Amazon GameLift Deep-Dive

Scale Multiplayer Games

Seungmo Koo
Gaming SA

Gaming on AWS Develop, Operate and Analyze on Cloud

AGENDA

GameLift for Session-based Games

GameLift Deep Dive

GameLift Demo

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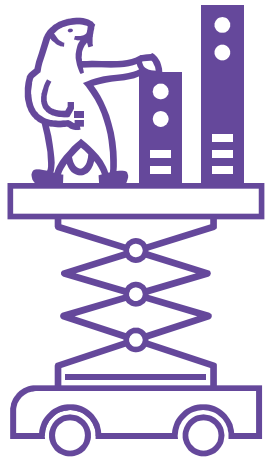
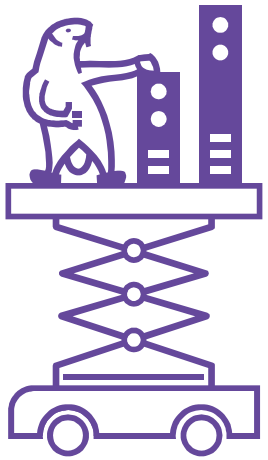
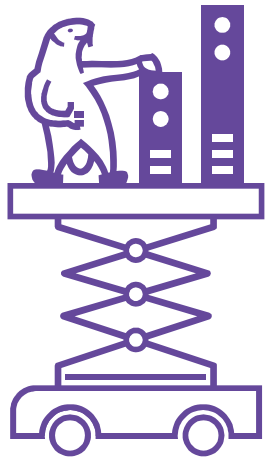


Imagine for a moment...

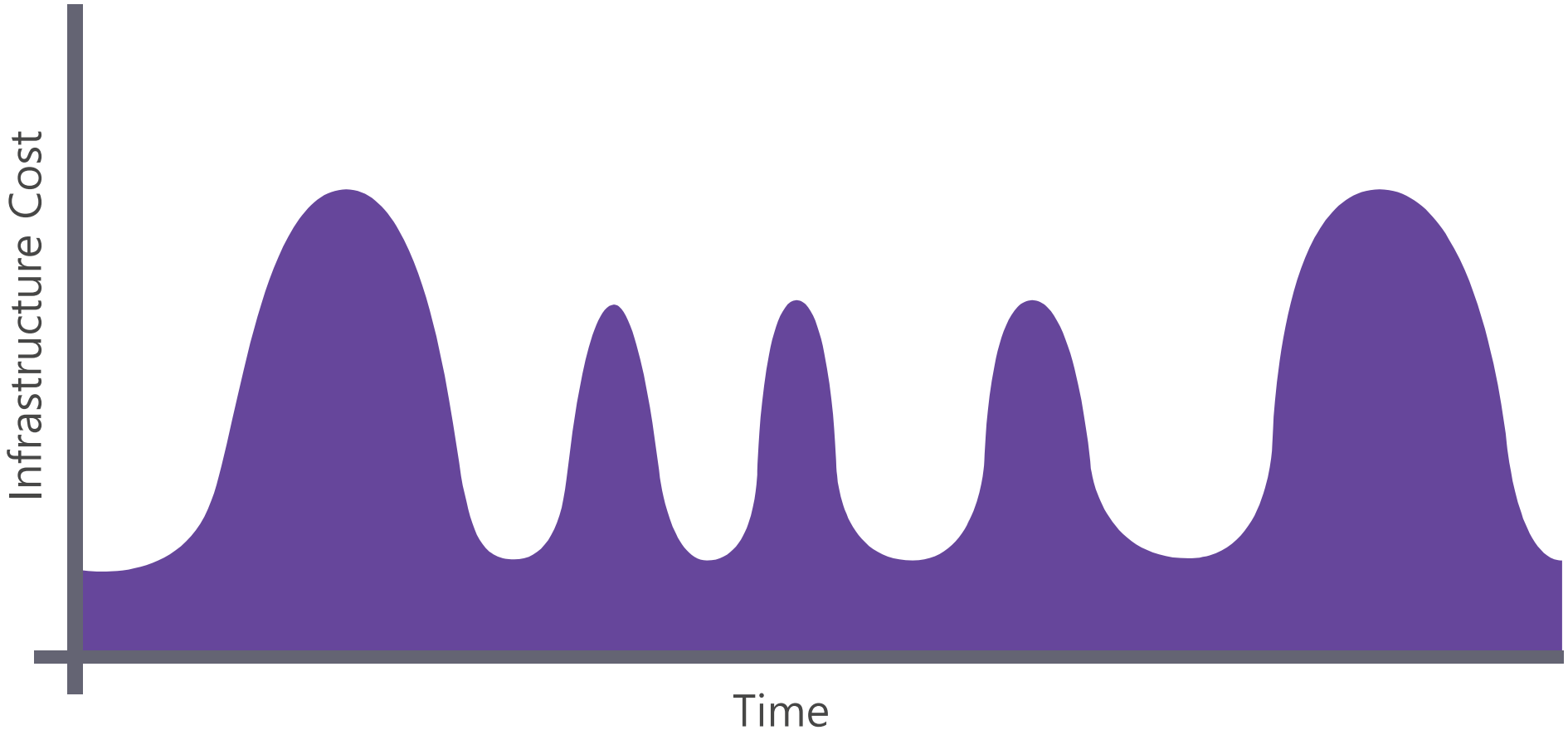


Scaling multiplayer games is hard



Deploy and scale multiplayer games, in minutes with Amazon GameLift

Typical Weekly Game Demand Curve



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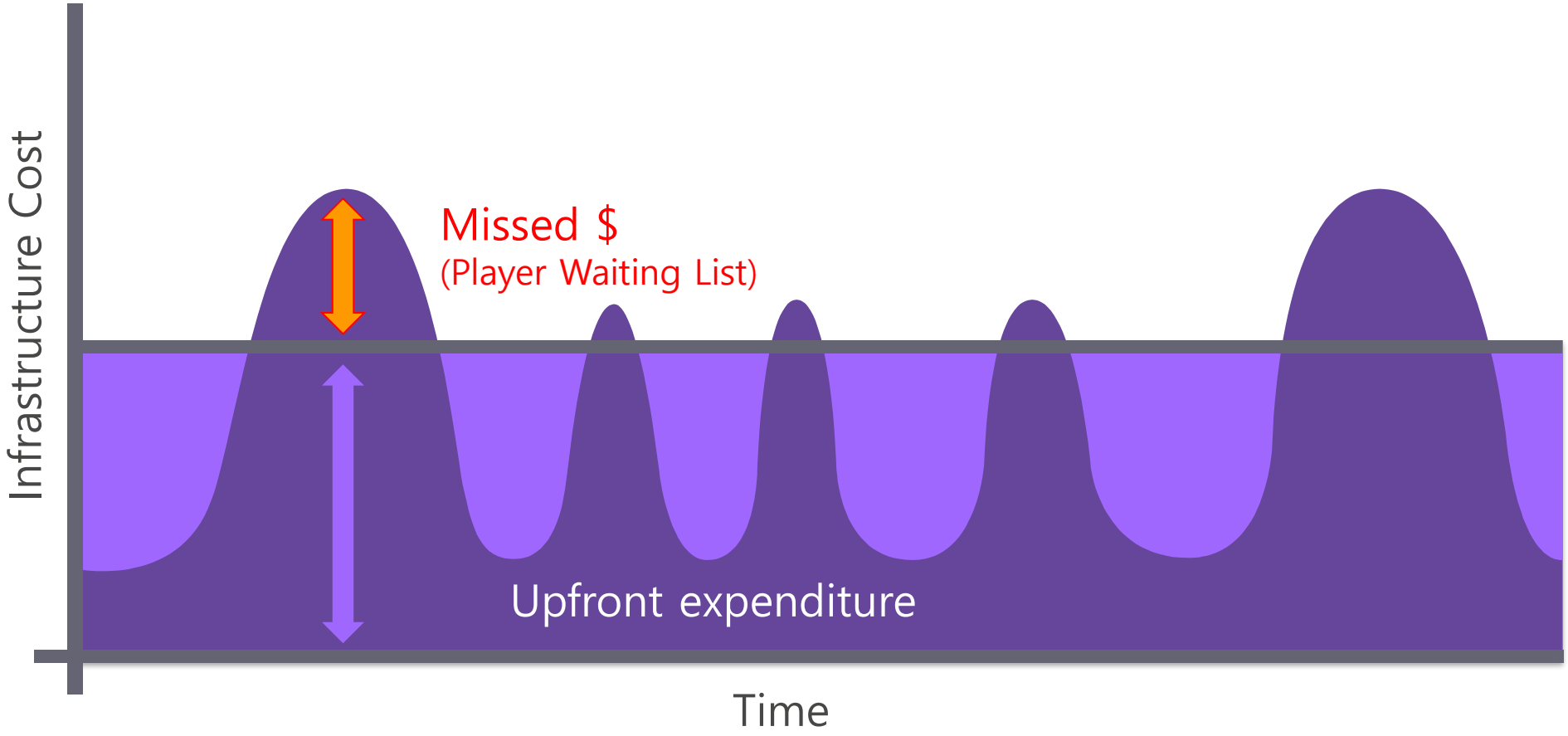
Under Capacity



