 10.3

*US States benchmark – 51 geofences with 1,617 vertices on average (78 min / 21,970 max)*



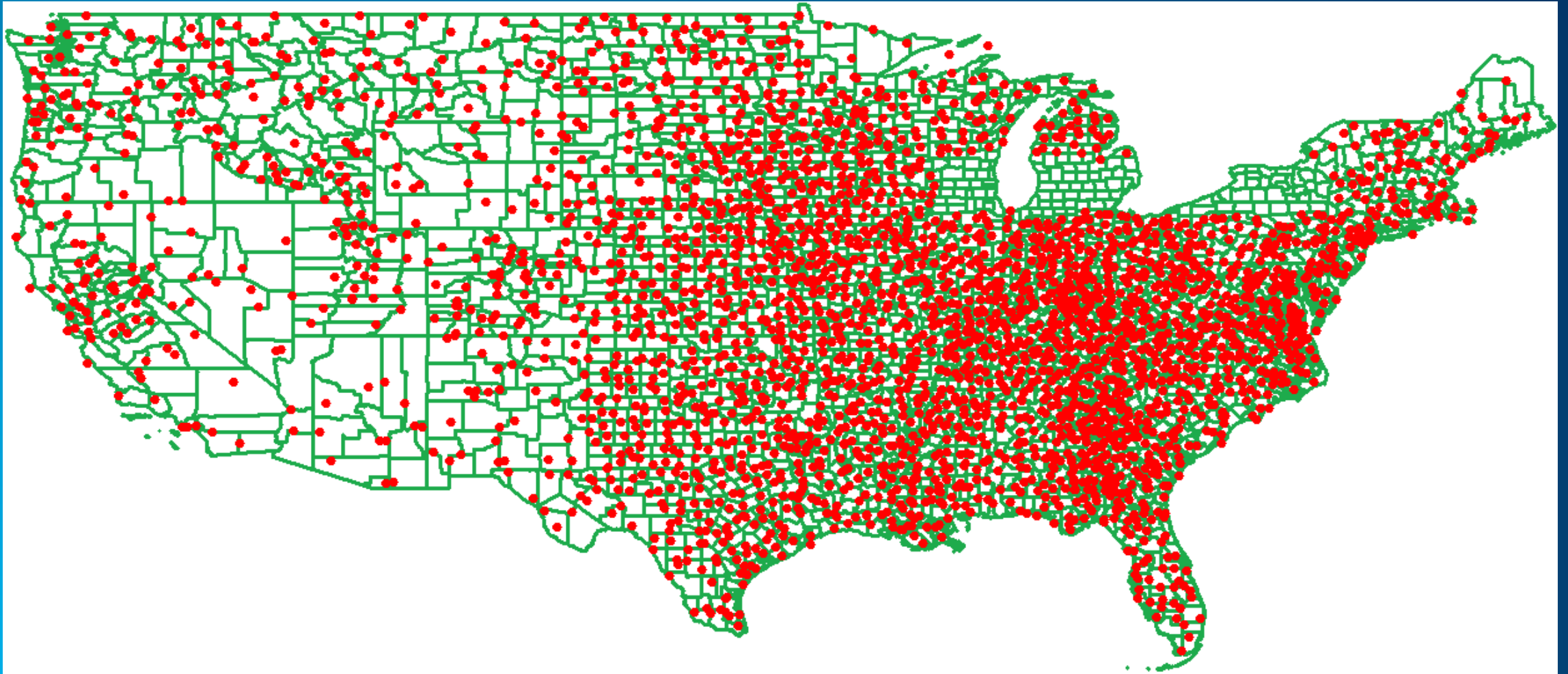
# Geofencing Performance Benchmark @ 10.3

*US Congressional Districts benchmark – 436 geofences with 512 vertices on average (24 min / 7,285 max)*



# Geofencing Performance Benchmark @ 10.3

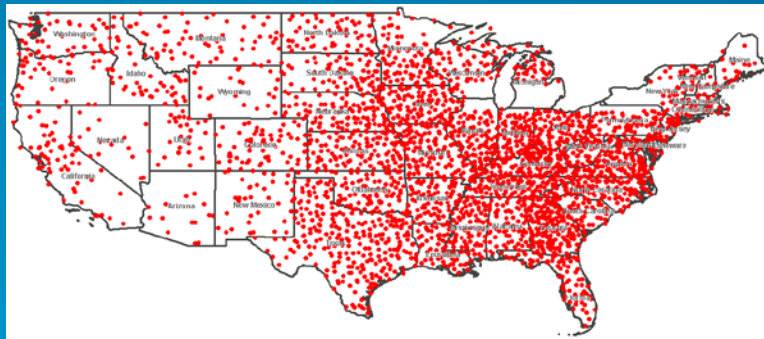
*US Counties benchmark = 3,143 geofences with 166 vertices on average (9 min / 838 max)*



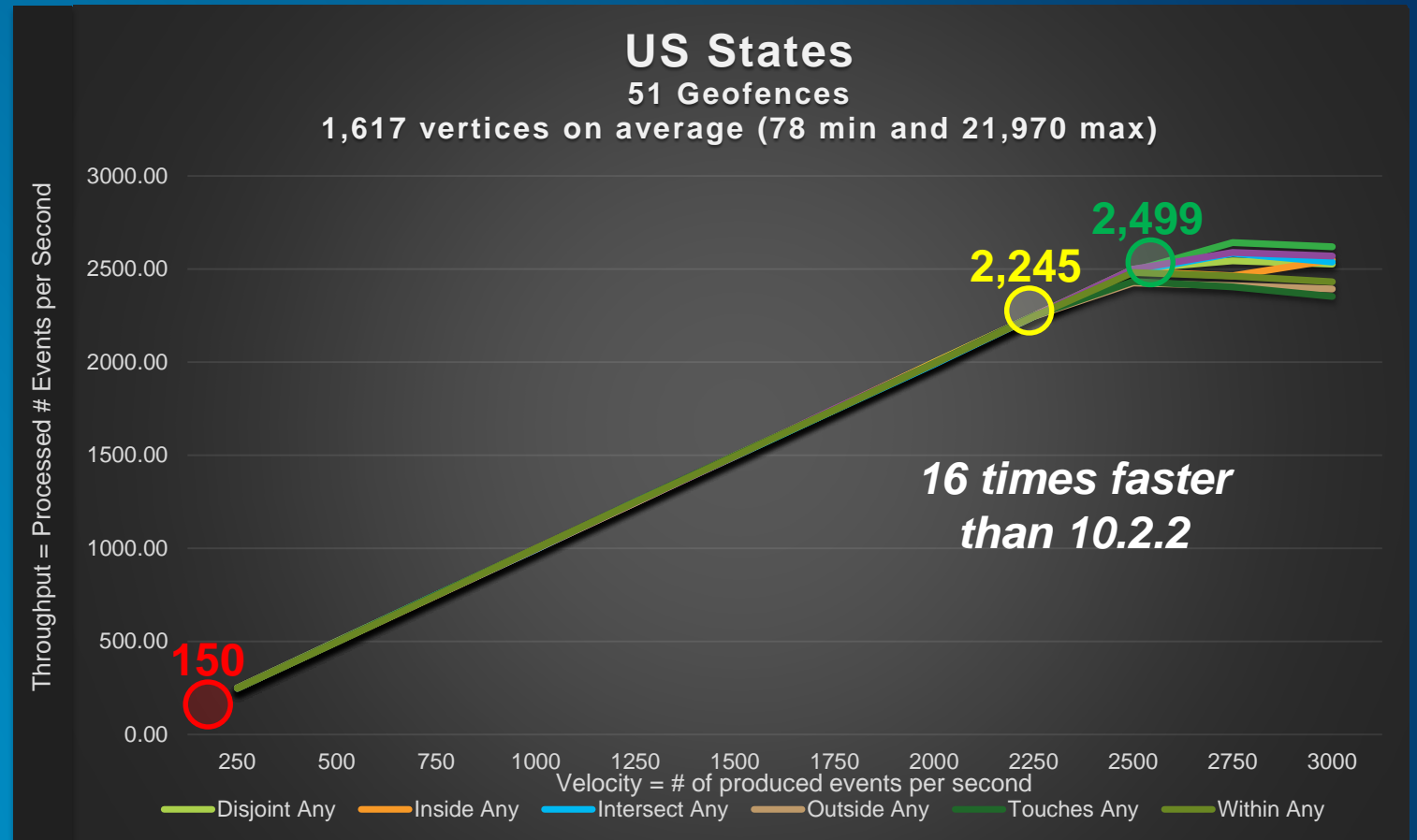


# Geofencing Performance Benchmark @ 10.3

US States benchmark



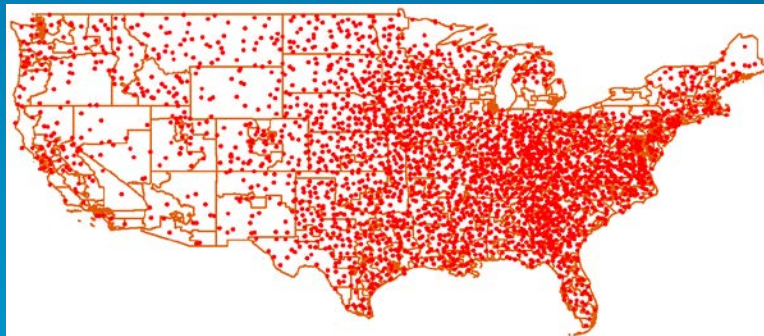
Operator	10.3 events per second	10.2.2 events per second
Disjoint Any	2,499	
Inside Any	2,488	150
Intersect Any	2,486	
Within Any	2,482	
Touches Any	2,248	
Outside Any	2,245	



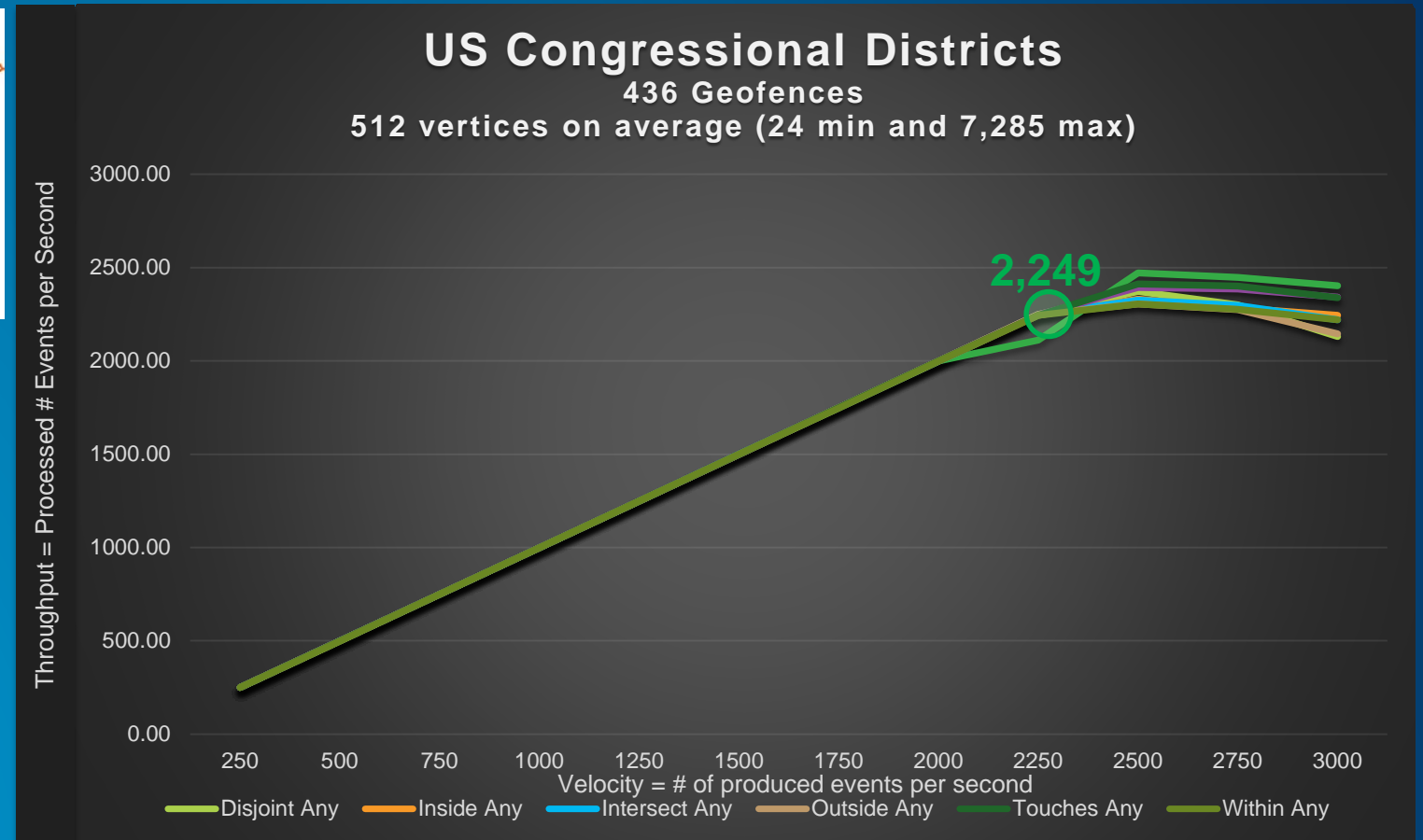
As captured on primary benchmarking machine using ArcGIS 10.3

# Geofencing Performance Benchmark @ 10.3

US Congressional Districts benchmark



Operator	10.3 events per second
Disjoint Any	2,249
Outside Any	2,248
Intersect Any	2,248
Touches Any	2,244
Within Any	2,244
Inside Any	2,244

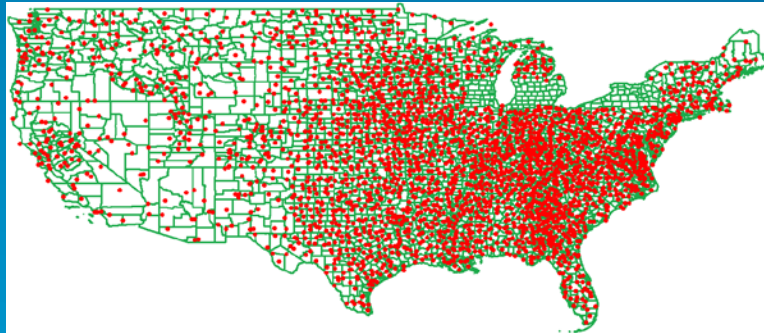


As captured on primary benchmarking machine using ArcGIS 10.3  
note: this scenario was not benchmarked at 10.2.2

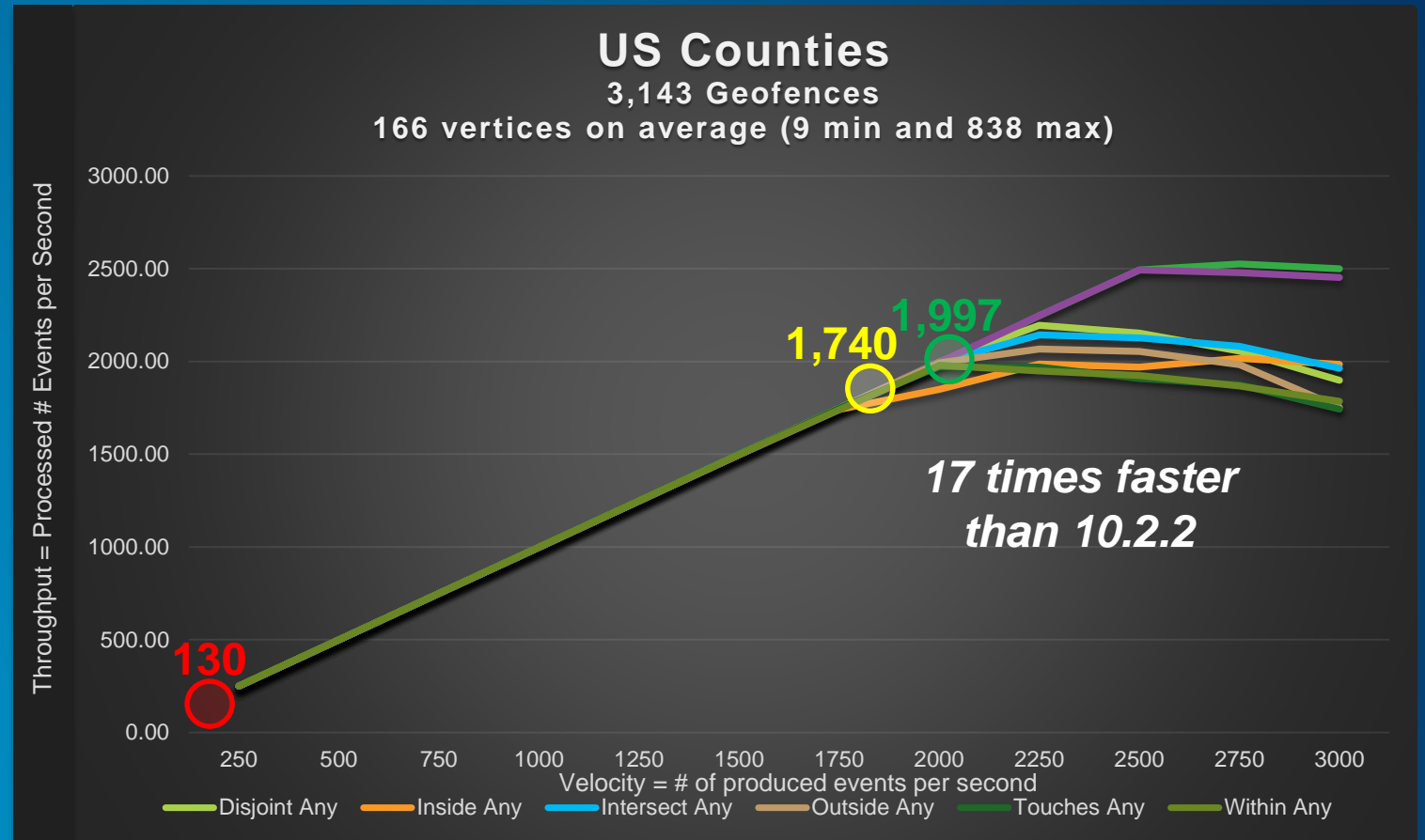


# Geofencing Performance Benchmark @ 10.3

US Counties benchmark



Operator	10.3 events per second	10.2.2 events per second
Disjoint Any	1,997	
Intersect Any	1,996	
Outside Any	1,992	
Touches Any	1,747	
Inside Any	1,742	130
Within Any	1,740	



As captured on primary benchmarking machine using ArcGIS 10.3

# What are the primary factors I should consider for Performance?

*Operating environment, Network, RAM, and Processors*

- **Operating environment:** *Bare Metal = Windows 7 (64 bit) Enterprise*
  - Virtual Machines – beware! resources need to be shared in an effective way, like EC2.
  - Bare-Metal machines – dedicated resources are much more deterministic.
- **Network**
  - Speed (Mbps) – the faster the better. *1 Gbps*
- **RAM**
  - size (GB) – 8GB is required at 10.3. *16GB, defaulted JVM max heap size of 4GB used*
  - type – minimum of DDR3 is recommended. *DDR3*
  - clock speed (MHz) and transfer rate (Mbps) – the faster the better.
- **Processors**
  - speed (GHz) – the faster the better. *3.70GHz, Intel Xeon E5-1620 v2*
  - # of cores – the more the better. *4 physical 8 Virtual*

The background features a vibrant blue gradient. On the left side, there are several overlapping geometric shapes: a large purple triangle pointing upwards, a yellow triangle pointing downwards, and a dark purple triangle pointing downwards. These shapes are layered, creating a sense of depth. The text is centered in the upper half of the image.

# High Availability & Scalability

# High Availability & Scalability

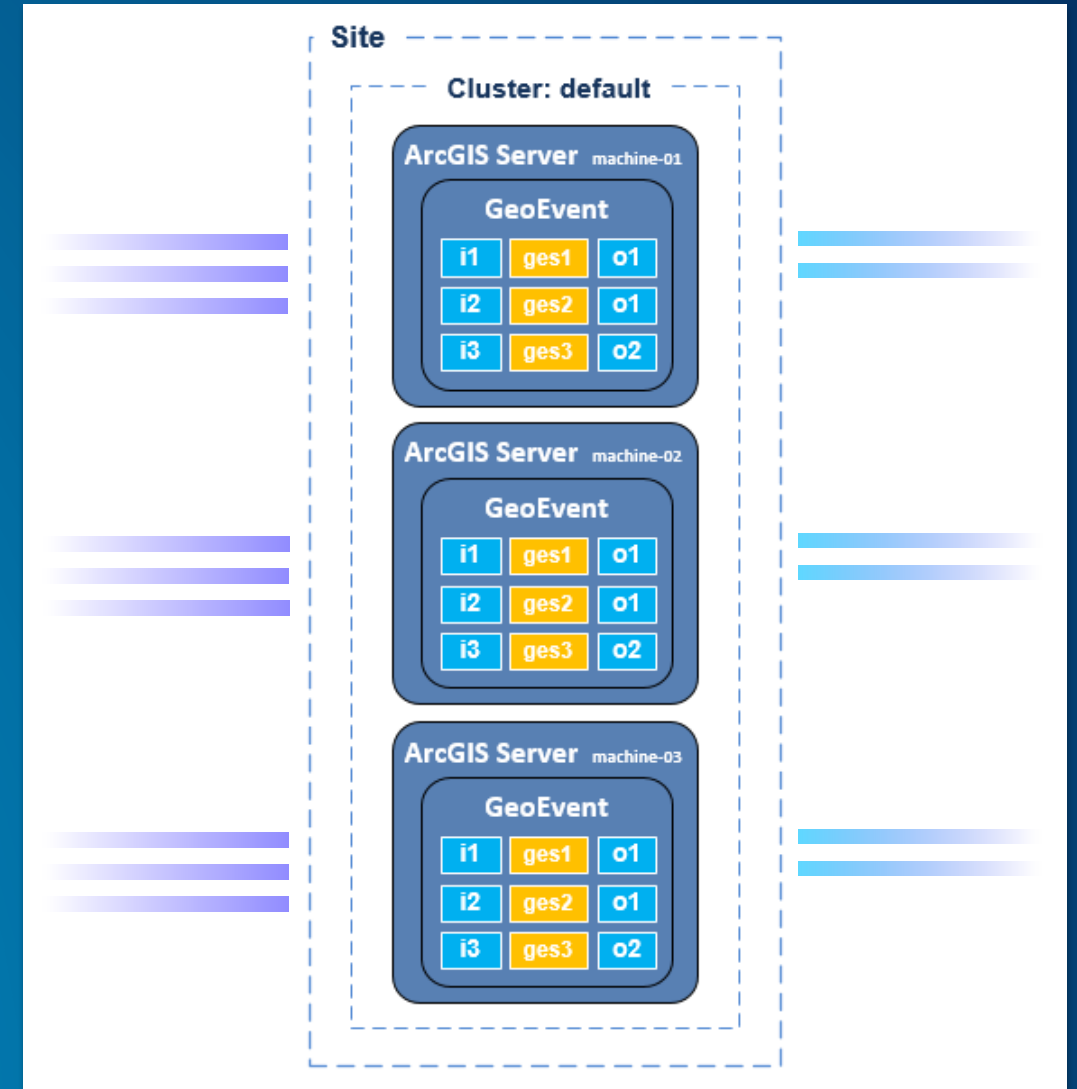
## Clustering

- Clusters administered via ArcGIS Server Manager
  - Site, Cluster(s), Machines
- Machines in a cluster share configuration
  - automatic provisioning upon joining a cluster
  - including custom components
- High Availability is achievable out-of-the-box
- Scale-out by adding machines to a cluster

Machines		
Name	Status	
LOANR2285.ESRI.COM	Started	ⓘ ■ ✕
RTRUJILLO.ESRI.COM	Started	ⓘ ■ ✕
SOURCE.ESRI.COM	Stopped	ⓘ ✕
XW8600-W7.ESRI.COM	Stopped	ⓘ ▶ ✕

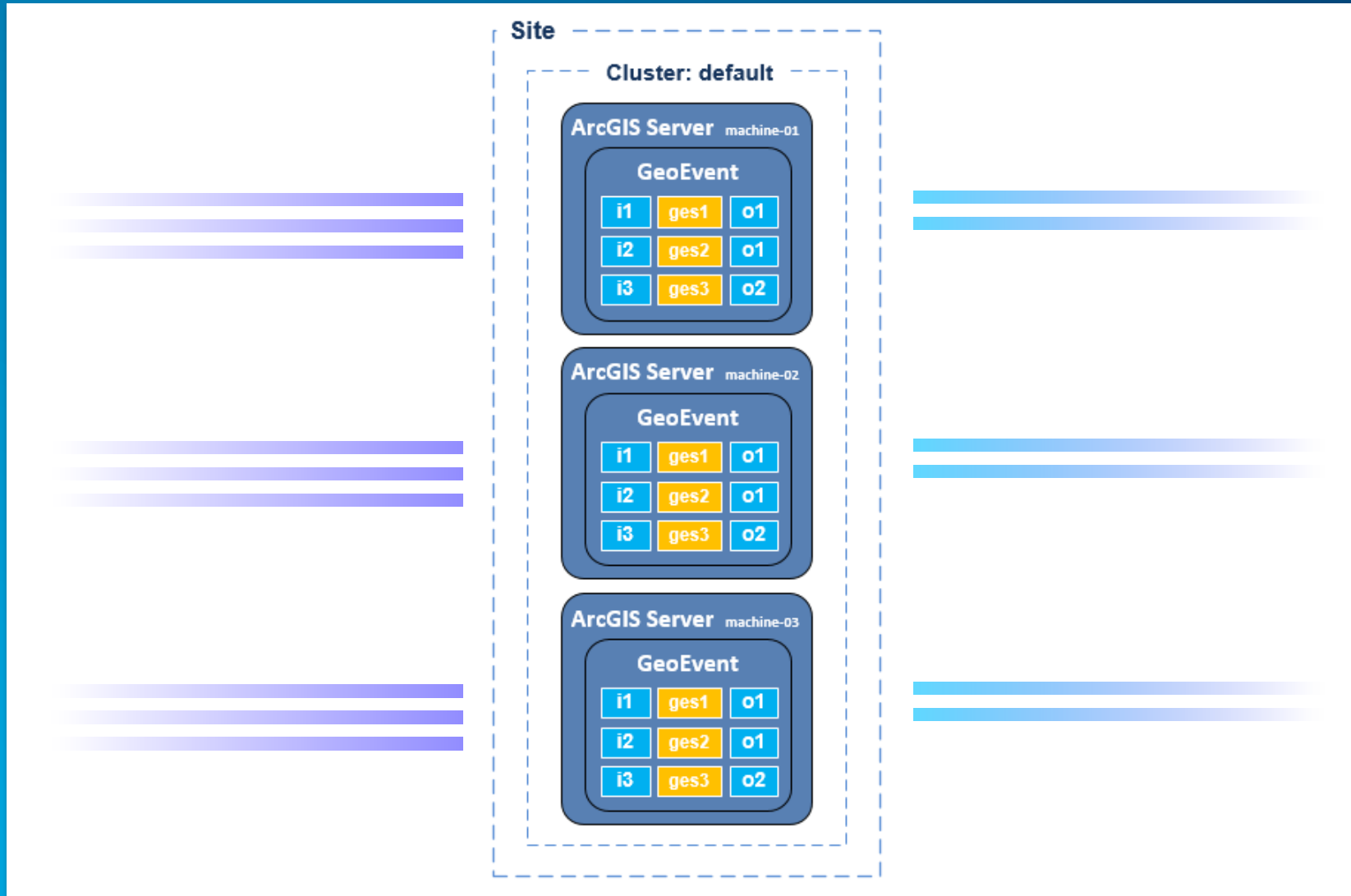
  

Clusters		
Name	Machines	Protocol
default	SOURCE.ESRI.COM LOANR2285.ESRI.COM RTRUJILLO.ESRI.COM	TCP port 4004