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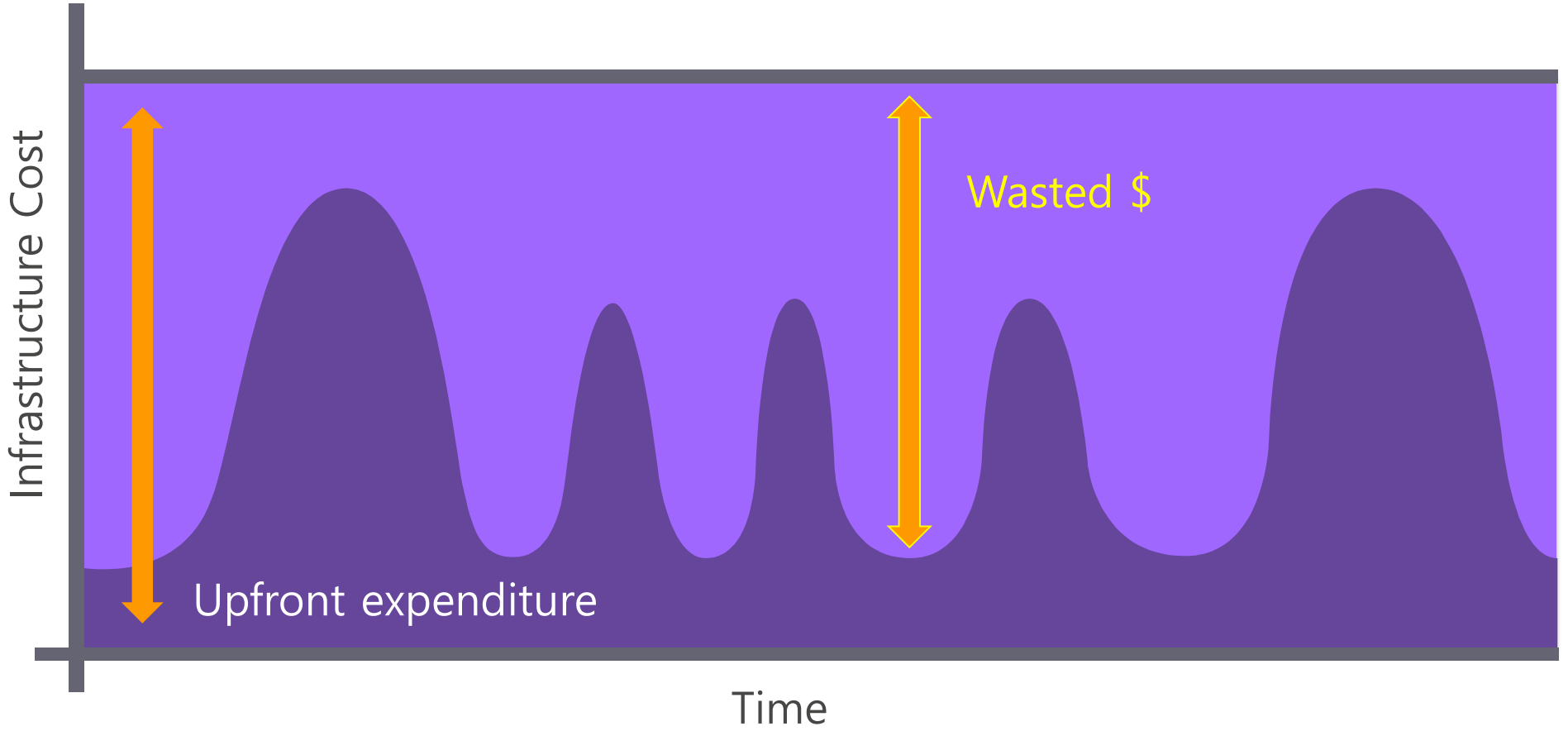
Over Capacity



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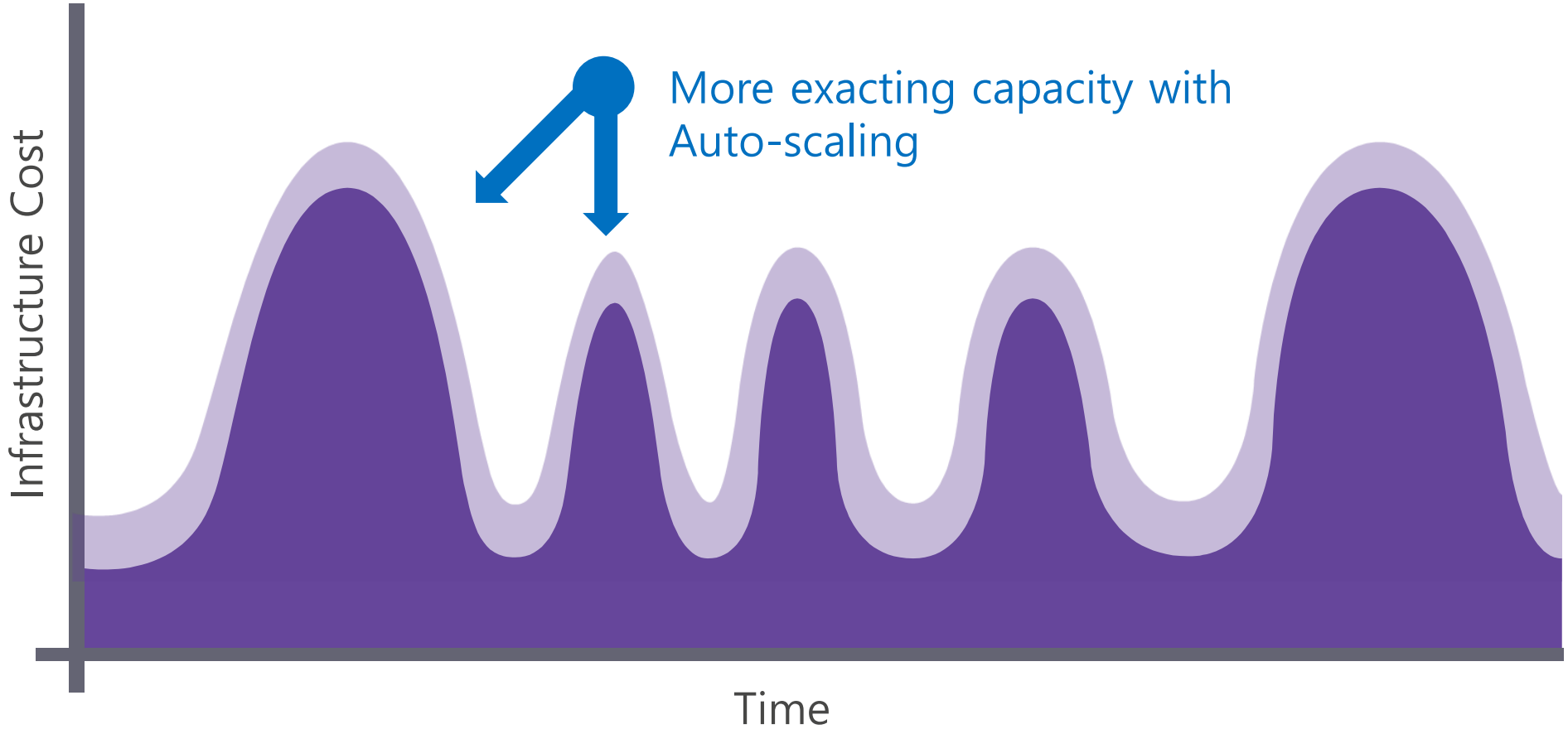
GameLift Autoscaling



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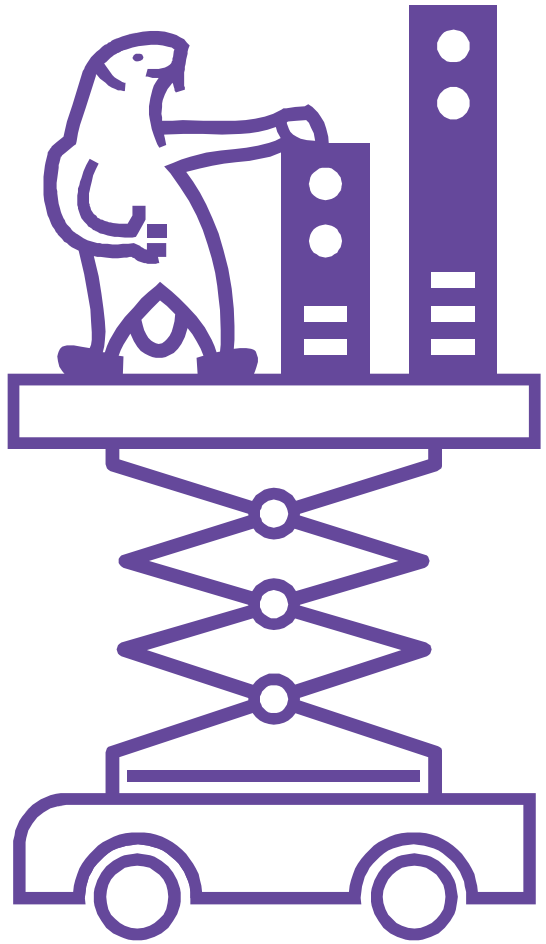

Amazon GameLift

- Managed service for hosting session-based multiplayer game servers
- Automatically scale up and down to meet player demand, as needed
- Deliver low-latency player experiences around the world
- Release live updates with no downtime
- Pay only for what you use

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Designed for Session-based Games

Asynchronous

Persistent

Session

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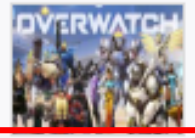
Top 10 Multiplayer Games in Korea

Gametrics Index

게임순위 2016년 9월 27일

순위		게임정보	점유율
1	▲1	 14주 1위 블리자드	29.08%
		오버워치	
2	▼1	리그 오브 레전드	26.03%
3	-	피파온라인3	7.71%
4	-	서든어택	5.82%
5	▲1	스타크래프트	2.99%
6	▼1	던전앤파이터	2.95%
7	-	월드 오브 워크래프트	2.44%
8	▲1	리니지	1.91%
9	▼1	메이플 스토리	1.76%
10	-	블레이드 & 소울	1.47%

Session-based

MMOG

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Hire 4+ *expert* engineers

Give them thousands of hours to:

Design & architect

Build a prototype

Build again for production

Debug and fix nasty scaling issues

Build a UI dashboard

Launch

Provide 24/7 post-launch coverage

Optimize for cost

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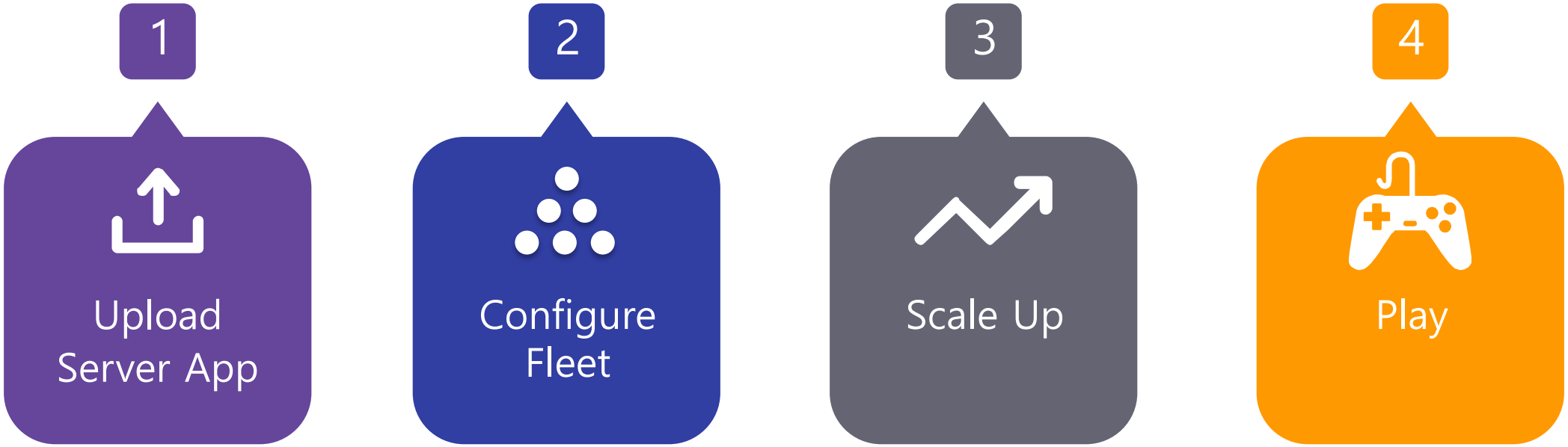
Easy to use. Start in minutes.



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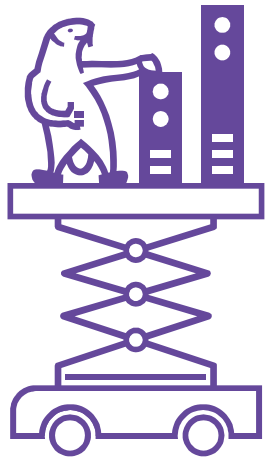
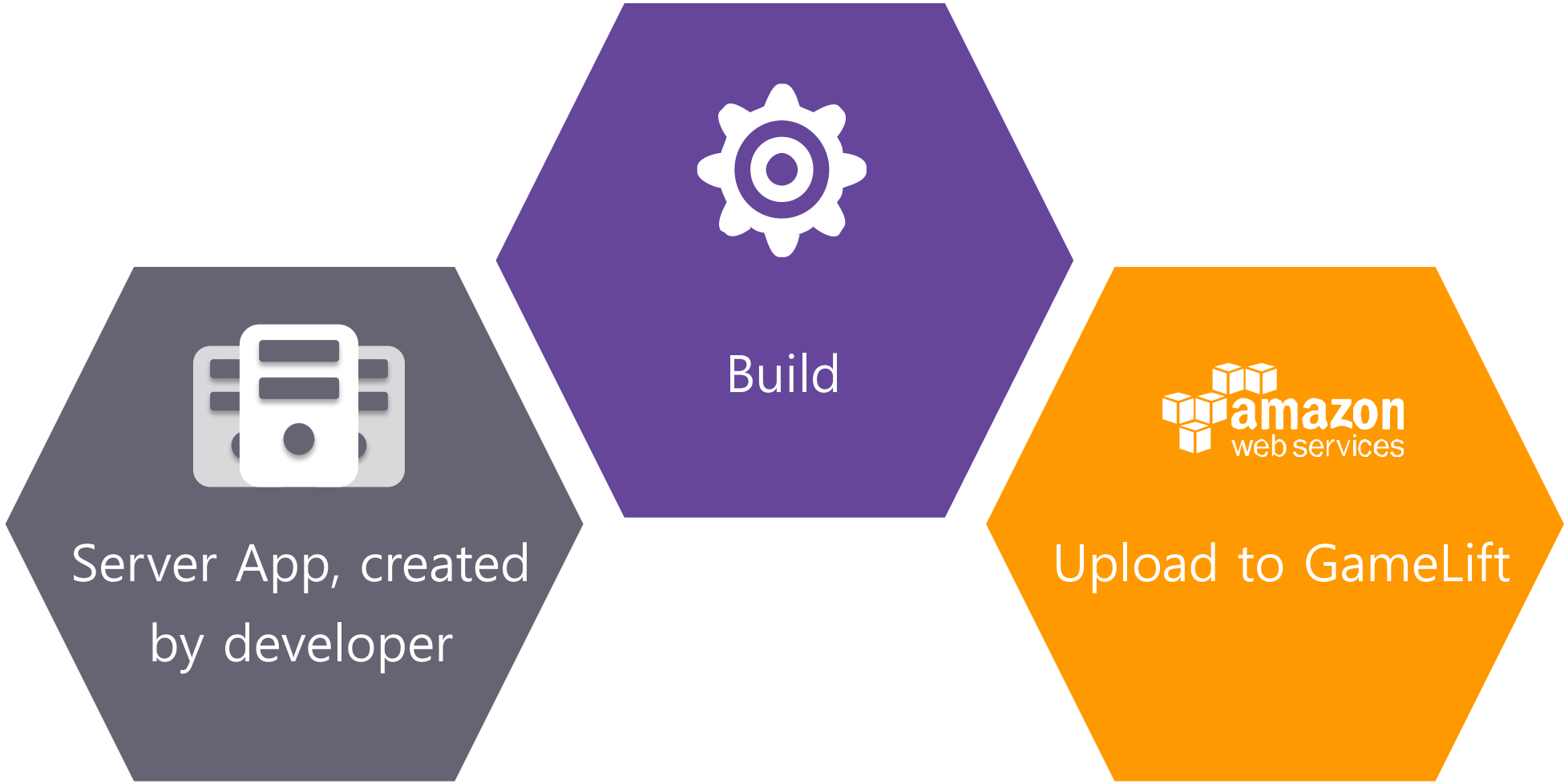


GameLift Deep Dive

Build



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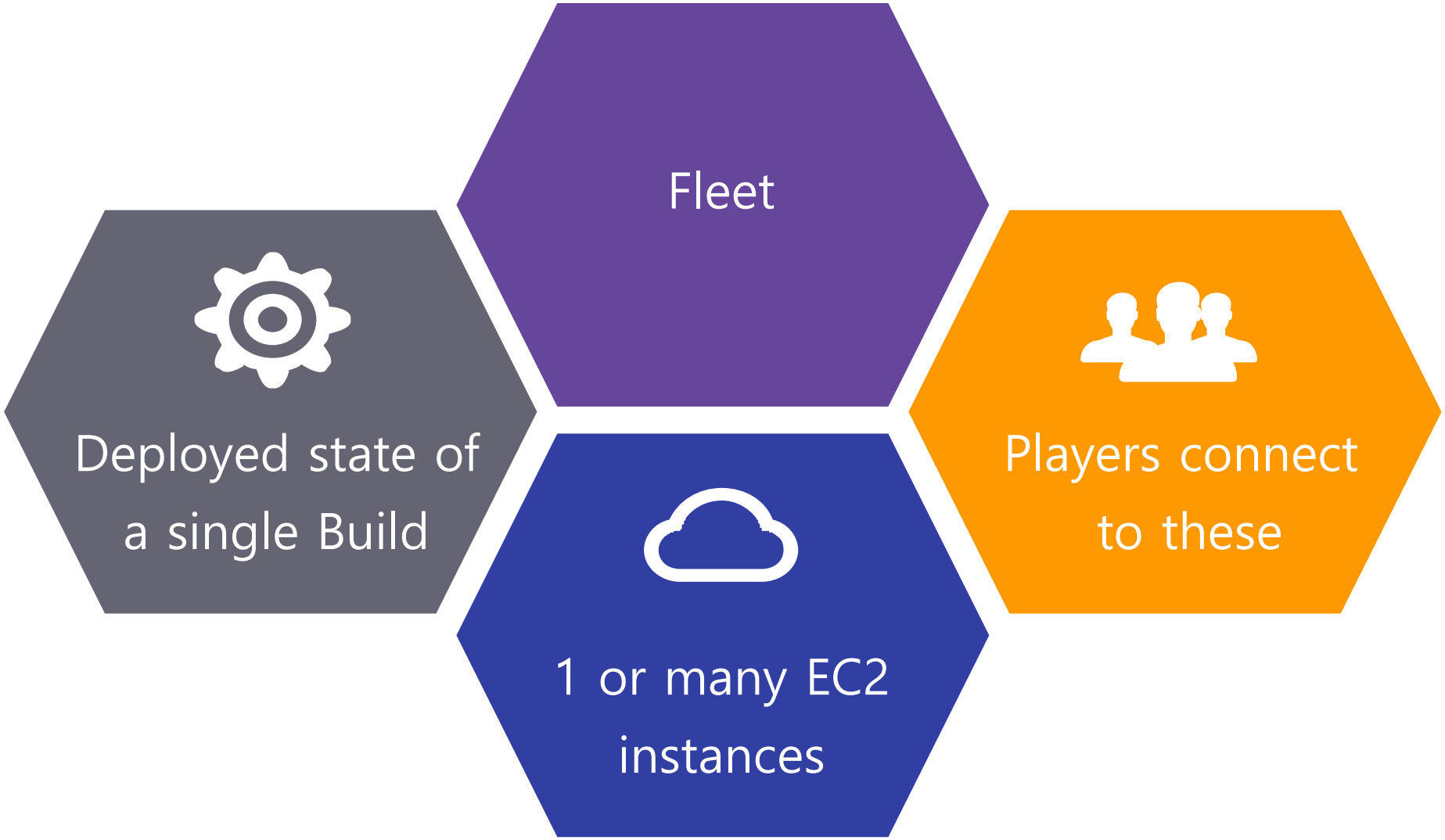
Fleet