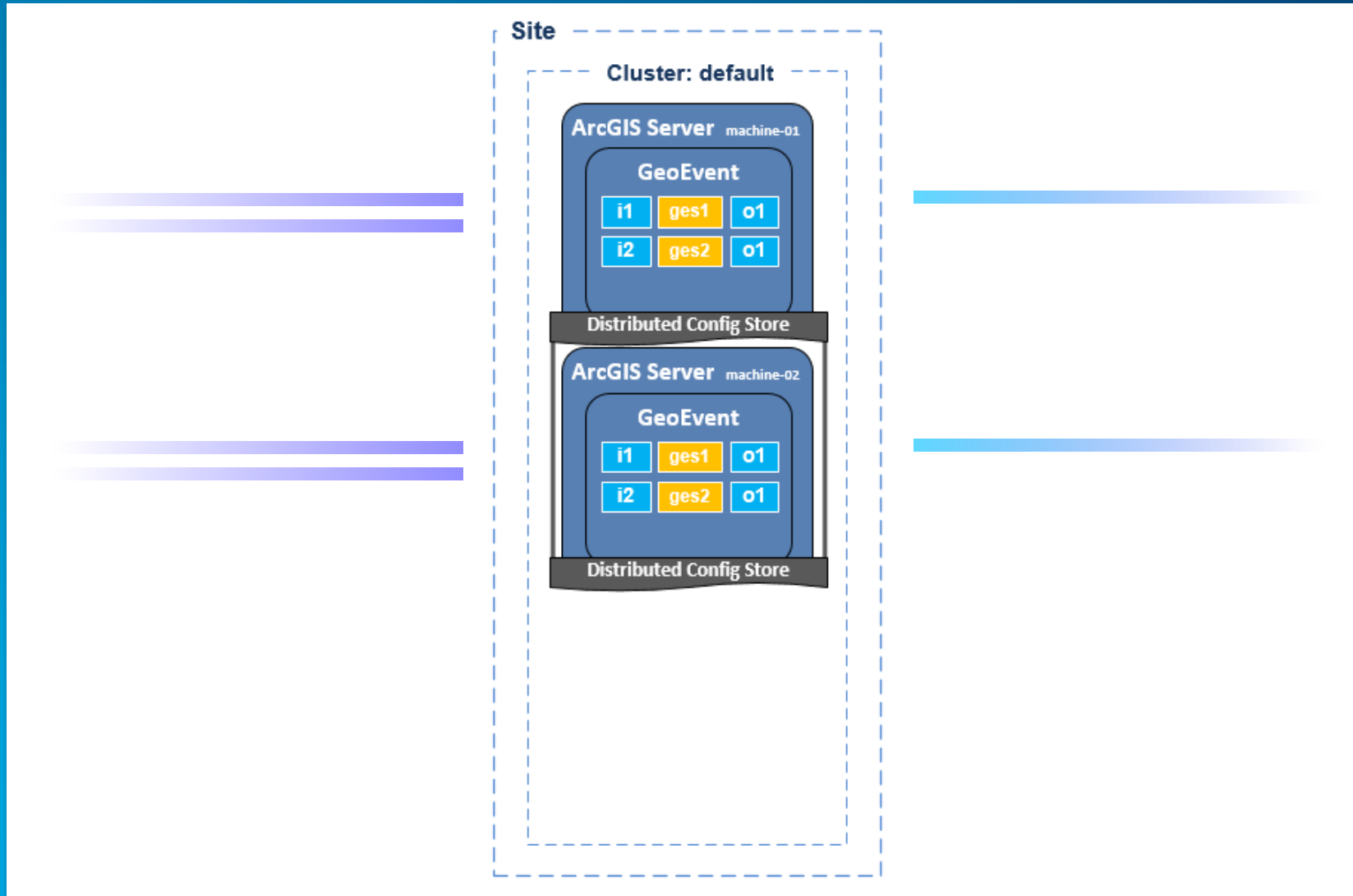
# High Availability

*Site, cluster(s), and machines*



# High Availability

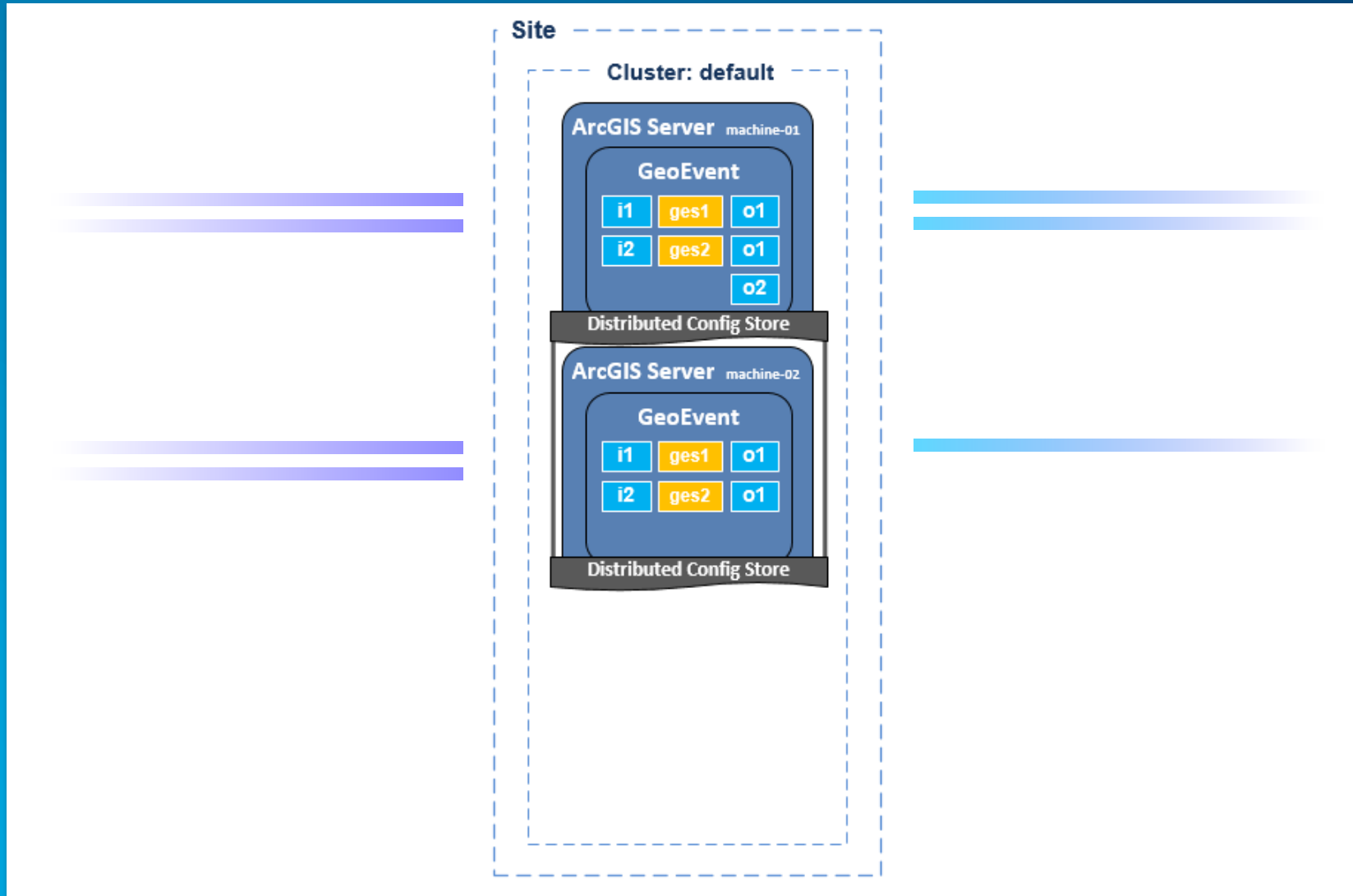
*Distributed configuration store*





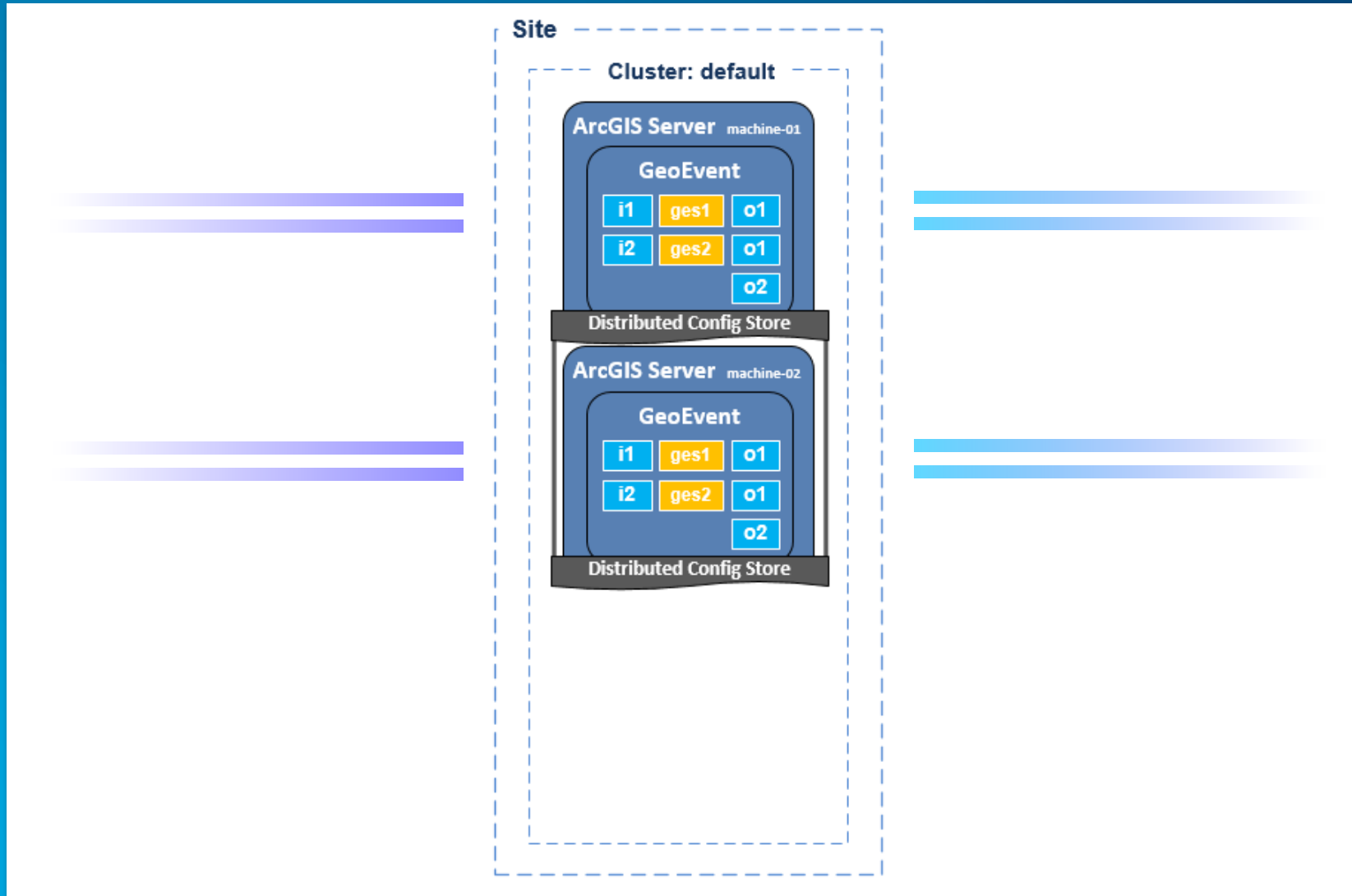
# High Availability

*Distributed configuration store*



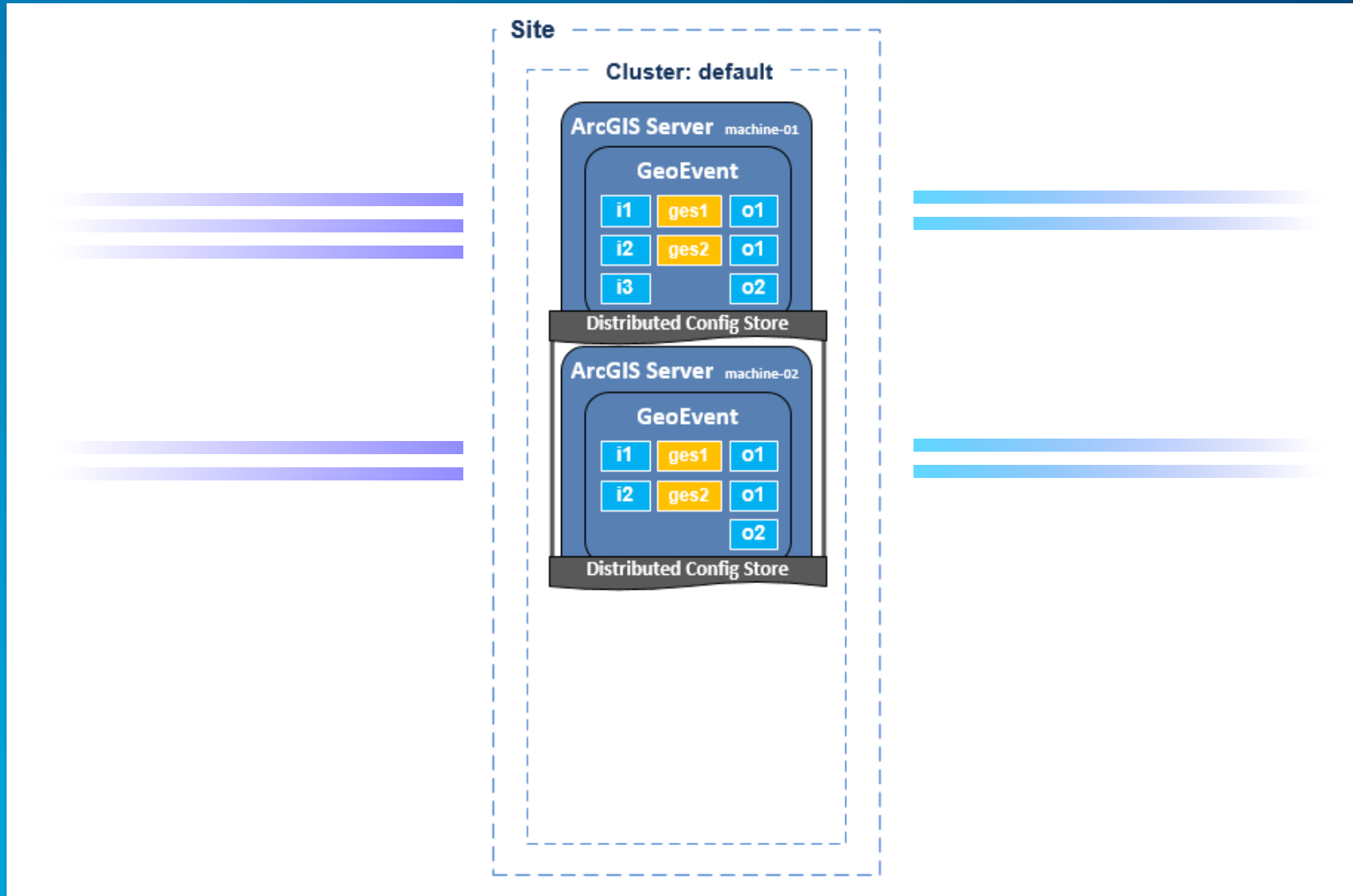
# High Availability

*Distributed configuration store*



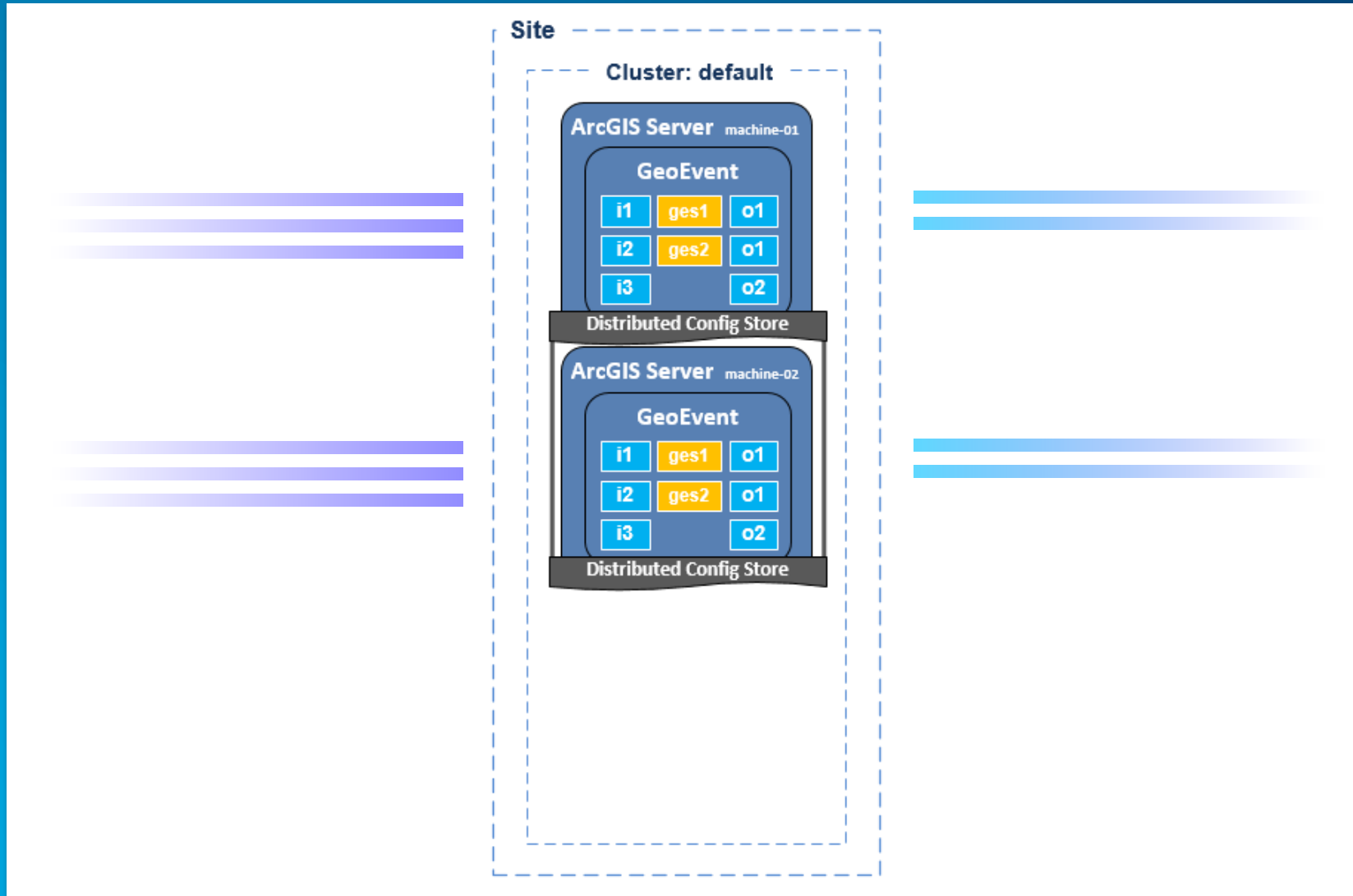
# High Availability

*Distributed configuration store*