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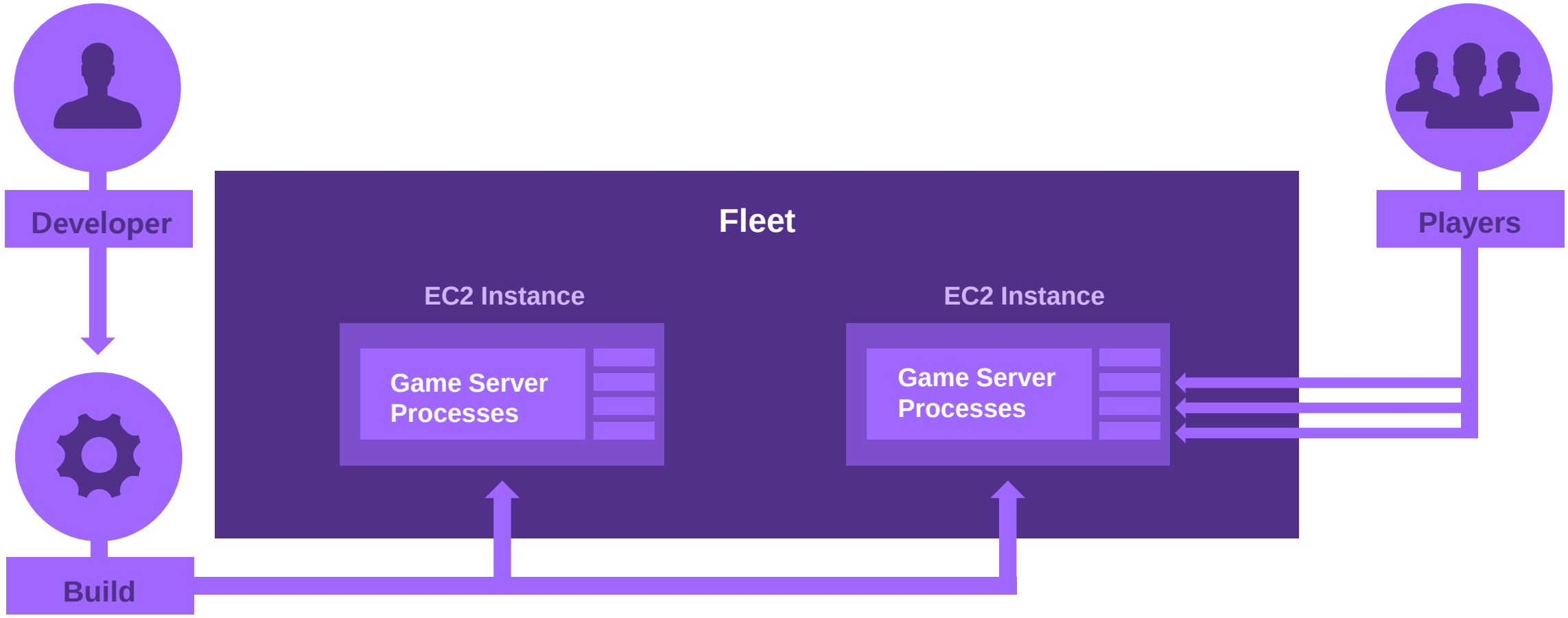
Fleet Overview



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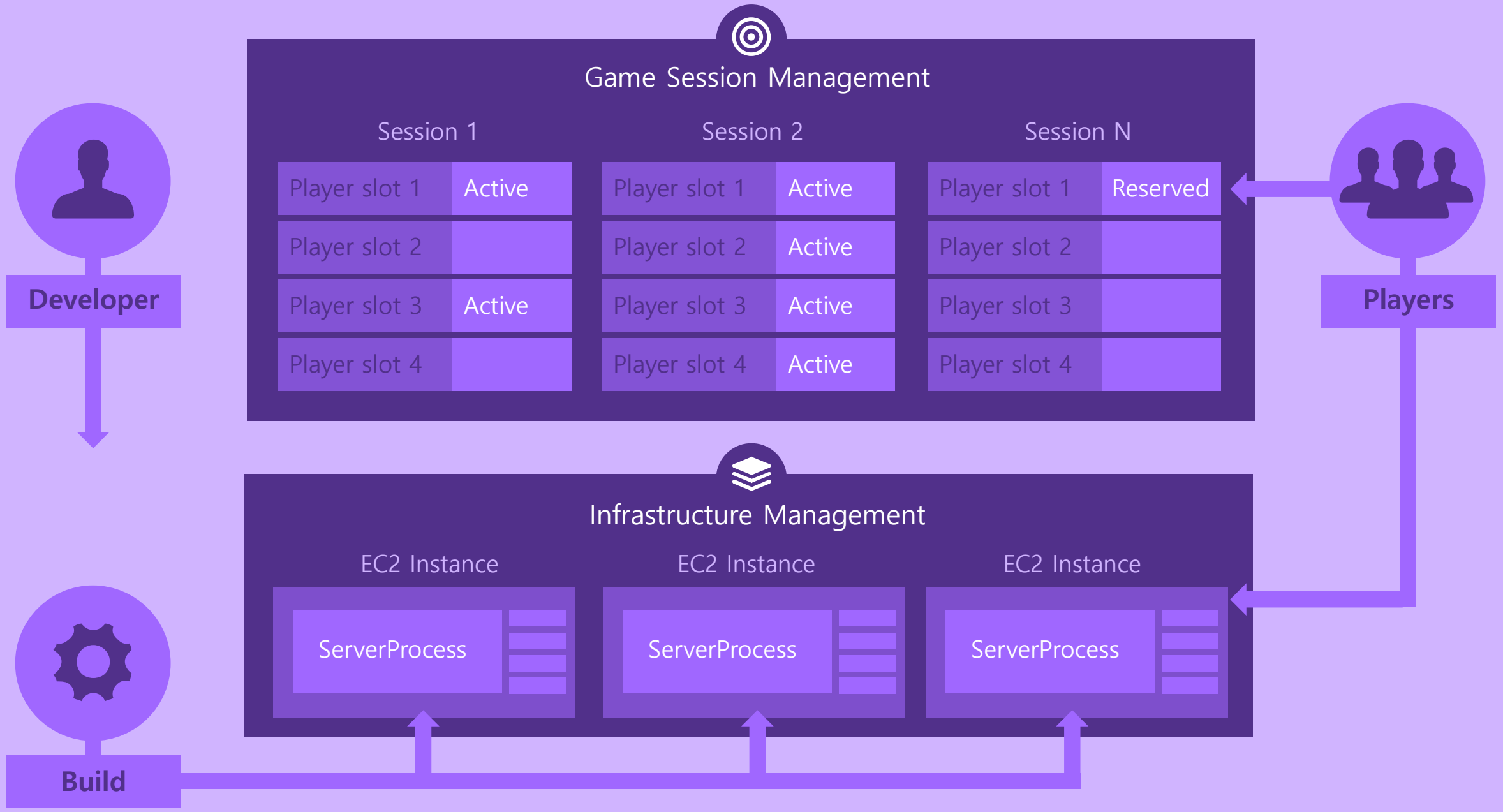
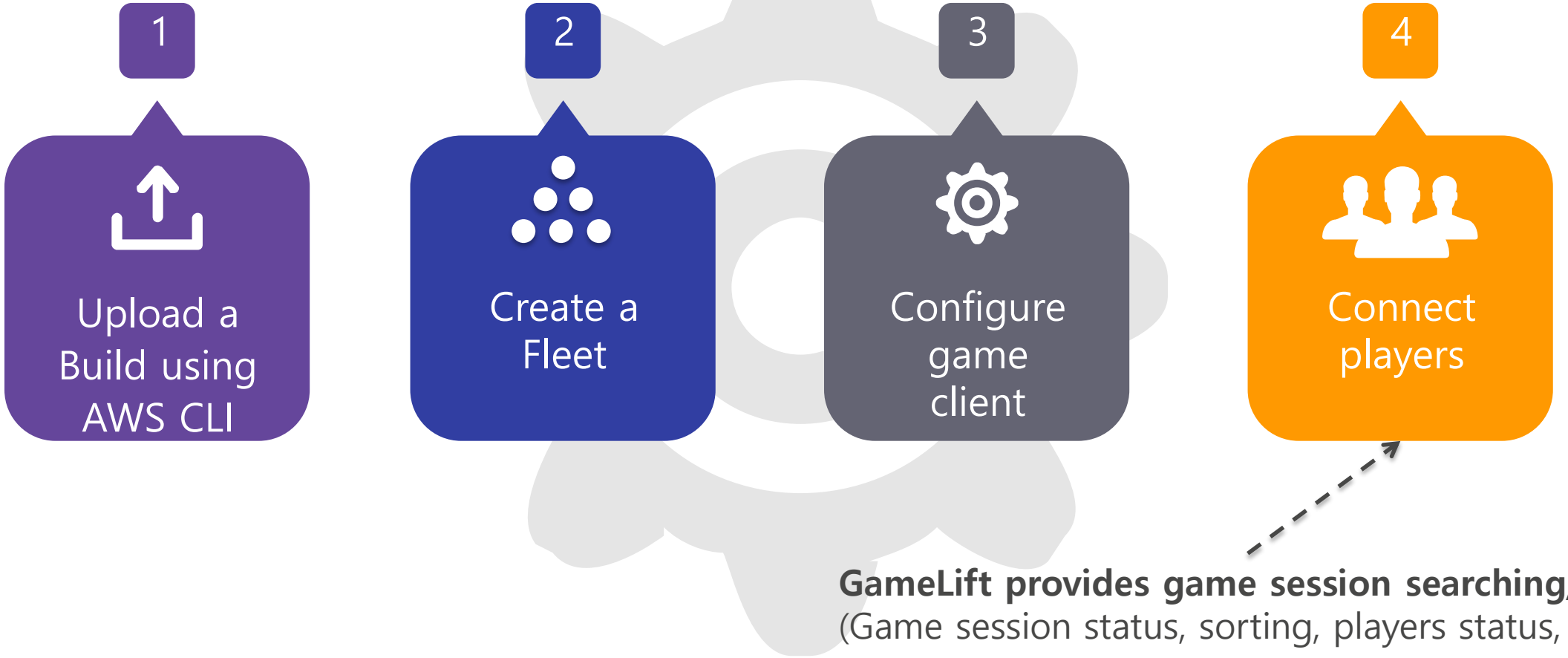