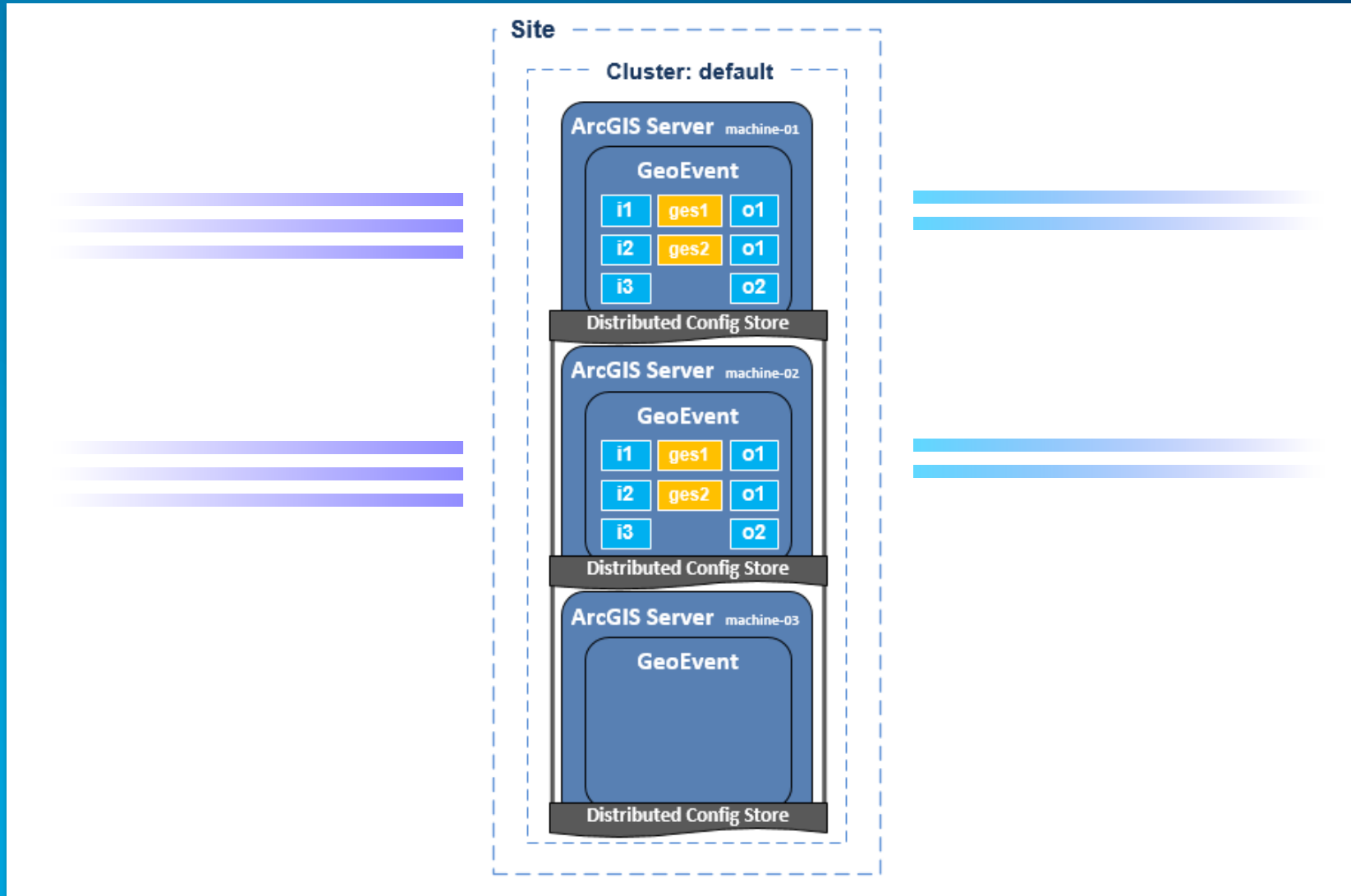
# High Availability

*Distributed configuration store*



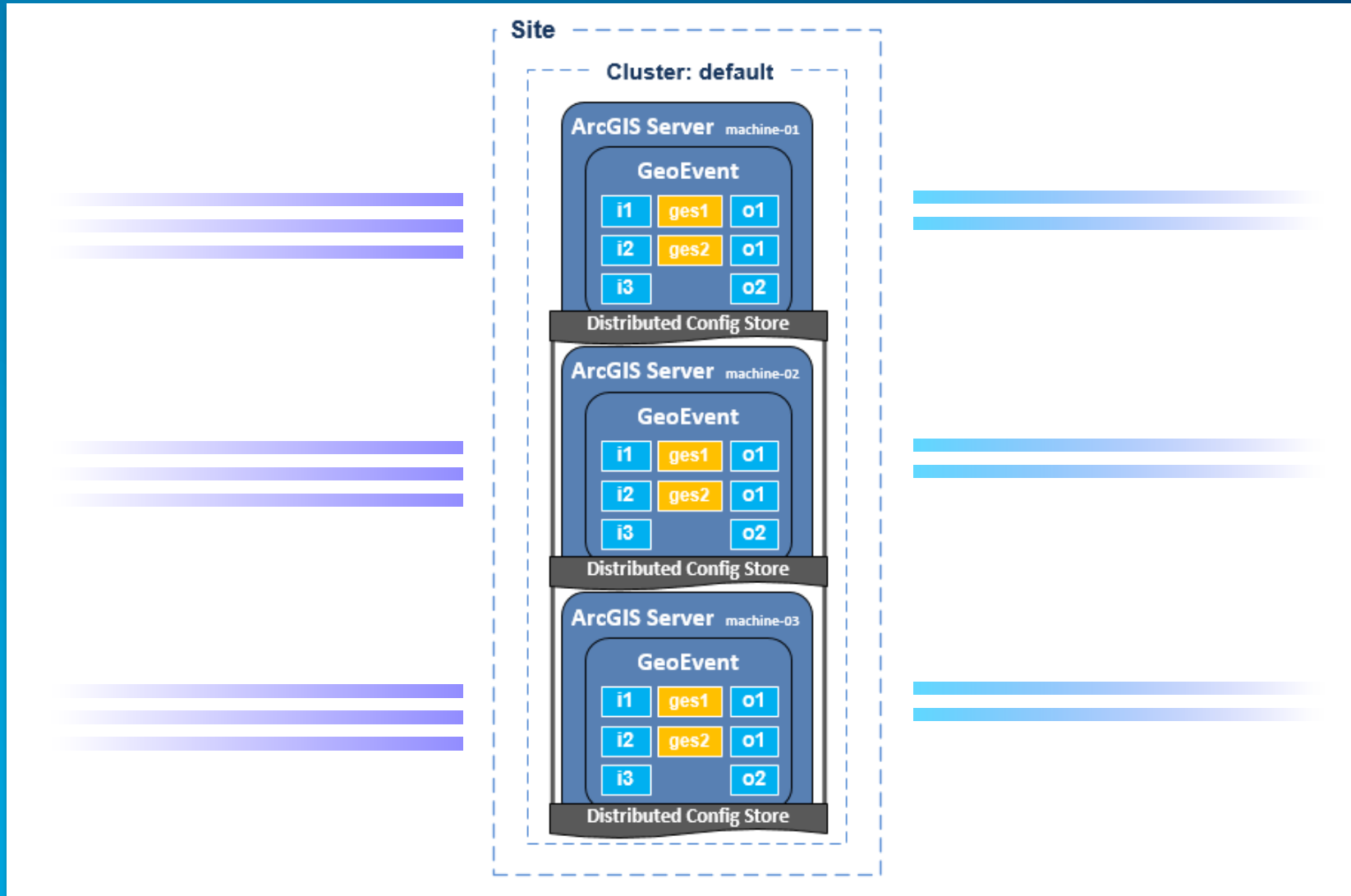
# High Availability

*Distributed configuration store*



# High Availability

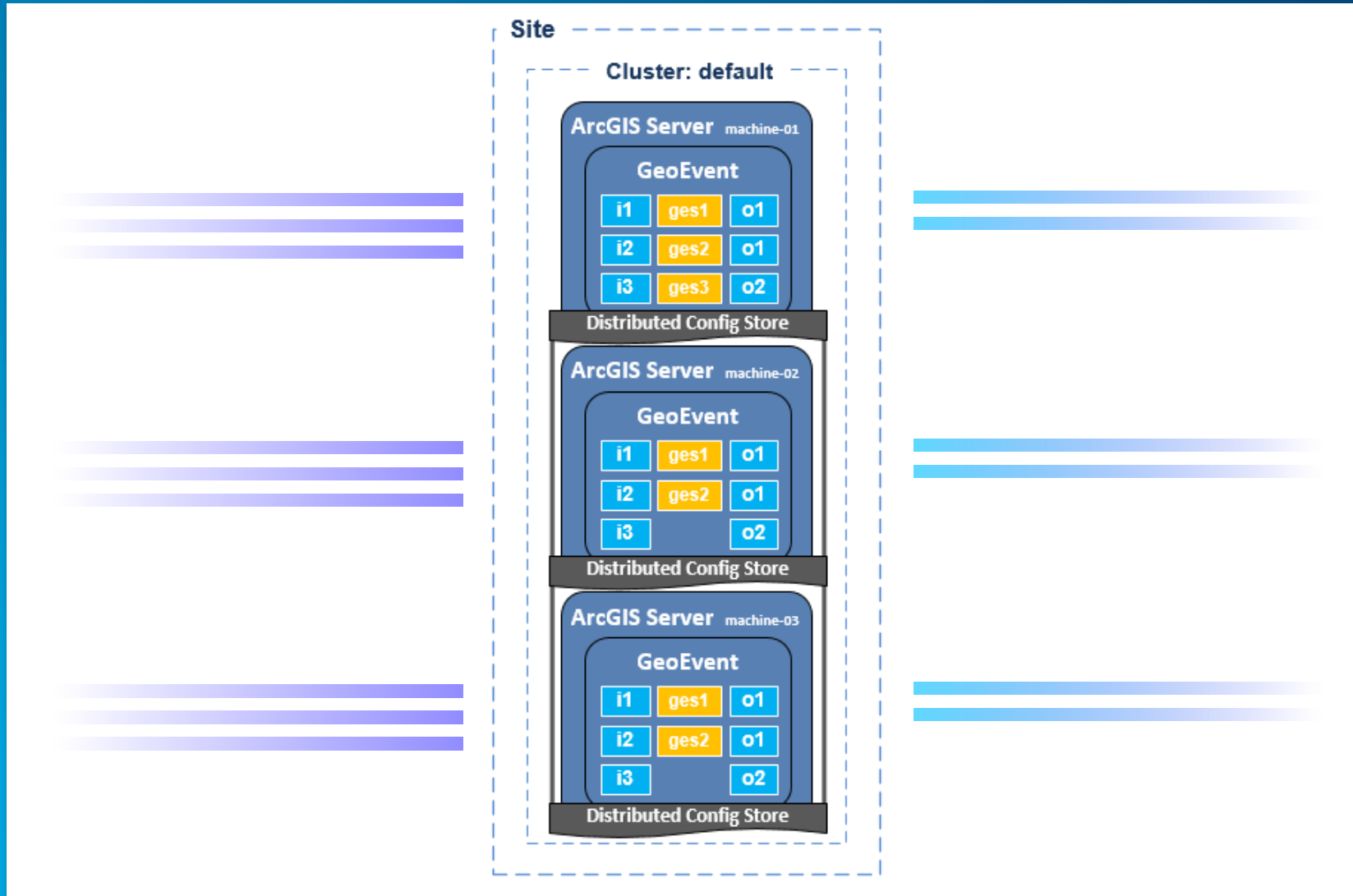
*Distributed configuration store*





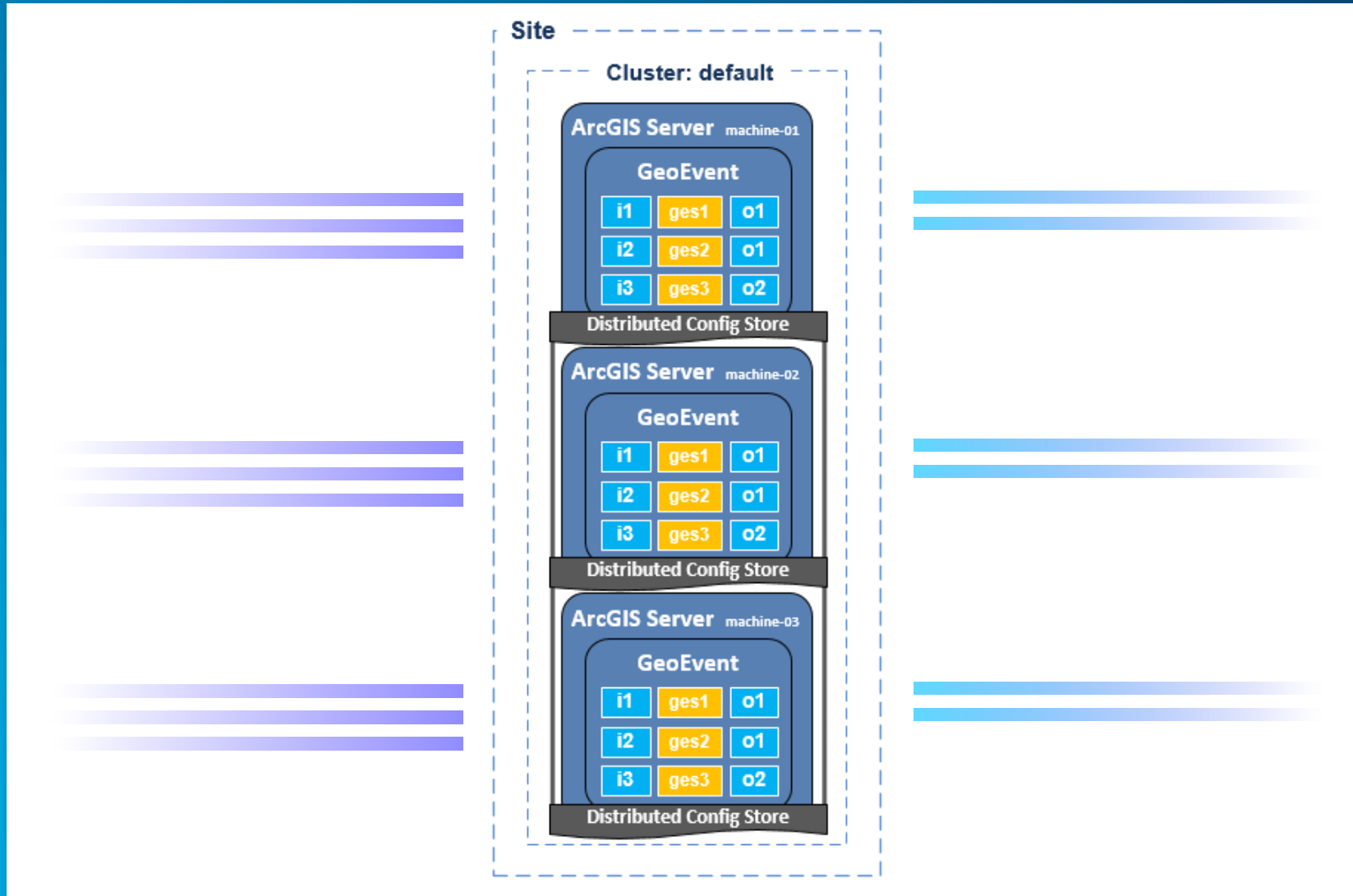
# High Availability

*Distributed configuration store*



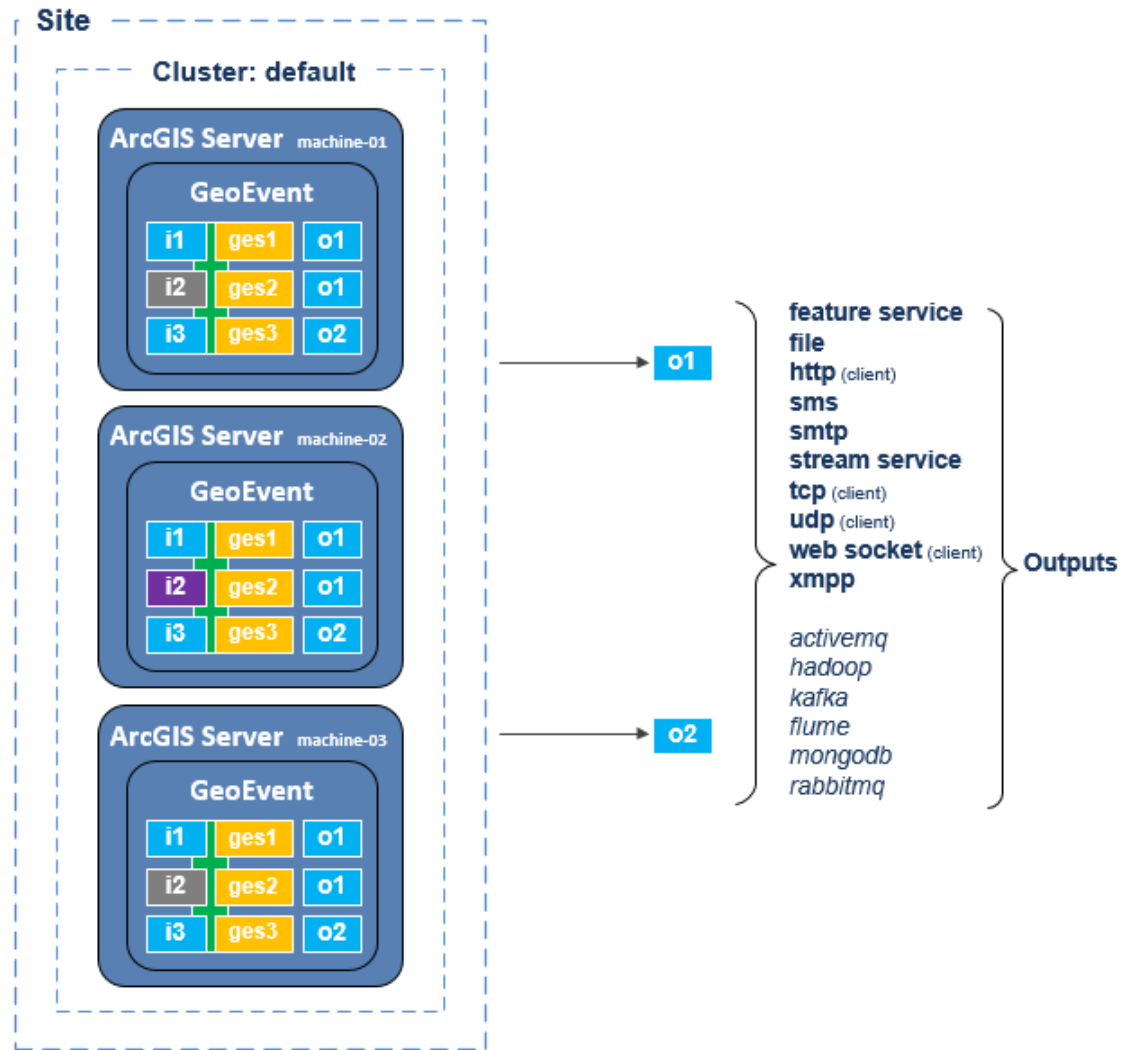