Game Session Management
Session 1
Player slot 1
Active
Player slot 2
Player slot 3
Active
Player slot 4
Session 2
Player slot 1
Active
Player slot 2
Active
Player slot 3
Active
Player slot 4
Active
Session N
Player slot 1
Reserved
Player slot 2
Player slot 3
Player slot 4
Developer
Players
Infrastructure Management
EC2 Instance
ServerProcess
EC2 Instance
ServerProcess
EC2 Instance
ServerProcess
Build

Simple Dev Environment: 4 Steps



GameLift provides game session searching/matching
(Game session status, sorting, players status, …)

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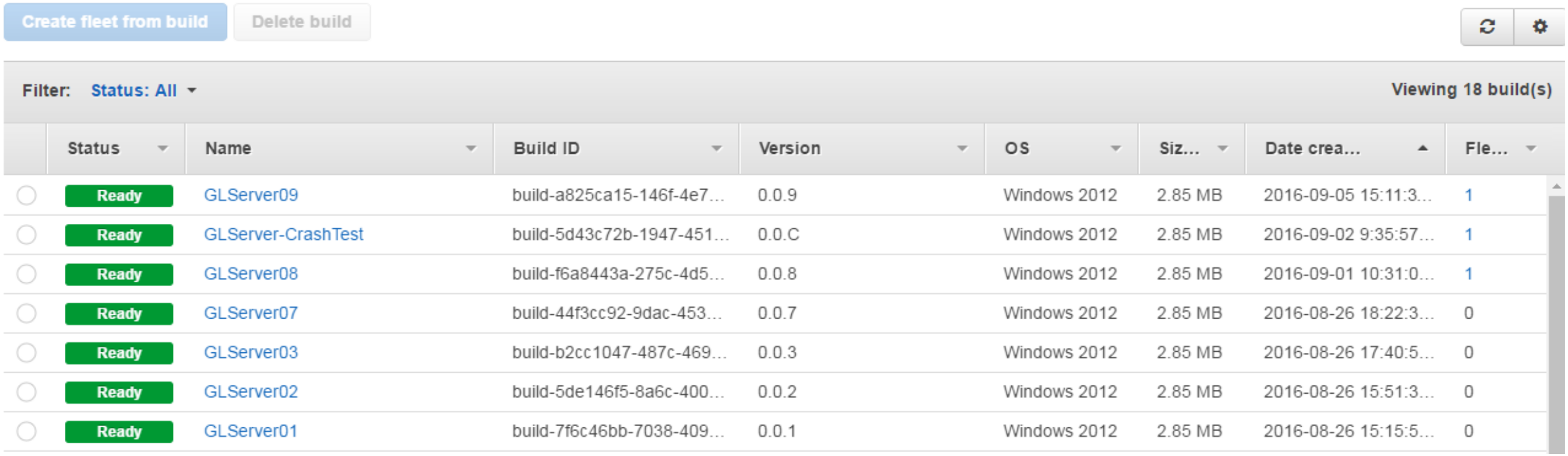
Upload a Build

- AWS CLI

  aws gamelift upload-build --name <build name> --build-root <folder> --operating-system <WINDOW_2012 or AMAZON_LINUX> --region <region>



Status	Name	Build ID	Version	OS	Siz...	Date crea...	Fle...
Ready	GLServer09	build-a825ca15-146f-4e7...	0.0.9	Windows 2012	2.85 MB	2016-09-05 15:11:3...	1
Ready	GLServer-CrashTest	build-5d43c72b-1947-451...	0.0.C	Windows 2012	2.85 MB	2016-09-02 9:35:57...	1
Ready	GLServer08	build-f6a8443a-275c-4d5...	0.0.8	Windows 2012	2.85 MB	2016-09-01 10:31:0...	1
Ready	GLServer07	build-44f3cc92-9dac-453...	0.0.7	Windows 2012	2.85 MB	2016-08-26 18:22:3...	0
Ready	GLServer03	build-b2cc1047-487c-469...	0.0.3	Windows 2012	2.85 MB	2016-08-26 17:40:5...	0
Ready	GLServer02	build-5de146f5-8a6c-400...	0.0.2	Windows 2012	2.85 MB	2016-08-26 15:51:3...	0
Ready	GLServer01	build-7f6c46bb-7038-409...	0.0.1	Windows 2012	2.85 MB	2016-08-26 15:15:5...	0

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Fleet Configuration

- EC2 instance type
- Execution file name, parameters, concurrent process count
- Open port, protocol, CIDR
- Auto-scaling policy

Instance type

Select an instance type to determine the computing resources that will be used to run your dedicated game servers on this fleet. All Amazon GameLift instances include 50 GB of elastic block storage (EBS). Instances for this fleet are either Windows or Linux, depending on the operating system of the selected build. For more details, see EC2 Instance Types. Instance type cannot be changed once the fleet is created.

	Family	Instance type	vCPU	Memory (GB)	Instance stor...	Network perf...
◉	Compute optimized	c3.large Free tier	2	3.75	50GB EBS only	Moderate
○	General purpose	t2.micro	1	1	50GB EBS only	Low to moderate
○	General purpose	t2.small	1	2	50GB EBS only	Low to moderate
○	General purpose	t2.medium	2	4	50GB EBS only	Low to moderate
○	General purpose	t2.large	2	8	50GB EBS only	Low to moderate
○	General purpose	m4.large	2	8	50GB EBS only	Moderate
○	General purpose	m4.xlarge	4	16	50GB EBS only	High

Capacity allocation - New

Based on the processing capacity of the selected instance type, specify how many server processes can run concurrently on each instance without exceeding resources, and configure how to launch each server process. To run more than one server executable or use different launch parameters, add more configurations.

Launch path*	Launch parameters	Concurrent processes*	
C:\game\GameLiftGameServer.exe	5999	1	
C:\game\GameLiftGameServer.exe	1935	1	

Add configuration

Multiple configurations and concurrent processes are supported with game servers using the Amazon GameLift SDK v.3.0+ (included in Lumberyard v.1.4+). Game servers using earlier versions can support only one concurrent process. If the fleet is configured for more than one concurrent process, it will fail to activate.

EC2 port settings

Set IP address and port ranges to allow inbound access to games on this fleet. Each server process in this fleet must use an IP address and port in these ranges.

Port range*	Protocol*	IP address range*	
1935-1935	TCP	0.0.0.0/0	
5999-5999	TCP	0.0.0.0/0	

Add port settings

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Automatic scaling policies

Allow GameLift to automatically scale for you. You can add as many policies to your fleet as needed.

Name* Safe Scaling Policy

Rule* If Current Player Sessions are < 1 for 60 minutes, then scale to 1

Name* Scale Up

Rule* If Activating Game Sessions are >= 3 for 20 minutes, then scale up by 1 instances

Name* Scale Down gogo

Rule* If Current Player Sessions are <= 10 for 30 minutes, then scale down by 15 %

Add Policy

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Fleet Creation

Fleets

Monitor metrics for your fleets, including the number of active game sessions and number of active and available player sessions.

Create fleet

Status	Fleet name	EC2 type	Active	Desired	Active ...	Player s..
Downloading	MyEduServerFleet-11	c3.large	0	1	0	0 of 0
Active	MyEduServerFleet10-LOG	c3.large	1	1	0	0 of 0
Error	MyEduServerFleet9	c3.large	0	1	0	0 of 0
Active	MyEduServerFleet8	c3.large	1	1	1	1 of 8

- Status: **Downloading → Validating → Activating → Active**
- Active: Clients can connect to Fleet

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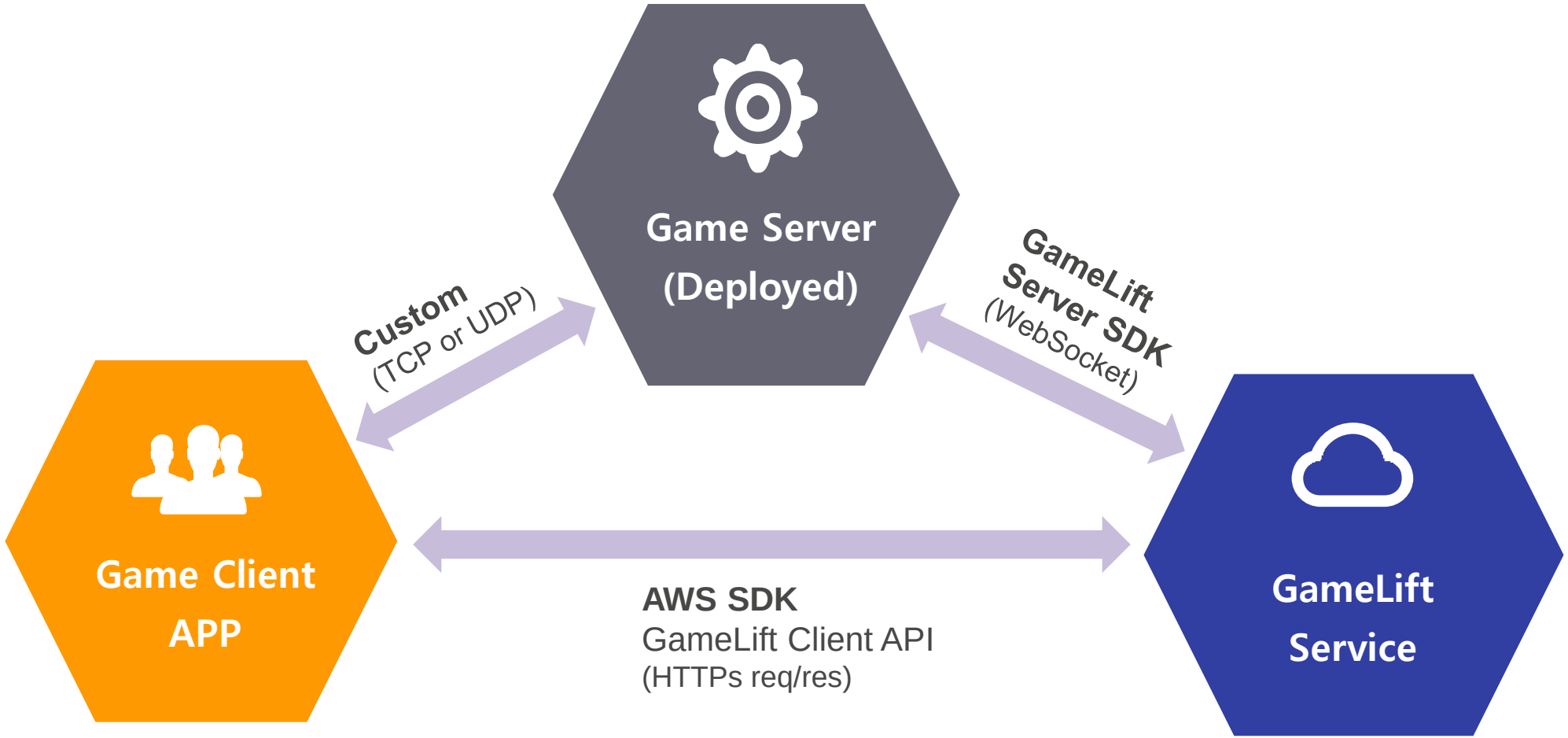
GameLift API Interaction



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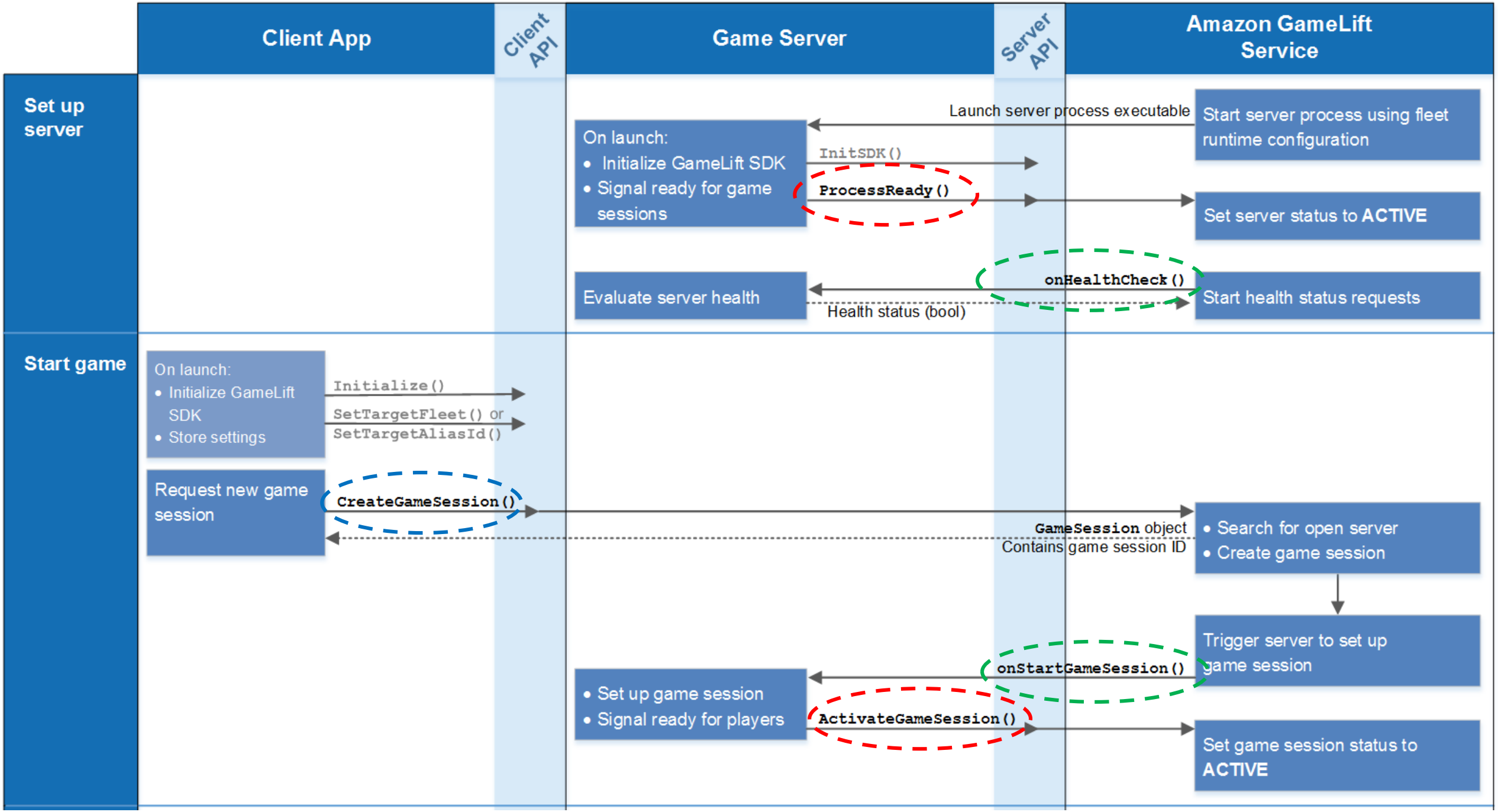
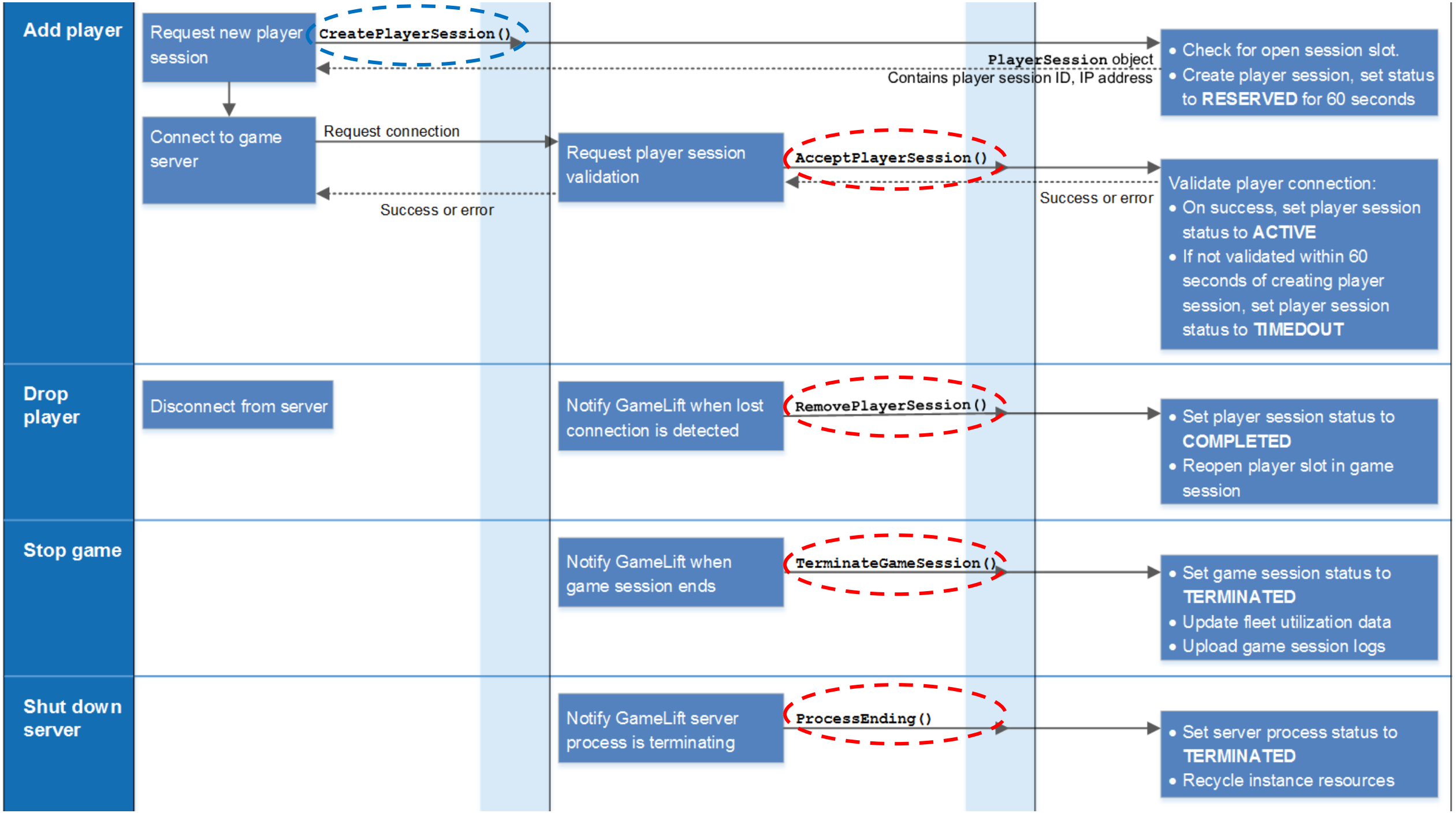

Client App
Client API
Game Server
Server API
Amazon GameLift Service
Set up server
Launch server process executable
Start server process using fleet runtime configuration
On launch:
• Initialize GameLift SDK
• Signal ready for game sessions
InitSDK()
ProcessReady()
Set server status to ACTIVE
onHealthCheck()
Evaluate server health
Start health status requests
Health status (bool)
Start game
On launch:
• Initialize GameLift SDK
• Store settings
Initialize()
SetTargetFleet() or SetTargetAliasId()
Request new game session
CreateGameSession()
GameSession object
Contains game session ID
• Search for open server
• Create game session
Trigger server to set up game session
onStartGameSession()
• Set up game session
• Signal ready for players
ActivateGameSession()
Set game session status to ACTIVE