# High Availability

*Distributed configuration store*



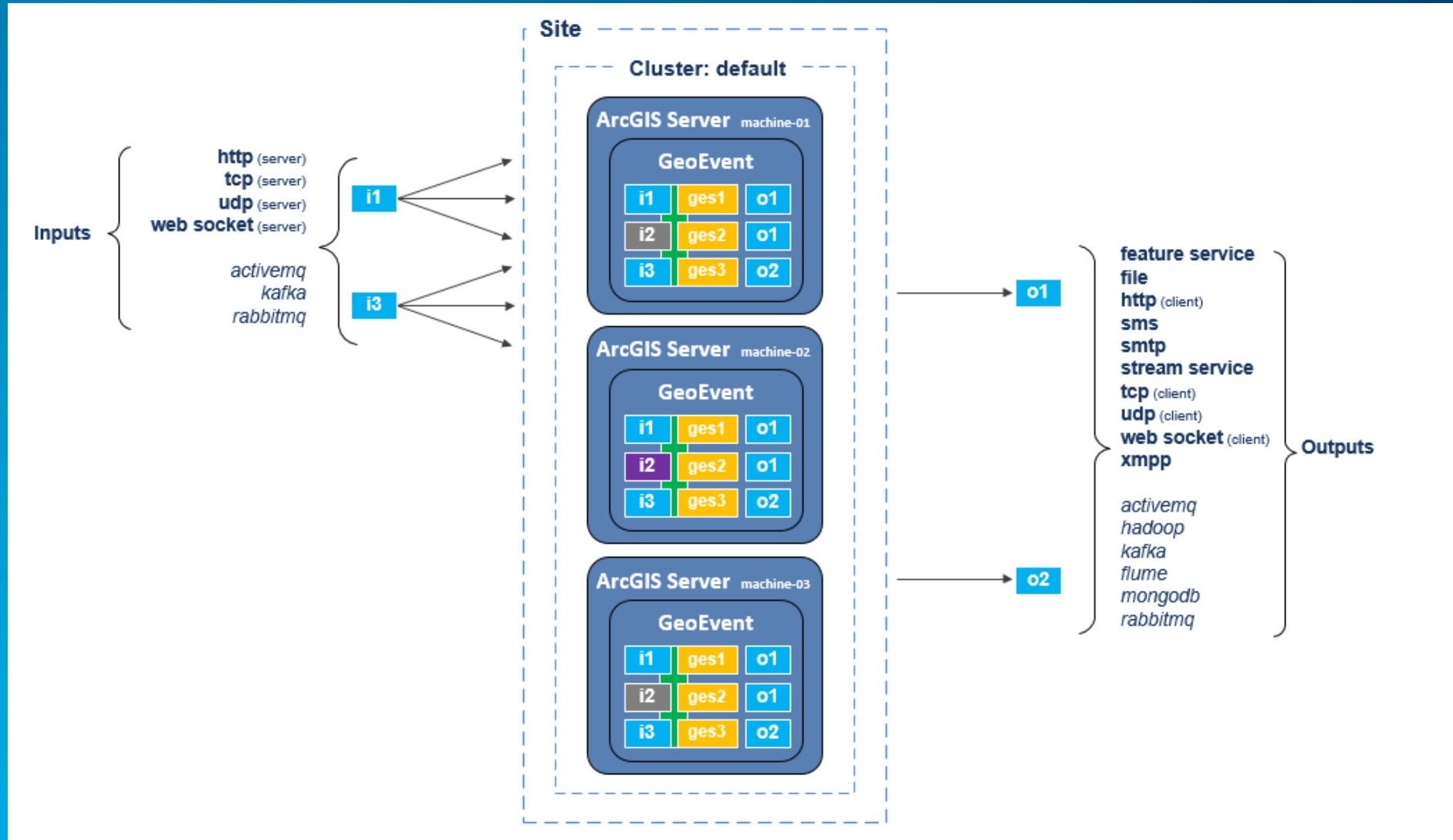
# Scalability

## Output transports



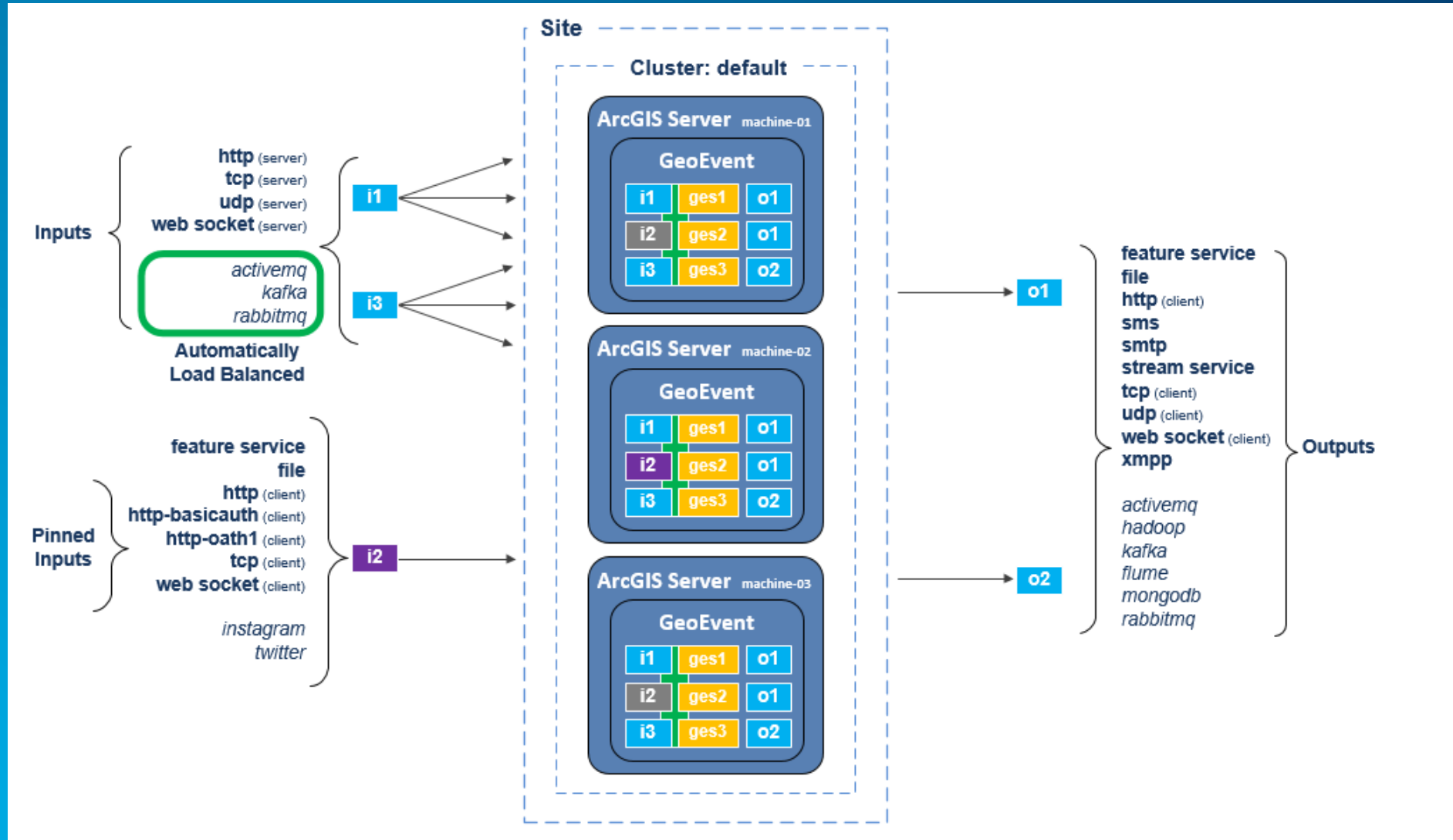
# Scalability

## Input transports



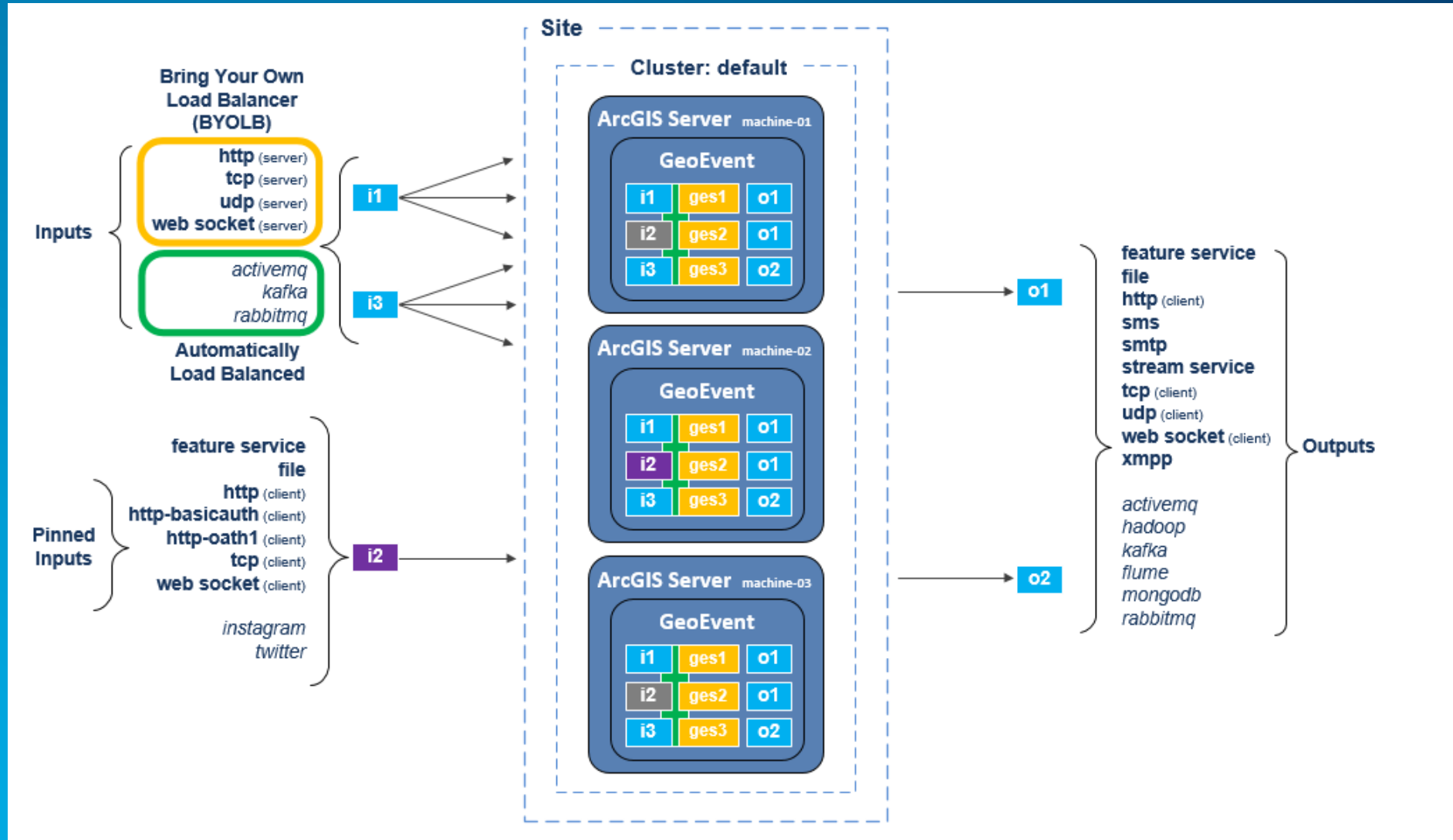
# Scalability

Input transports that are automatically load balanced



# Scalability

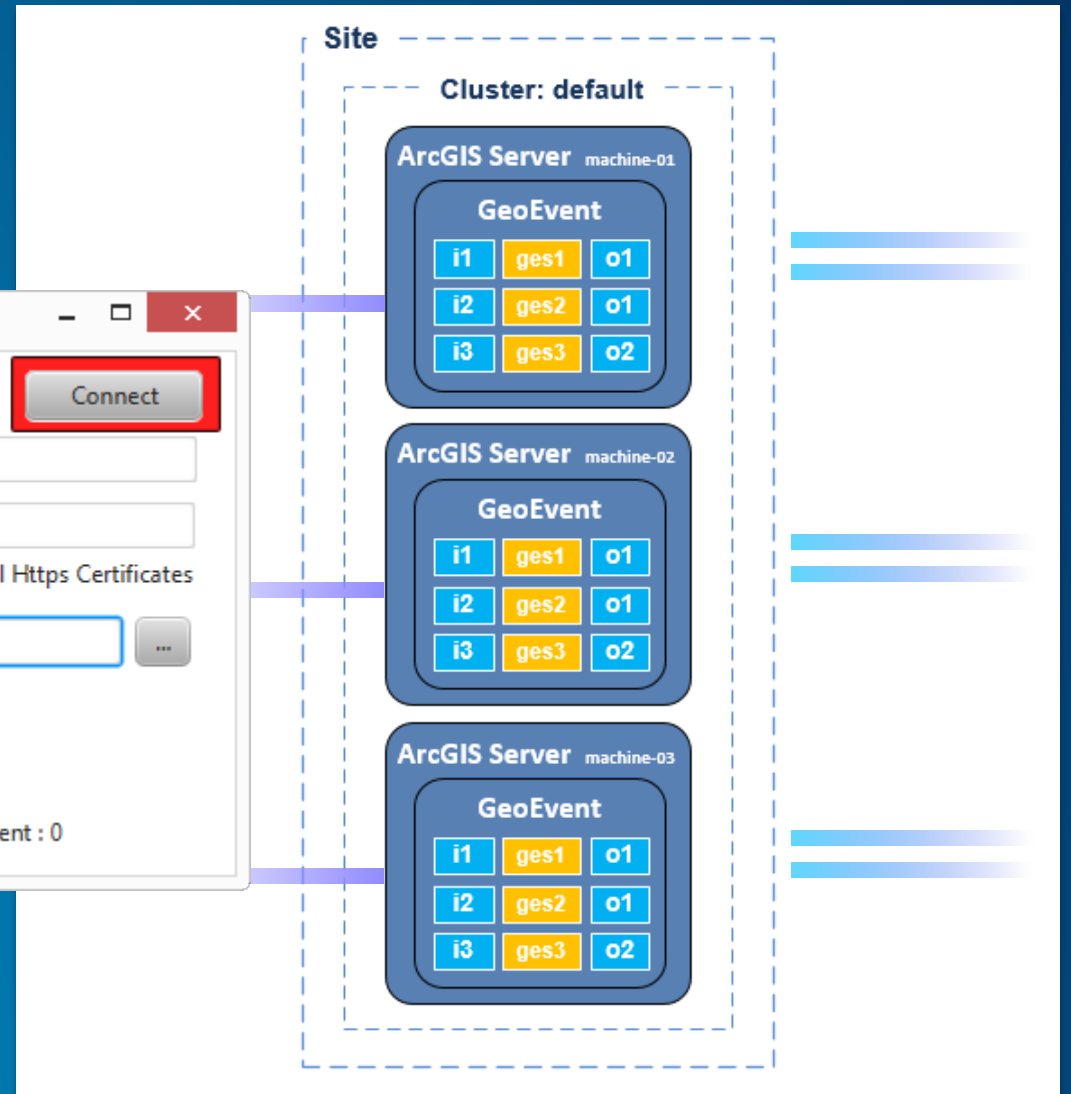
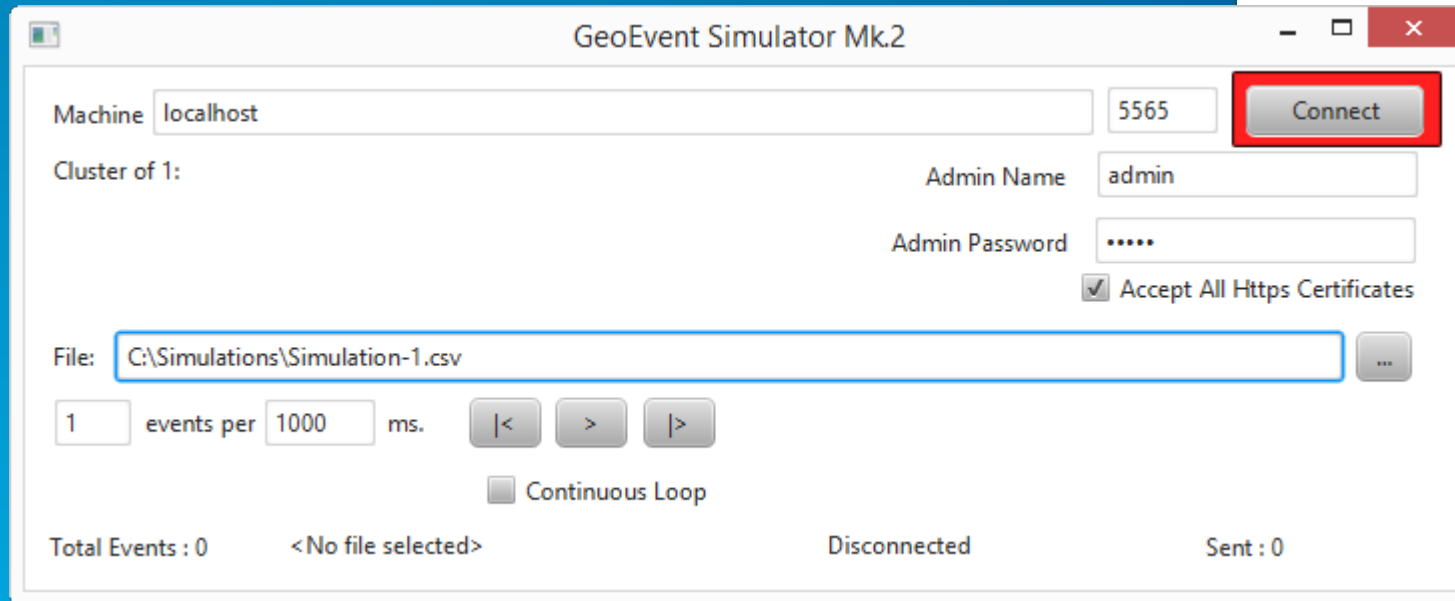
*Inputs transports that require you to bring your own load balancer*