Add player
Request new player session
CreatePlayerSession()
PlayerSession object
Contains player session ID, IP address
• Check for open session slot.
• Create player session, set status to RESERVED for 60 seconds
Connect to game server
Request connection
Request player session validation
AcceptPlayerSession()
Success or error
Validate player connection:
• On success, set player session status to ACTIVE
• If not validated within 60 seconds of creating player session, set player session status to TIMEDOUT
Success or error
Drop player
Disconnect from server
Notify GameLift when lost connection is detected
RemovePlayerSession()
• Set player session status to COMPLETED
• Reopen player slot in game session
Stop game
Notify GameLift when game session ends
TerminateGameSession()
• Set game session status to TERMINATED
• Update fleet utilization data
• Upload game session logs
Shut down server
Notify GameLift server process is terminating
ProcessEnding()
• Set server process status to TERMINATED
• Recycle instance resources

GameLift Server SDK

- For a Game Server
  - Currently, only in C++ but supports C# soon
  - Windows Server and Amazon Linux
  - https://aws.amazon.com/gamelift/getting-started/

- FYI: GameLift Client API
  - AWS SDK itself
    - Supports many languages: C++, C#, Java, Python, …

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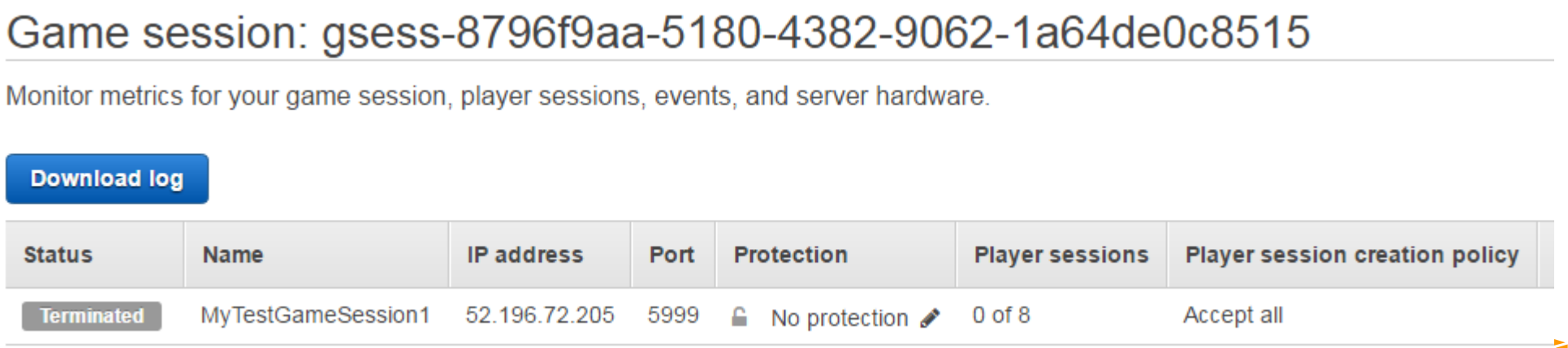
GameLift Tips

- Logs & Memory dumps for a Game Server
  - Debugging a game server on a Fleet
  - How-to
    - Upload a Build with “logs” folder
    - Implement to make a game server leave text logs and dumps into the “logs” folder
    - Download “logs” folder in AWS management console



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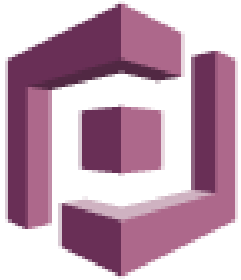
- Authentication
  - Access control about GameLift API called by a game client
  - AWS IAM
    - Web Federation such as Google ID and Facebook ID
    - OpenID Connect (OIDC), SAML 2.0
  - Amazon Cognito



- Installing custom programs on Fleet instances
  - Apps on dependent with a game server program
    - Scripting: install.bat for Windows, install.sh for Linux
    - Should be included in a Build

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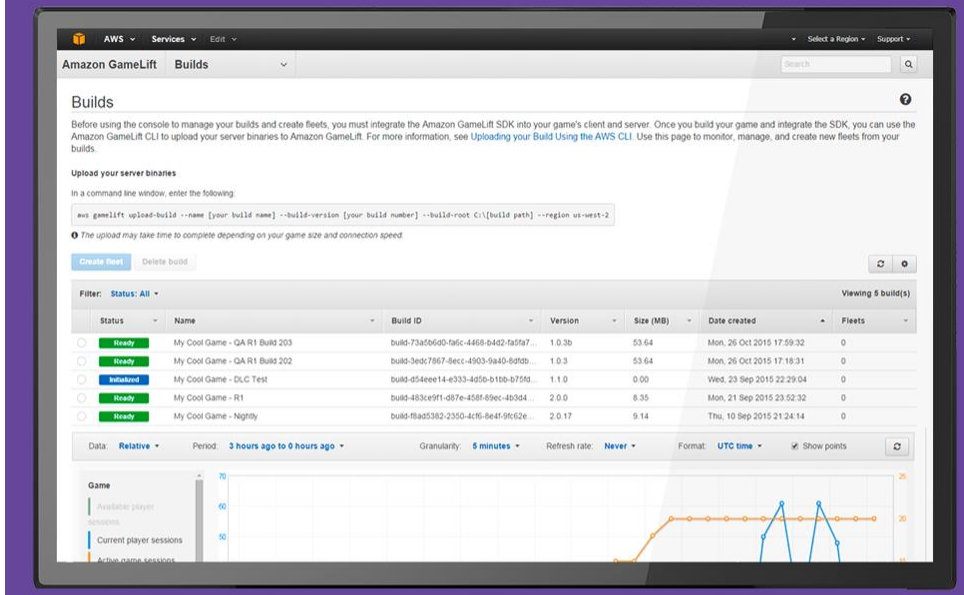
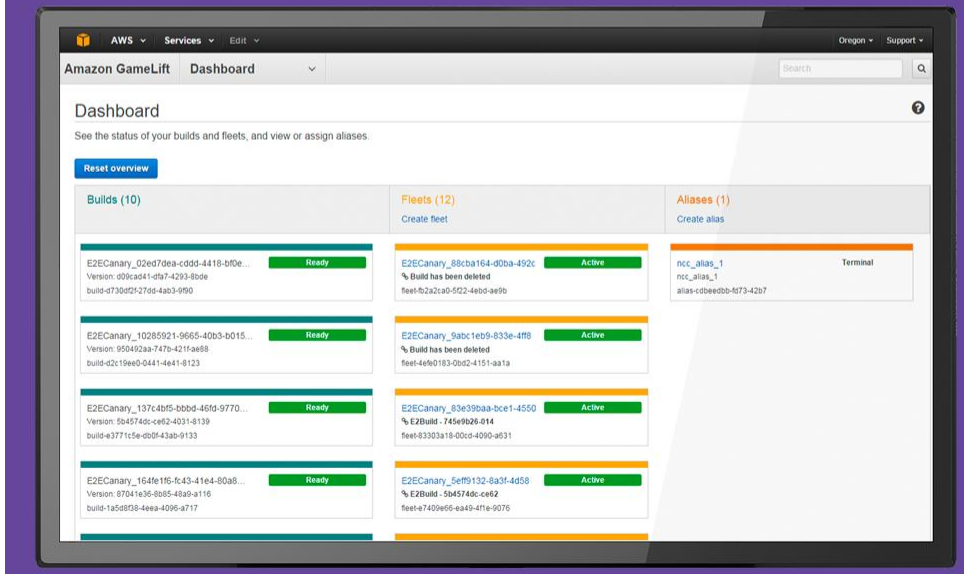
GameLift Operation

Web-based UI

- Can use API, too
- Measure performance
- Scaling
- Event
- Game sessions and player sessions
- Deploying updates by using ALIAS





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Visualization for Scaling Status

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Monitoring for Game/Player Sessions

Status	Name	IP address	Port	Protection	Player sessions	Player session creation policy	Uptime	Date created
Terminated	MyTestGameSession1	52.197.165.79	1935	No protection	0 of 8	Accept all	00d 00h 00m 12s	2016-08-29 14:10:13 UTC+0900

Player sessions

View all player sessions for the selected game session.

Filter: Status: All — Viewing 8 player session(s)

Status	ID	Player ID	Start time	End time	Total time
Completed	psess-a358bf90-7ea6-4e29-a162-3351d1102da9	DummyPlayer7	2016-08-29 14:10:14 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-5e94ce72-bd51-4220-b7f6-a89bd217b2be	DummyPlayer6	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-2c5b995c-03a9-41b1-b106-0aef2346195b	DummyPlayer5	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-e346bc70-66d7-425a-bd01-288ba30a8312	DummyPlayer4	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-c42b78c2-9889-4250-97df-d7a4d440f398	DummyPlayer3	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-e496ba19-76f2-4fd4-a431-54f4ba4e1290	DummyPlayer2	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-77f1602e-7f58-4a79-8313-cfdf4dec6085	DummyPlayer1	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s
Completed	psess-ca0c456e-4b90-4067-bf21-ecfcb519c230	DummyPlayer0	2016-08-29 14:10:13 UTC...	2016-08-29 14:10:25 UTC...	00d 00h 00m 11s

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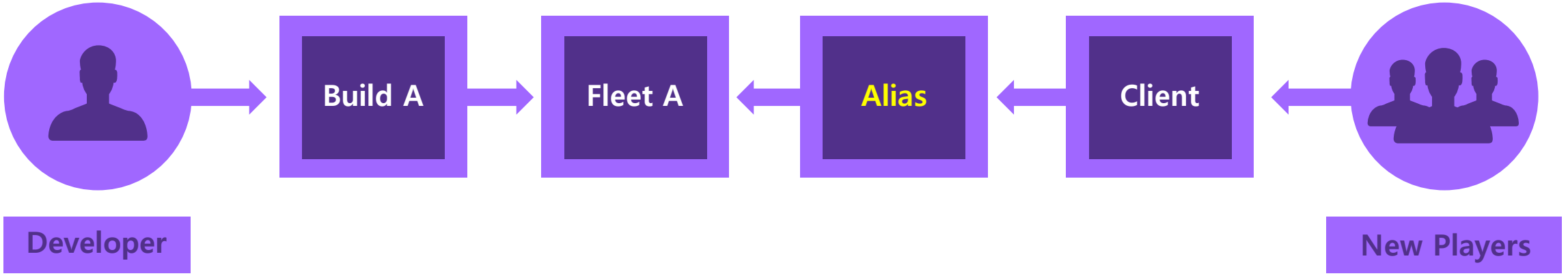
Continuous Deployment