# Scalability

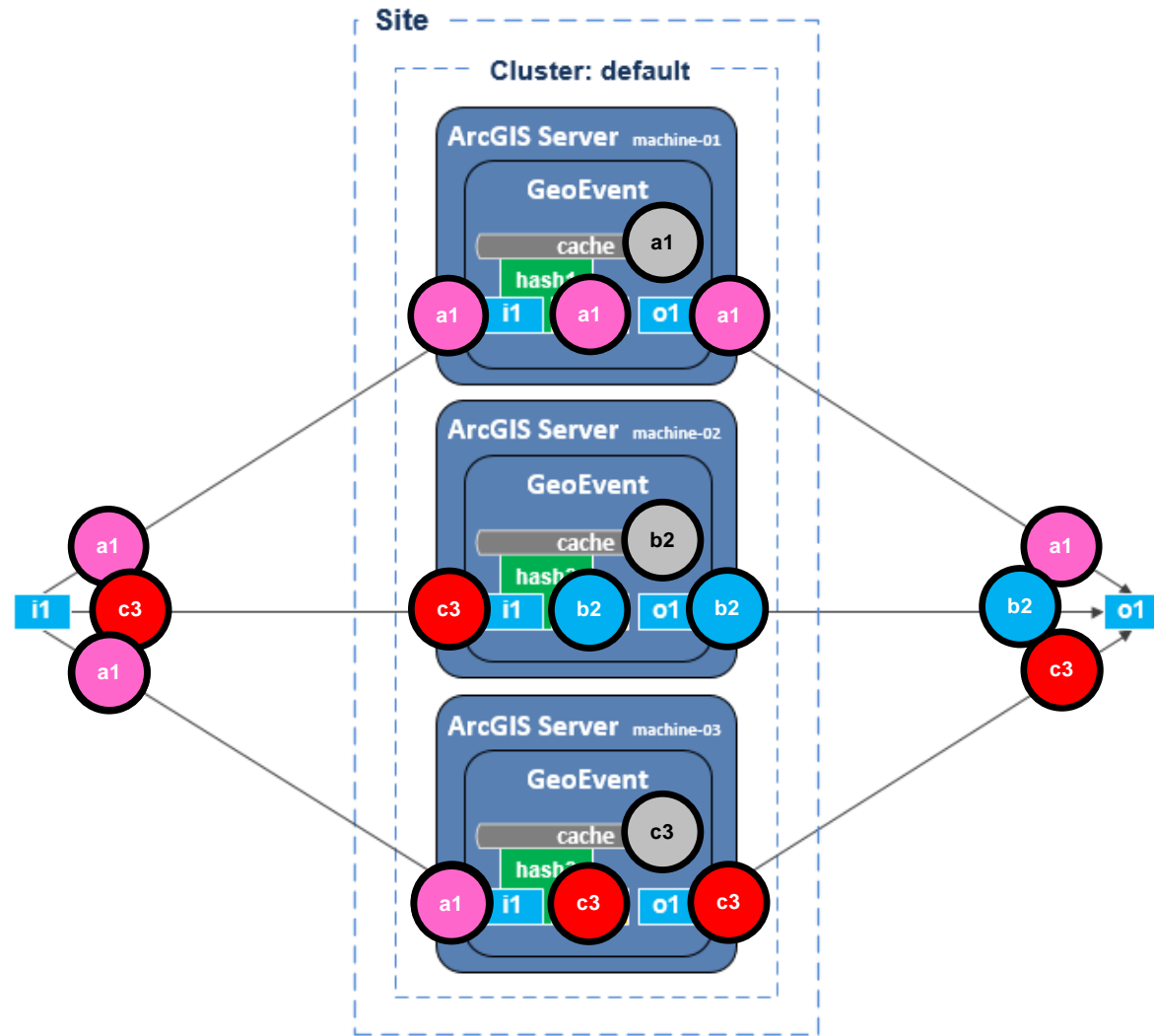
*cluster-simulator-for-geoevent*



<https://github.com/Esri/cluster-simulator-for-geoevent>

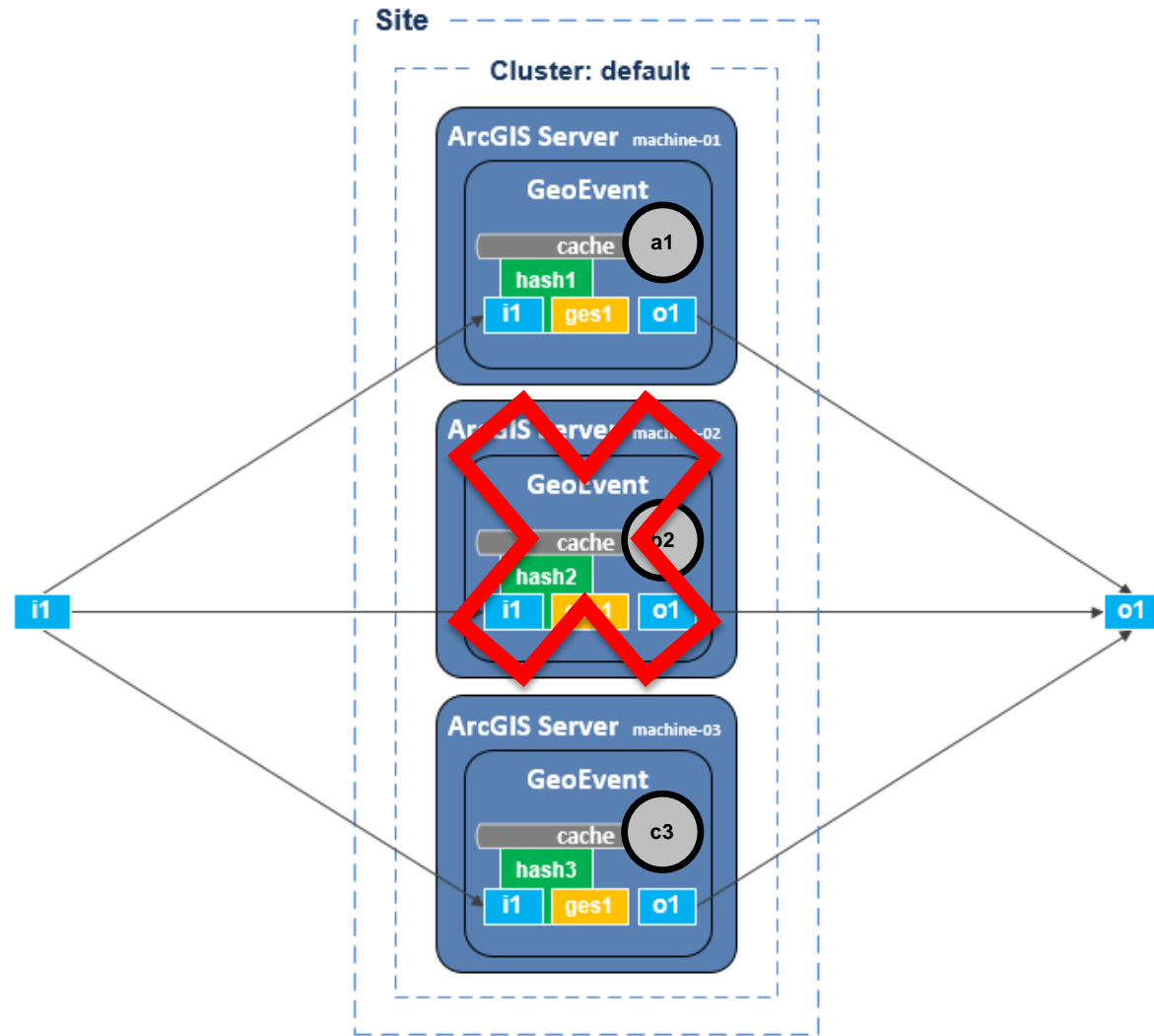
# Scalability

*Inputs and distributed stream processing*



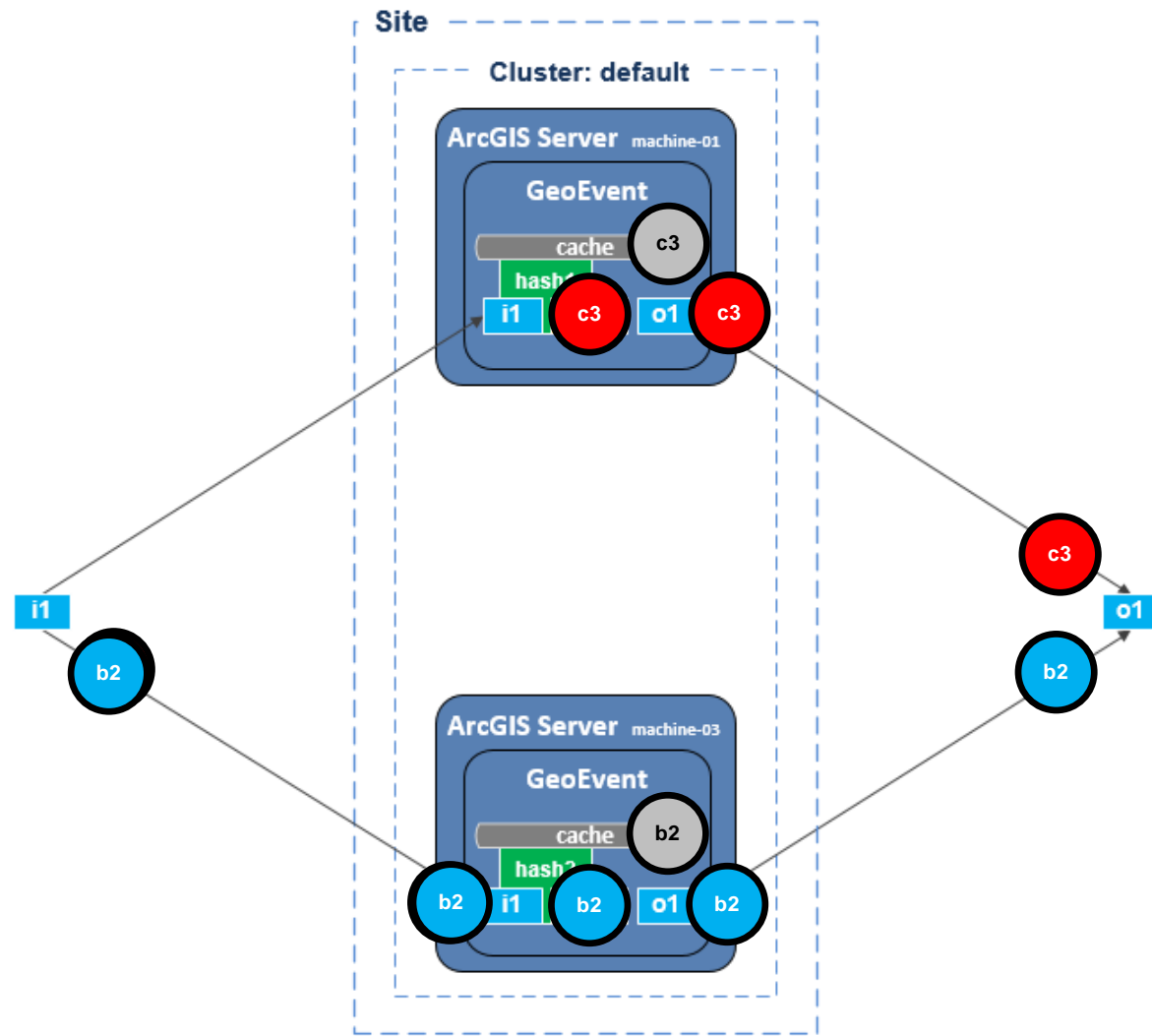
# High Availability

*Inputs and distributed stream processing*



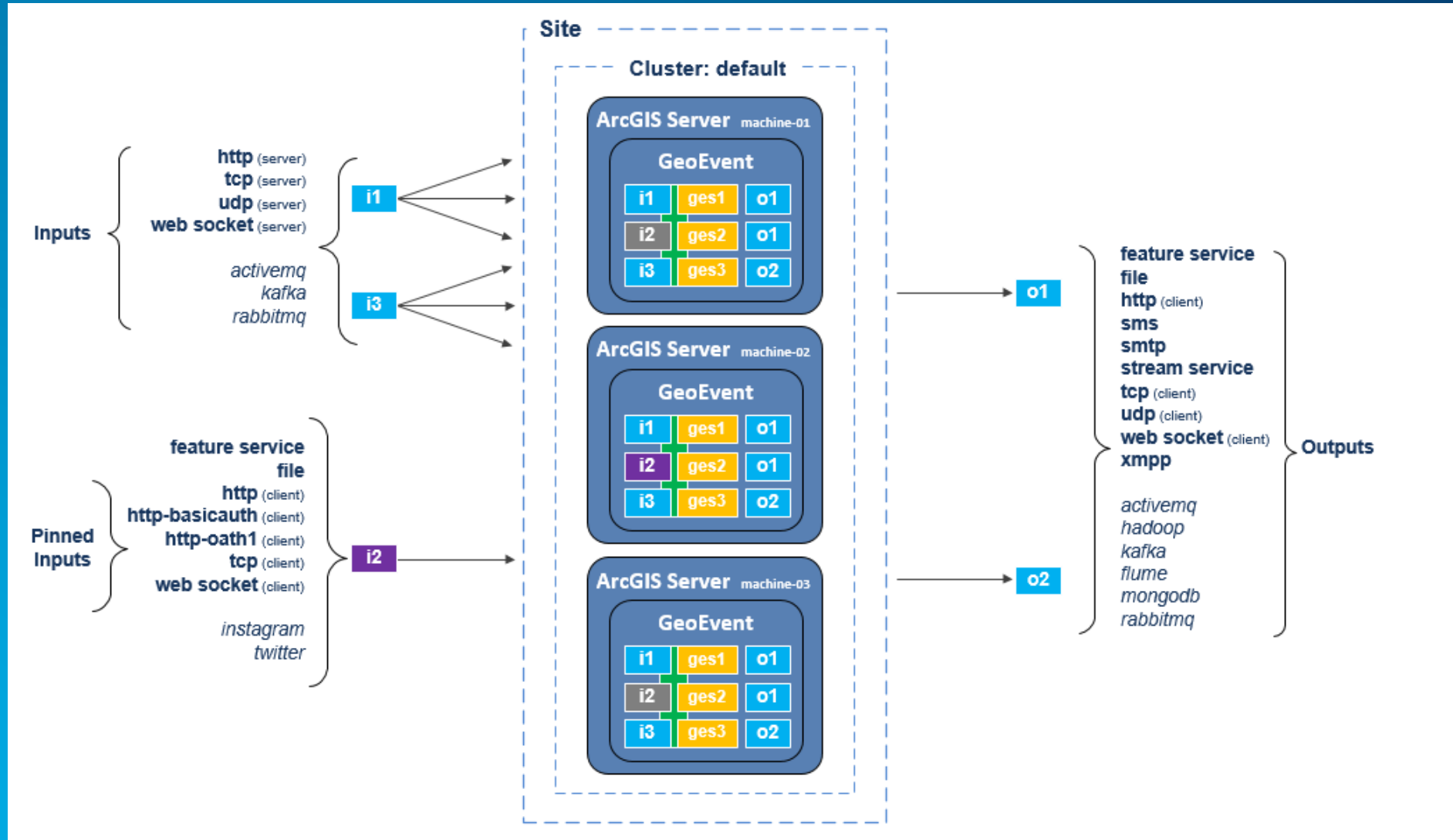
# High Availability

*Inputs and distributed stream processing*



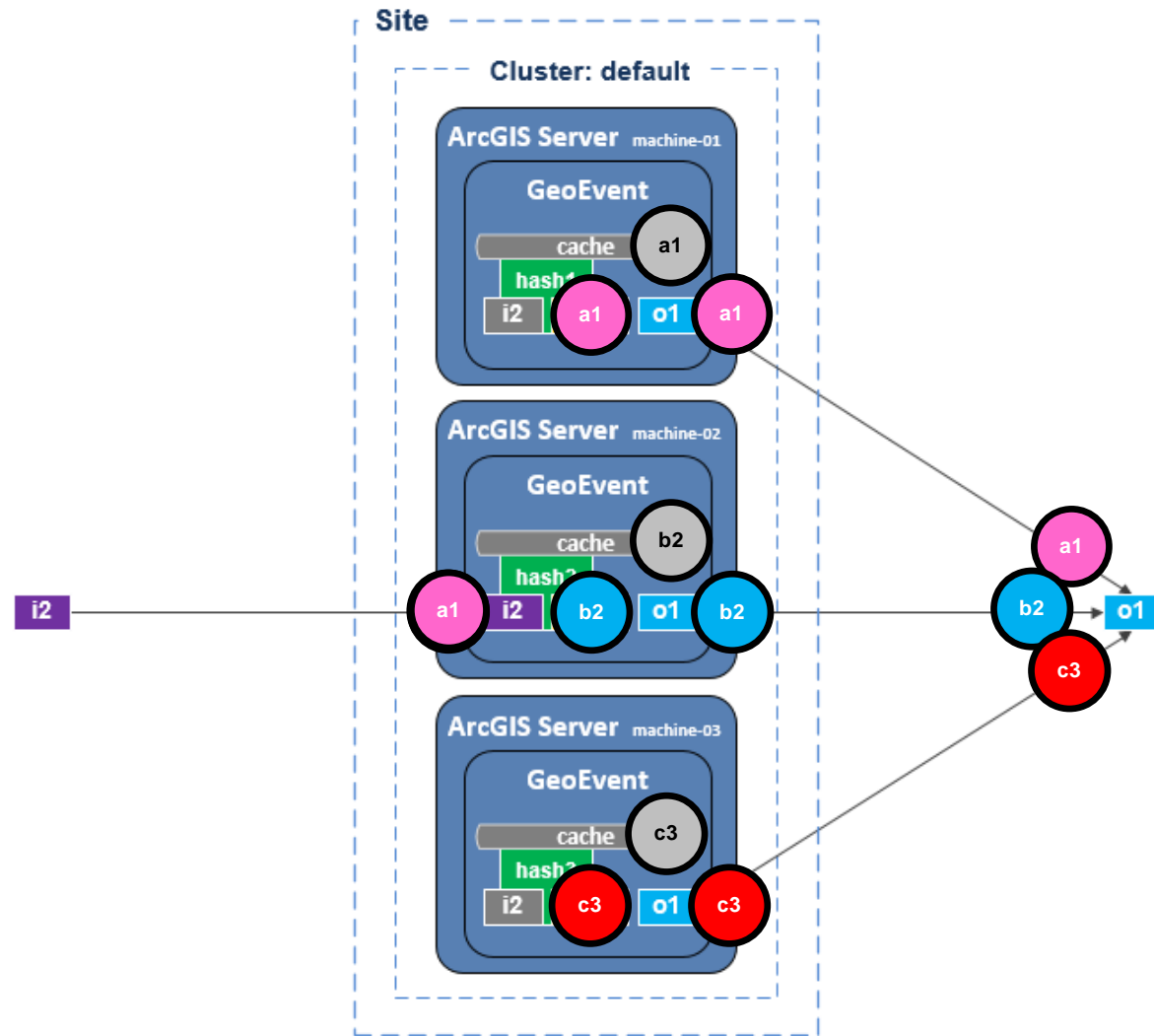
# Scalability

## Pinned inputs



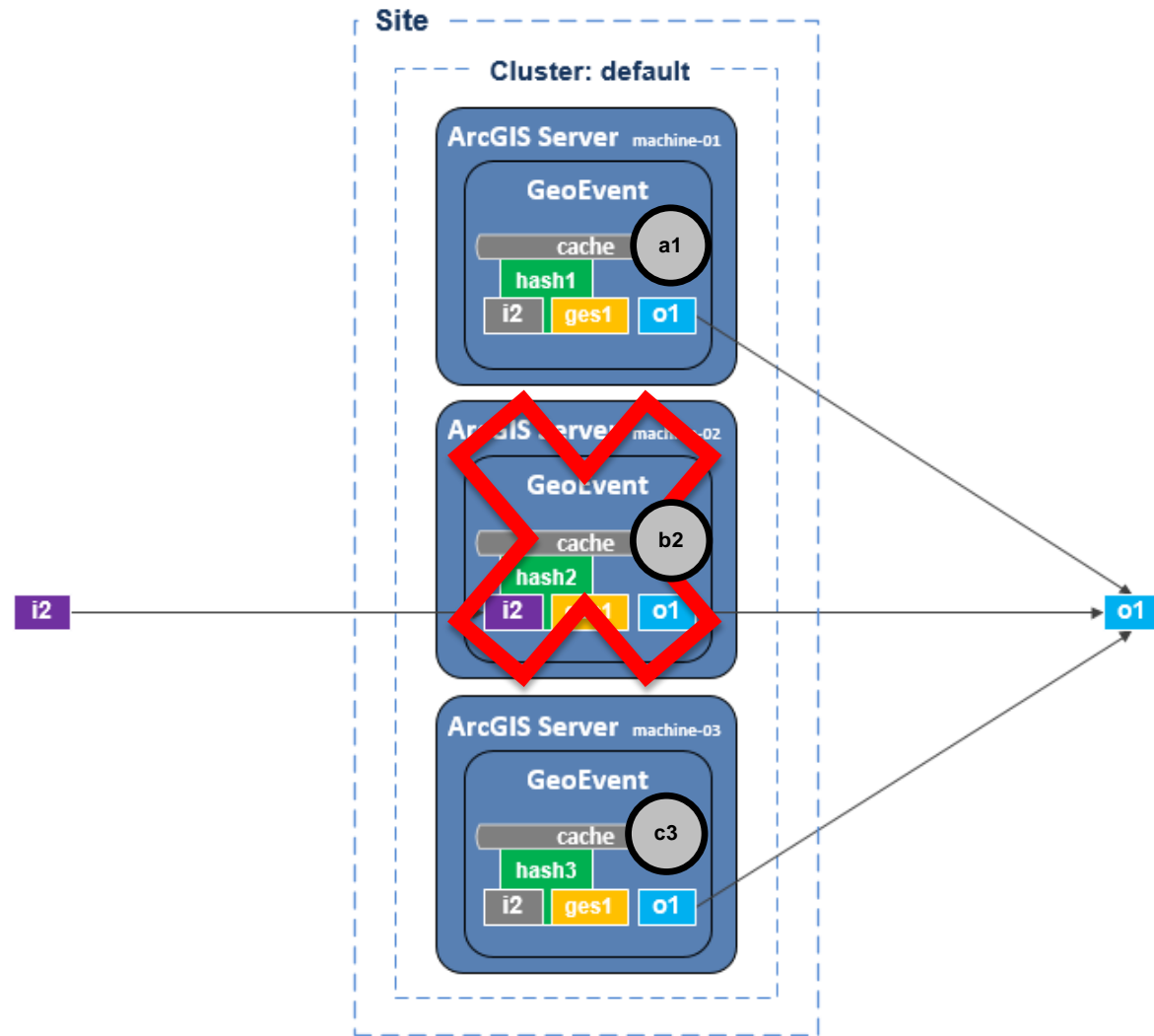
# Scalability

*Pinned inputs and distributed stream processing*



# High Availability

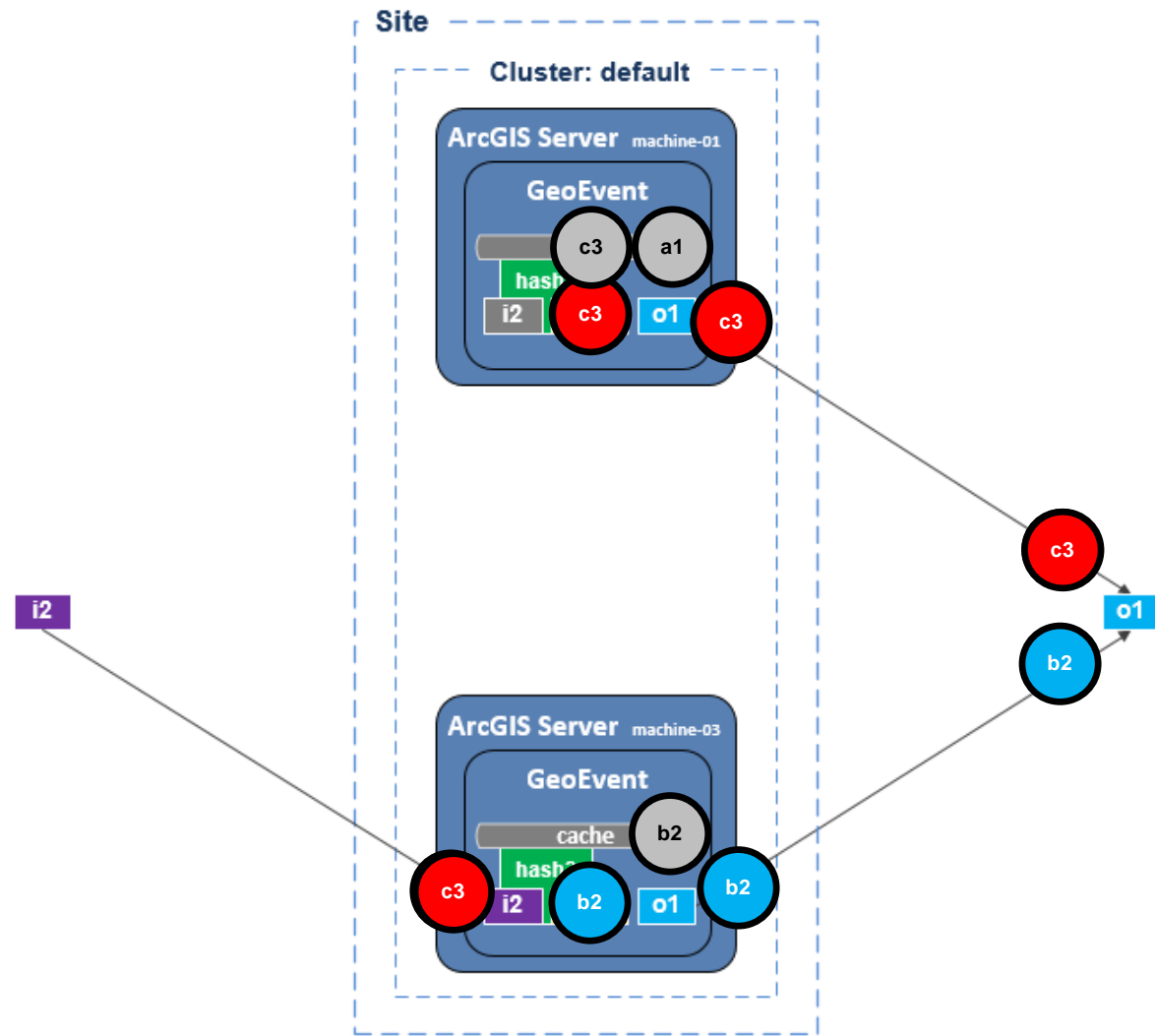
*Pinned inputs and distributed stream processing*





# High Availability

*Pinned inputs and distributed stream processing*

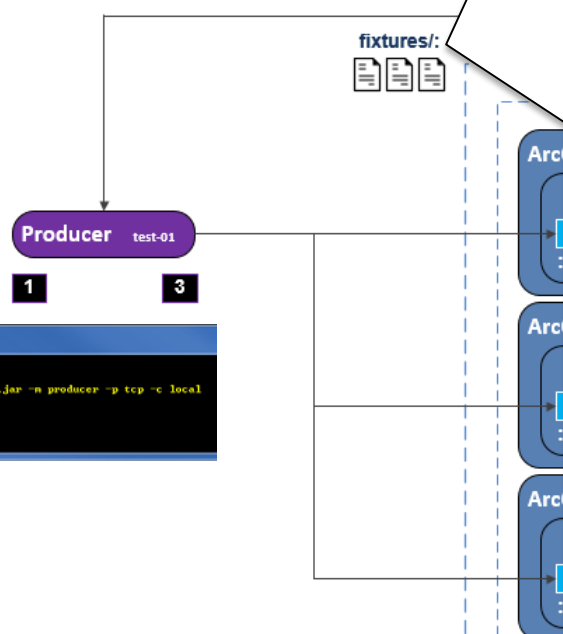


# How do I measure Cluster Performance

## performance-test-harness-for-geoevent

Test Harness Orchestrator runs a series of fixtures that specify

- the GeoEvent host(s) and input / output TCP ports
- timed tests with a rate and a stagger distribution (e.g. 100 events per second for 60 seconds with a 10% stagger)
- and where to record the results, a.k.a. reportFile



```
Command Prompt - runLocalTCPProducer.bat
C:\>geoevent-test-harness>runLocalTCPProducer.bat
C:\>geoevent-test-harness>"C:\Program Files\Java\jdk1.7.0_45\bin\java" -jar performance-test-10.3.0.jar -n producer -p tcp -c local
Listening for a connection from the orchestrator.
```

```
<Fixtures>
  <Report type="CSV">
    <ReportFile>reports/throughput-1000to4000step1000-cluster.csv</ReportFile>
  </Report>

  <DefaultFixture>
    <DefaultSharedConfig protocol="TCP"> <!-- also supports WS (Web Socket), RMQ (RabbitMQ)-->
      <Properties>
        <Property name="hosts">host1,host2,host3</Property>
      </Properties>
    </DefaultSharedConfig>

    <ProducerConfig commandPort="5010">
      <Properties>
        <Property name="port">5565</Property>
      </Properties>
    </ProducerConfig>

    <ConsumerConfig commandPort="5020" timeoutInSec="5">
      <Properties>
        <Property name="port">5575</Property>
      </Properties>
    </ConsumerConfig>

    <Simulation>
      <TimeTest eventsPerSec="1000" totalTimeInSec="30" staggeringInterval="10" />
    </Simulation>
  </DefaultFixture>

  <Fixture name="1000 e/s">
    <ProducerConfig>
      <Properties>
        <Property name="simulationFile">simulations/county_envelopes_points_1000.csv</Property>
      </Properties>
    </ProducerConfig>
    <Simulation>
      <TimeTest eventsPerSec="1000"/>
    </Simulation>
  </Fixture>

  ...

  <Fixture name="4000 e/s">
    <ProducerConfig>
      <Properties>
        <Property name="simulationFile">simulations/county_envelopes_points_4000.csv</Property>
      </Properties>
    </ProducerConfig>
    <Simulation>
      <TimeTest eventsPerSec="4000"/>
    </Simulation>
  </Fixture>
</Fixtures>
```

<https://github.com>

```
Karaf
C:\>geoevent-4281>
ArcGIS GeoEvent
Hit '<tab>' for a
and '<cmd>' --help
Hit '<ctrl-d>' or
GeoEvent@root>
```

# Scalability

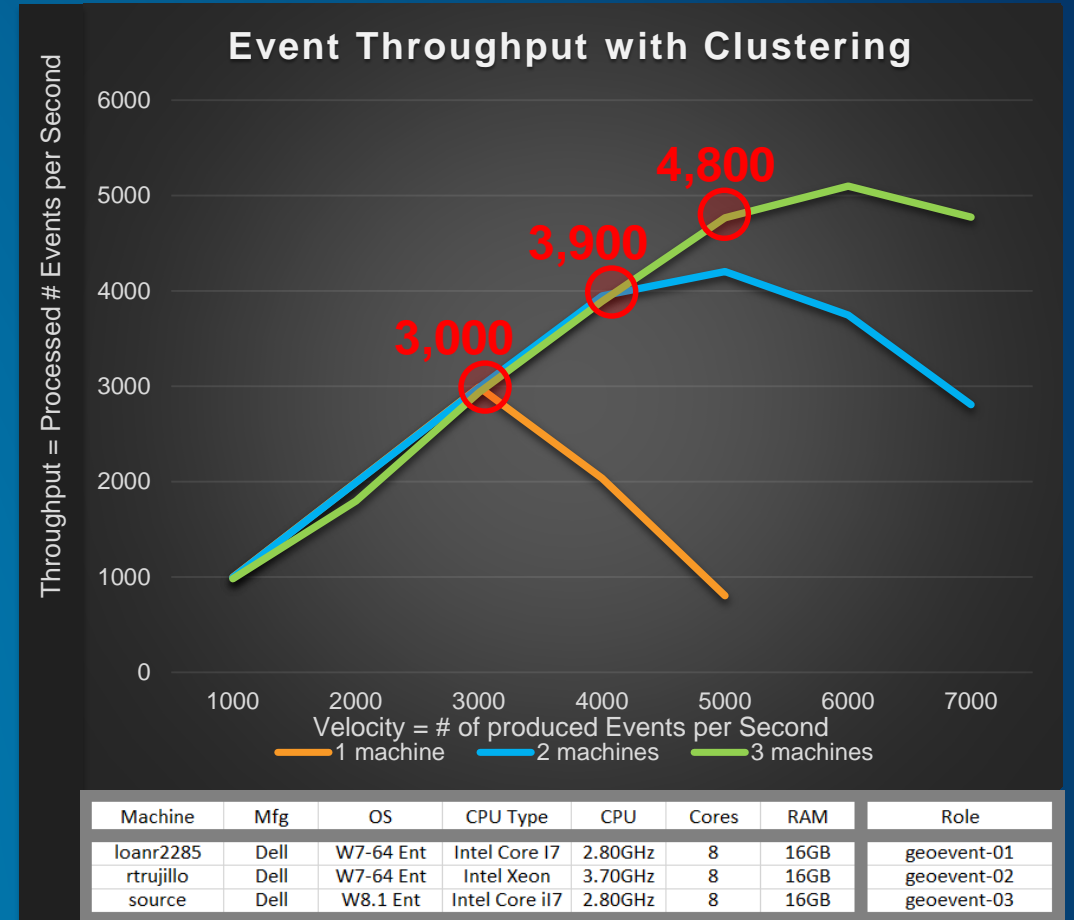
*Clustering for increased throughput*

- Clusters administered via ArcGIS Server Manager
  - Site, Cluster(s), Machines
- Scale-out by adding machines to a cluster

Machines	
Name	Status
LOANR2285.ESRI.COM	Started
RTRUJILLO.ESRI.COM	Started
SOURCE.ESRI.COM	Stopped
XW8600-W7.ESRI.COM	Stopped

Clusters		
Name	Machines	Protocol
default	SOURCE.ESRI.COM LOANR2285.ESRI.COM RTRUJILLO.ESRI.COM	TCP port 4004



As captured on 10.3 benchmarking cluster using ArcGIS 10.3

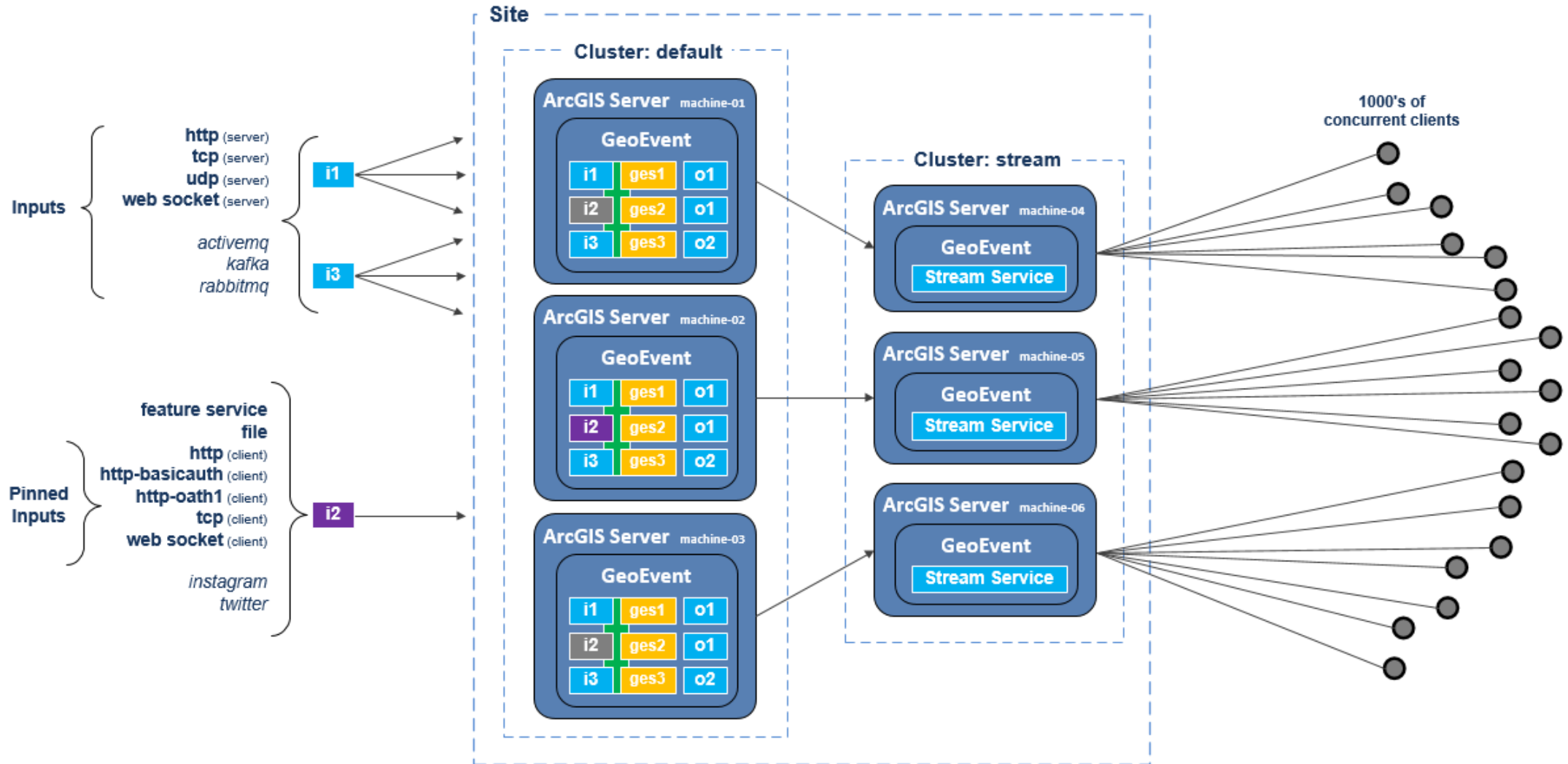


# Stream Services:

High Availability & Scalability

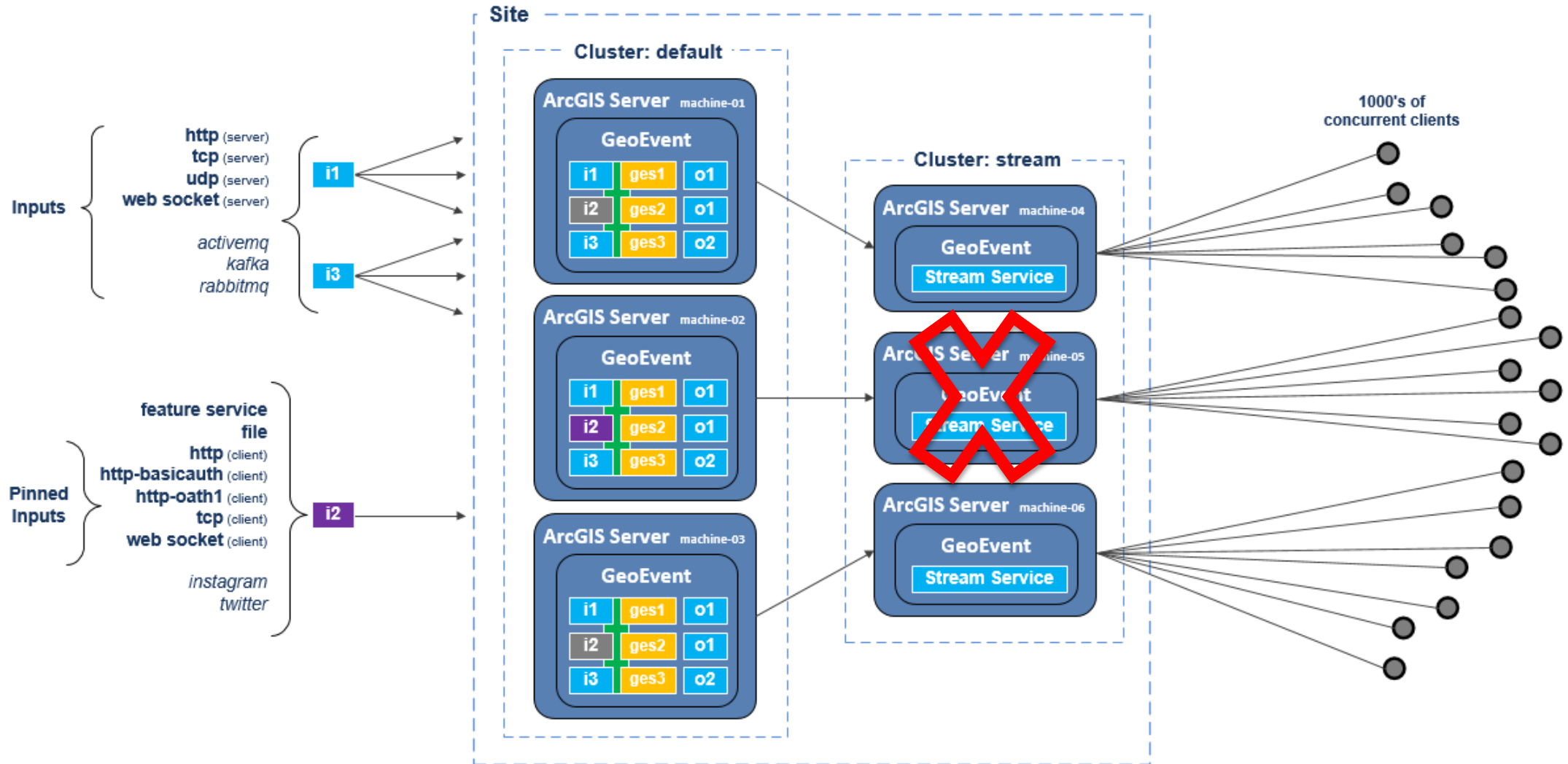
# Scalability

Scaling out Stream Services to support an increased # of concurrent users



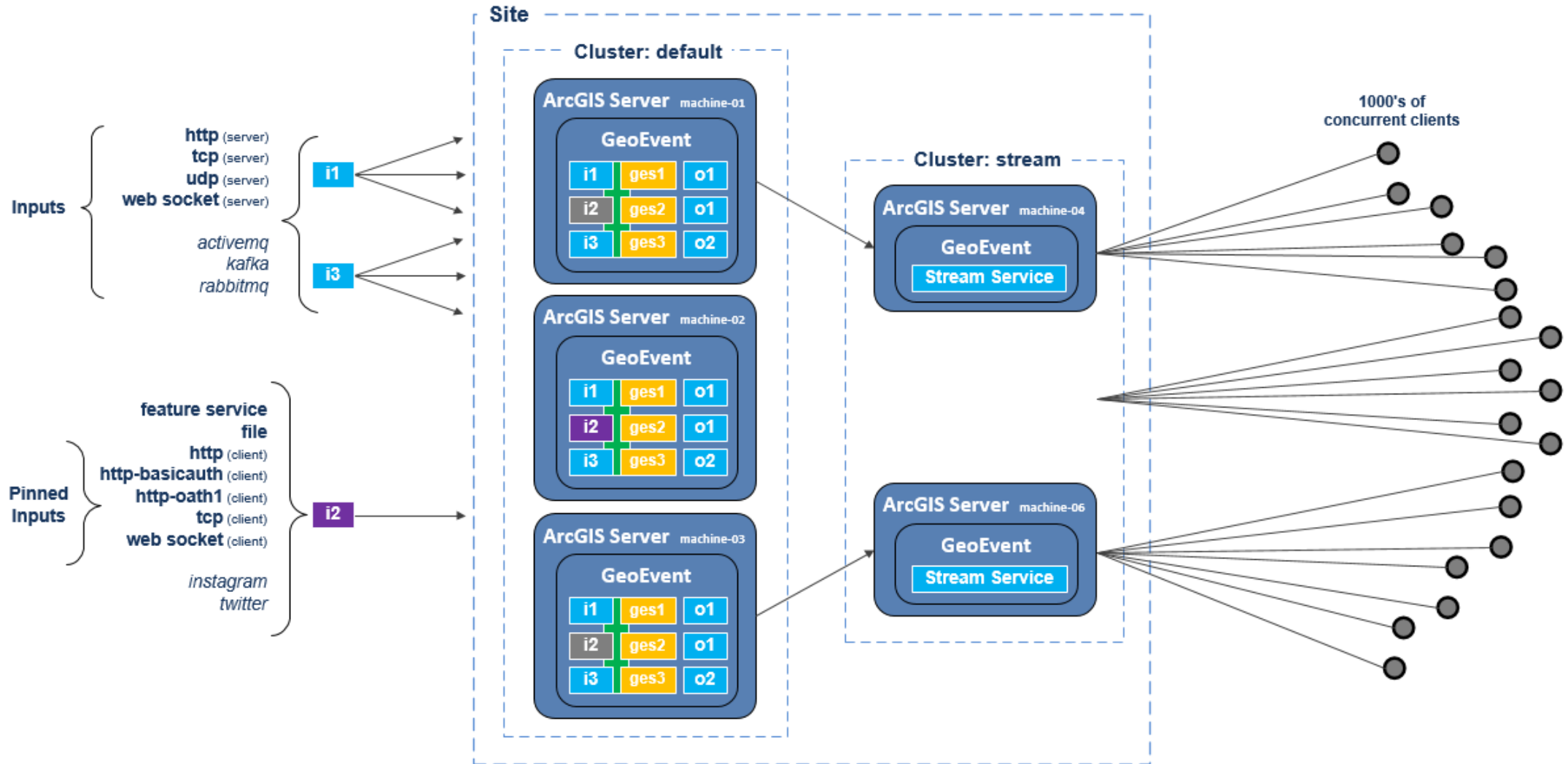
# High Availability

Stream Services concurrent user failover



# High Availability

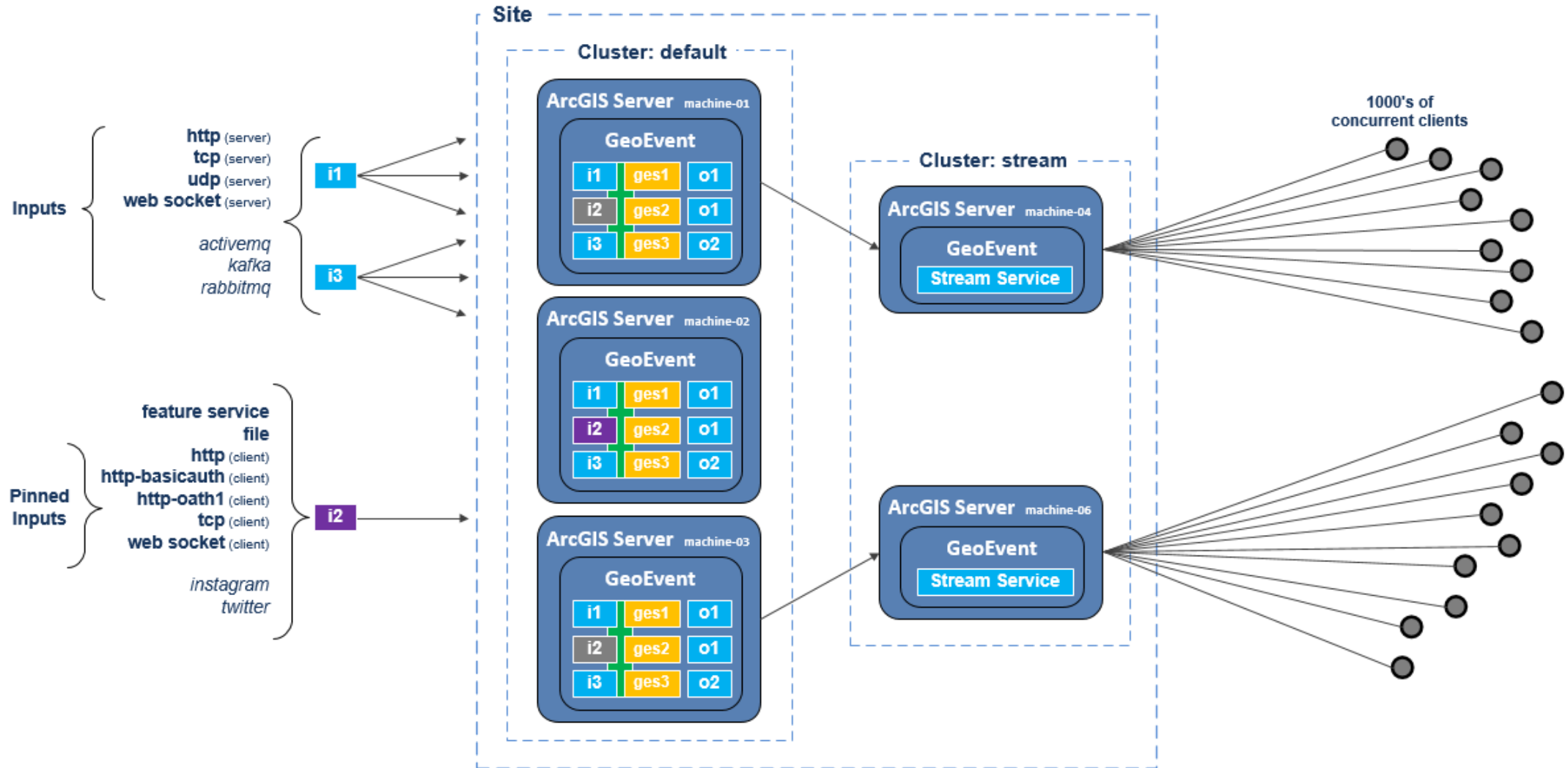
Stream Services concurrent user failover





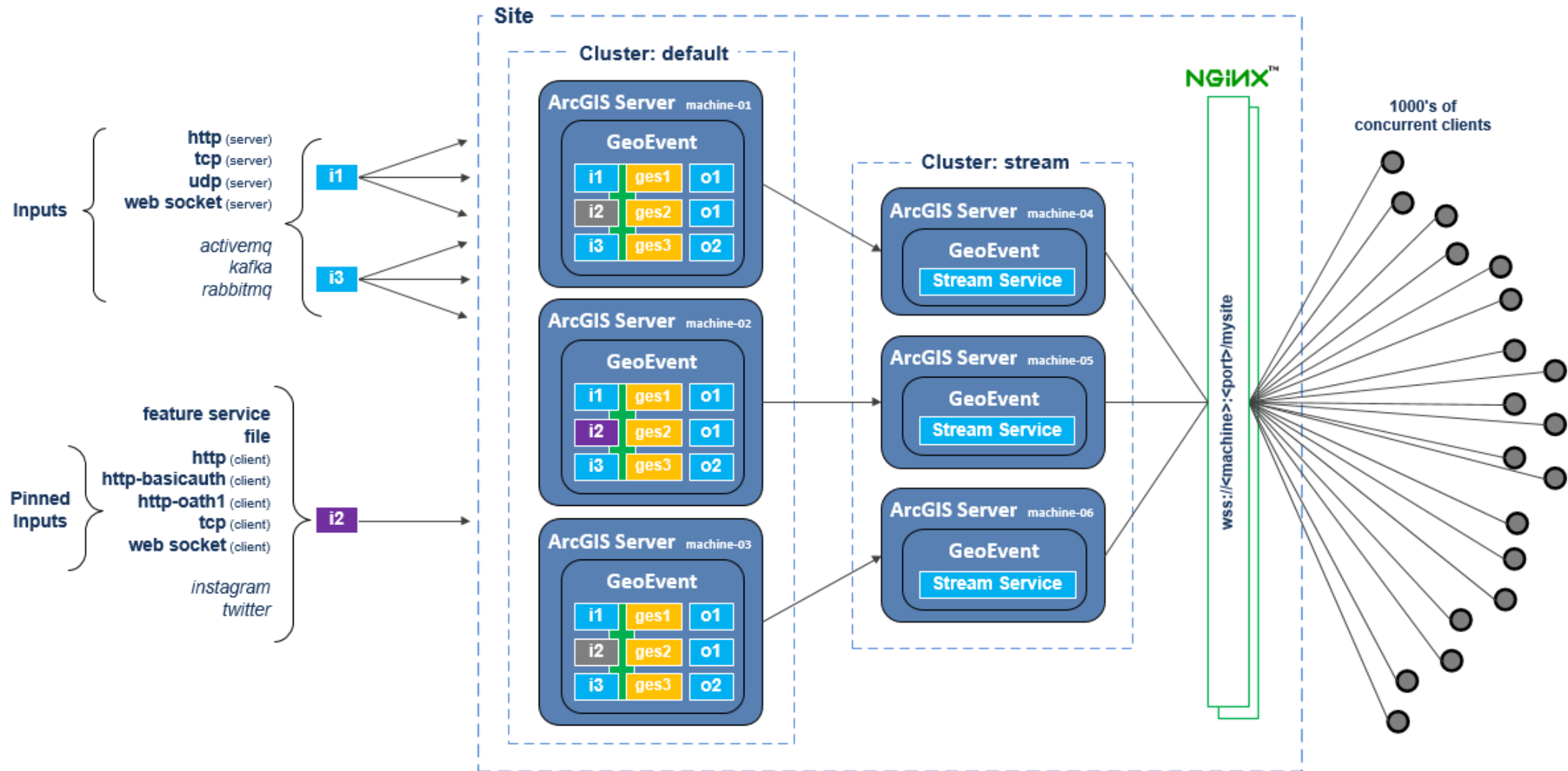
# High Availability

Stream Services concurrent user failover



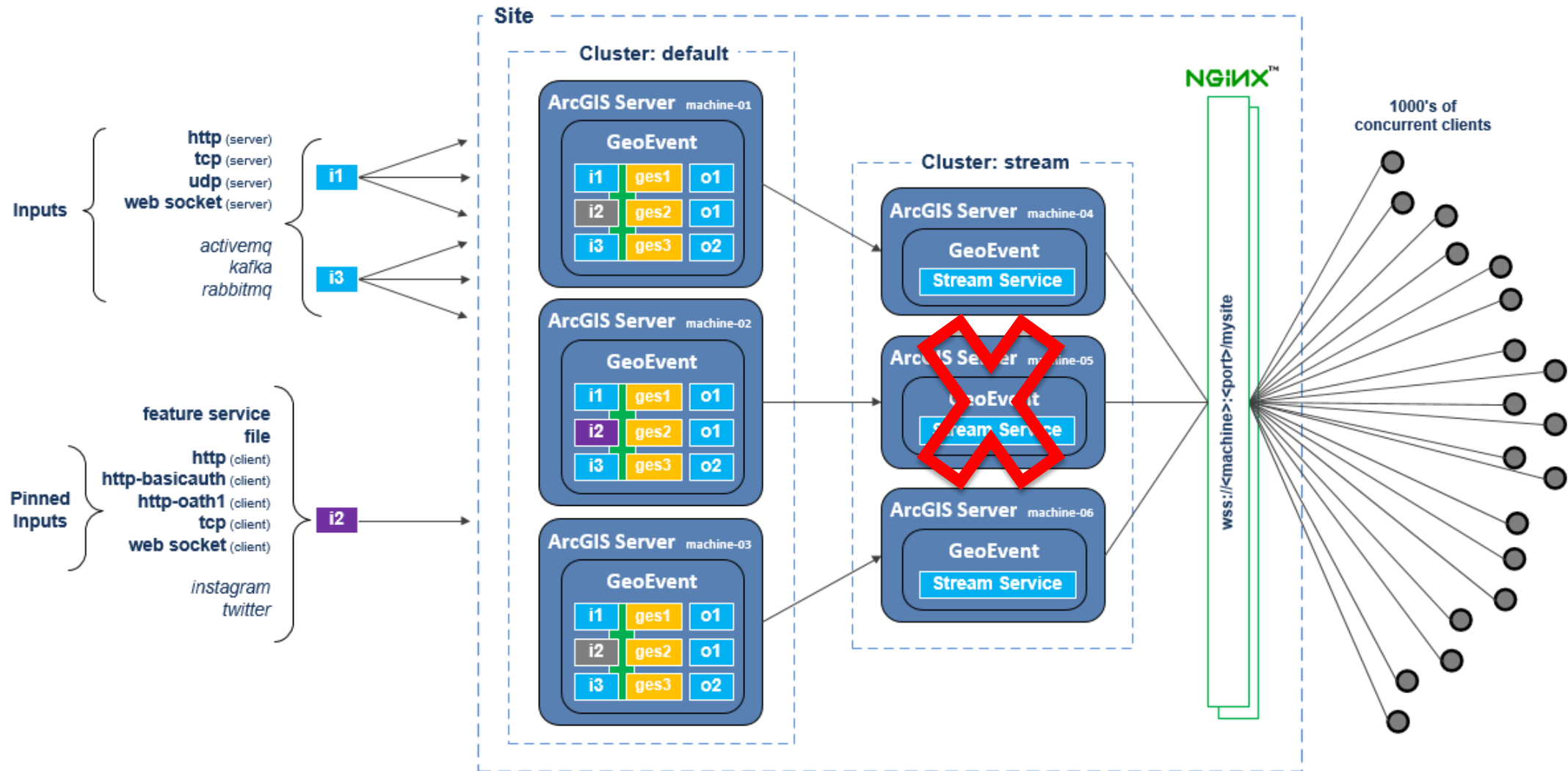
# Scalability

Scaling out Stream Services to support an increased # of concurrent users with a reverse proxy



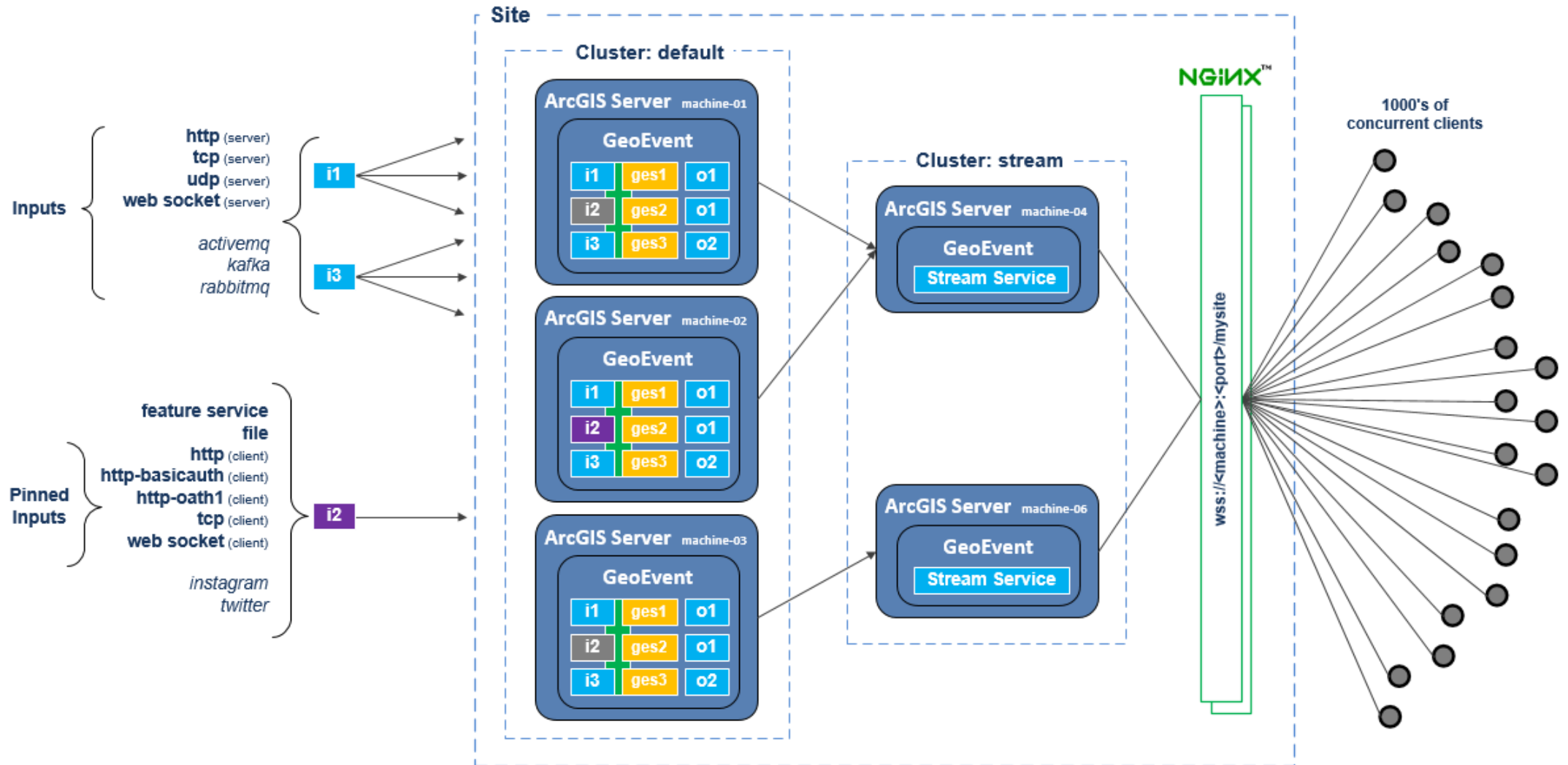
# High Availability

Stream Services concurrent user failover with a reverse proxy



# High Availability

Stream Services concurrent user failover with a reverse proxy



# GeoEvent Extension: Best Practices

## *Summary*

- **ArcGIS is a dynamic platform that enables continuous analytics and real-time visualization for better understanding of our world.**
- **The ArcGIS GeoEvent Extension for Server allows you to:**
  - know what is happening, as it happens
  - react and make smarter decisions faster
  - be notified when interesting events occur

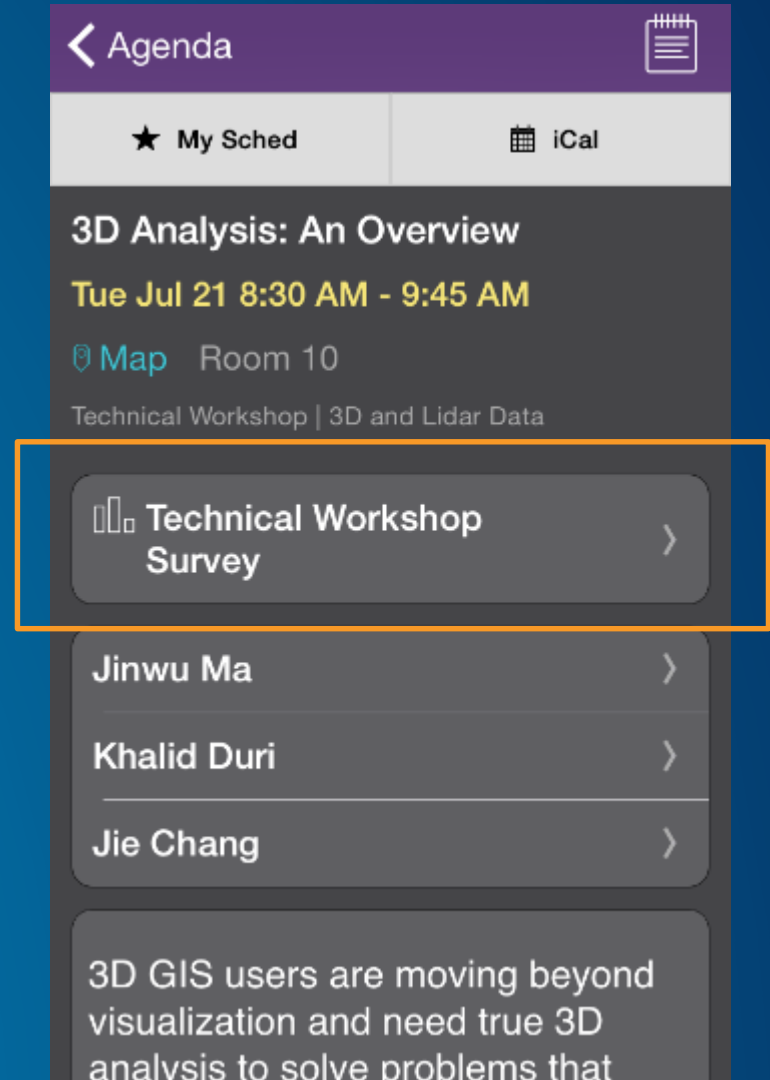
## Other Real-Time GIS Sessions

- **Real-Time GIS: GeoEvent Extension**
  - Tue 10:15-11:30am, Room 17 A
  - Wed 10:15-11:30am, Room 14 B
- **Real-Time GIS: Leveraging Stream Services**
  - Tue 8:30-9:45am, Room 01 A/B
  - Wed 8:30-9:45am, Ballroom 06 D
- **Real-Time GIS: Applying Real-Time Analytics**
  - Tue 10:15-11:30am, Room 15 B
  - Wed 8:30-9:45am, Room 14 B
- **Real-Time GIS Use Cases and Implementation Patterns**
  - Tue 2:30-3:15PM, Demo Theater 6 - Geodata
- **ArcGIS Intelligence: Discern Activities of Interest through Advanced Analytics**
  - Wed 10:15-11:30am, Omni Ballroom A/B
- **Real-Time GIS: The Road Ahead**
  - Wed 1:30-2:45pm, Room 14 B
- **Real-Time GIS: Best Practices**
  - Thu 8:30-9:45am, Room 14 B
- **Real-Time GIS for Asset Readiness, Event Preparation, and Intervention**
  - Thu 8:30-9:45am, Room 29 C



# Thank you...

- Please fill out the session survey in your mobile app
- Select session in the Mobile App
  - Use the Search Feature to quickly find this title
- Click “Technical Workshop Survey”
- Answer a few short questions and enter any comments





# Questions / Feedback?

To learn more:

<http://links.esri.com/geoevent>

<https://links.esri.com/geoevent-forum>



RJ Sunderman  
Product Engineer  
GeoEvent Extension  
[rjsunderman@esri.com](mailto:rjsunderman@esri.com)



esri



C. Adam Mollenkopf  
Real-Time GIS  
Capability Lead  
[amollenkopf@esri.com](mailto:amollenkopf@esri.com)  
[@amollenkopf](#)

<https://github.com/Esri/performance-test-harness-for-geoevent>

<https://github.com/Esri/cluster-simulator-for-geoevent>