ALIAS

- Link for Fleet ID
- Game clients can connect to Fleet using Alias ID



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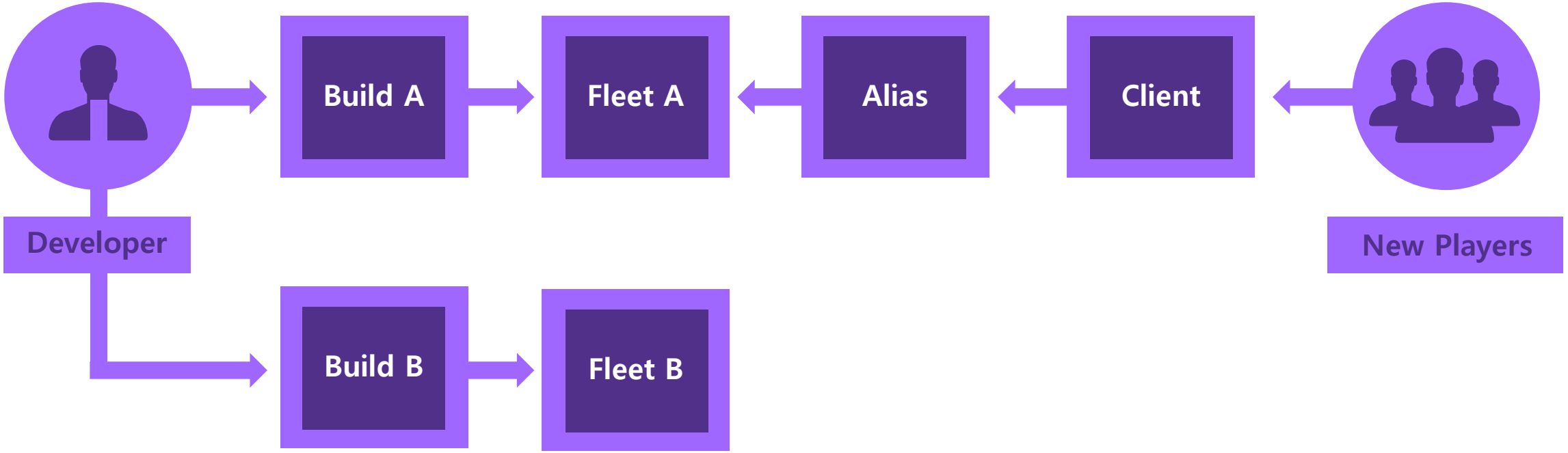
Deploying Updates



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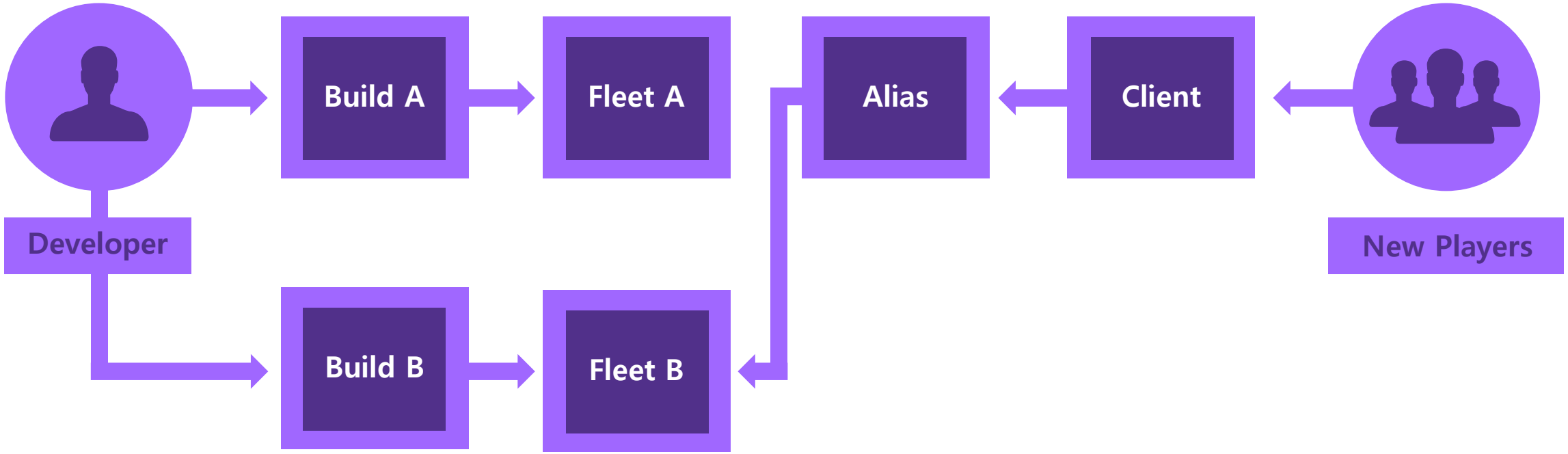
Newer Fleet by Changing ALIAS



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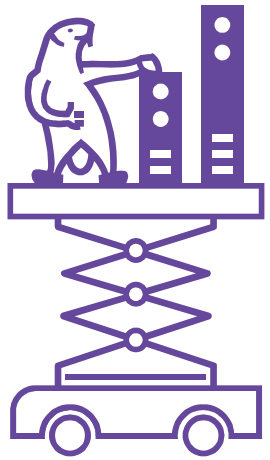
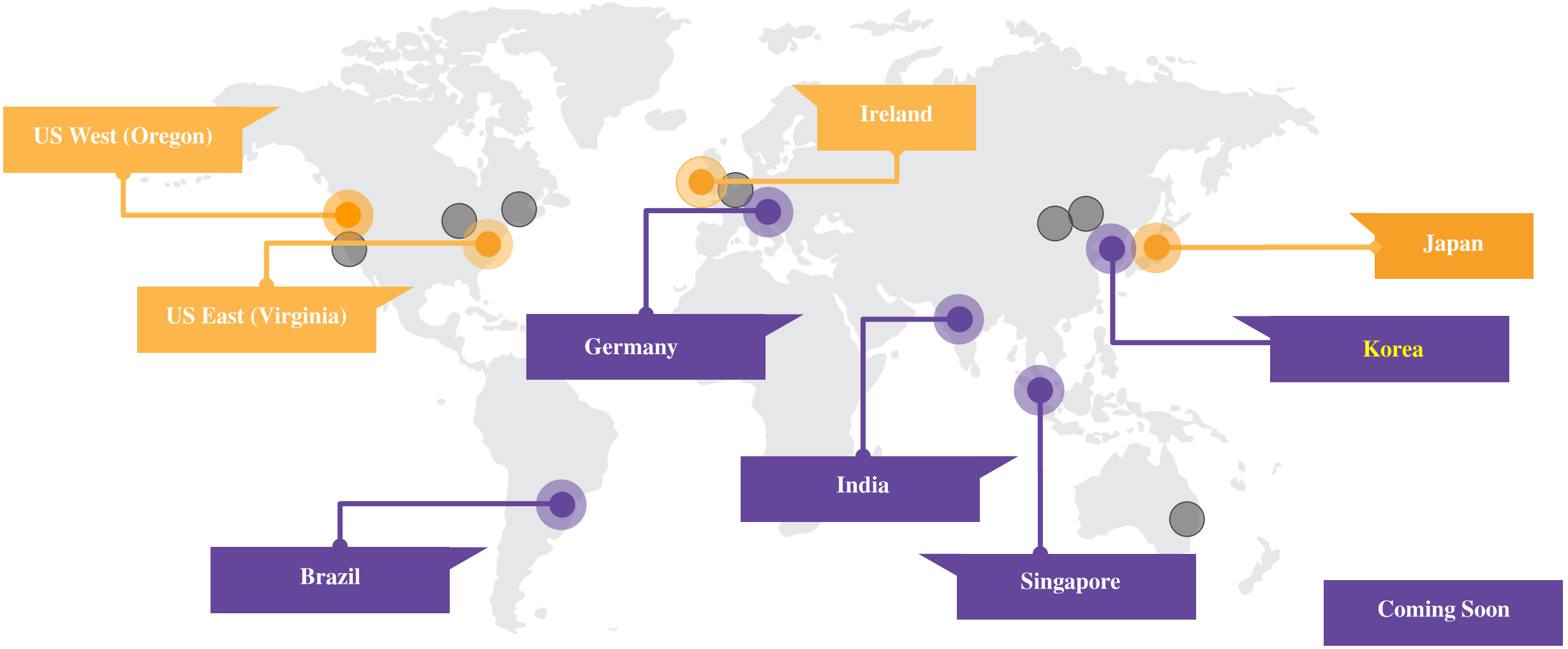


GameLift: getting started

Deliver low-latency experience from 9 regions



Low Latency!

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Free Tier

Test GameLift for Free

- c3.large type instance: 125 hours per month
- https://console.aws.amazon.com/gamelift/
- Providing a sample game for a quick test in a few clicks
  - Sample Game at AWS GameLift console
    - Soccer game for 8 concurrent players

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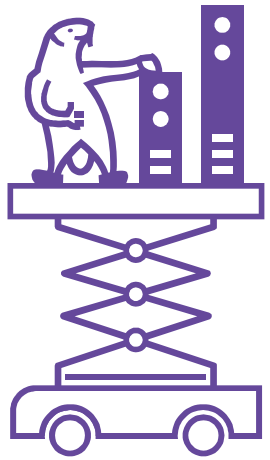
MultiplayerProject
2 0



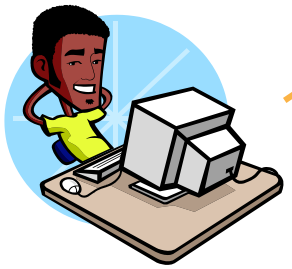
DEMO
(with Sample Code)

Demo Scenario

https://github.com/zeliard/GameLift

DummyClients

GameLift Fleet



Viewer
(Cocos2d-x client)

- **DummyClients**
Making game sessions and player sessions
Dummy players do random roaming

- **Viewer**
A simple game client to control a player

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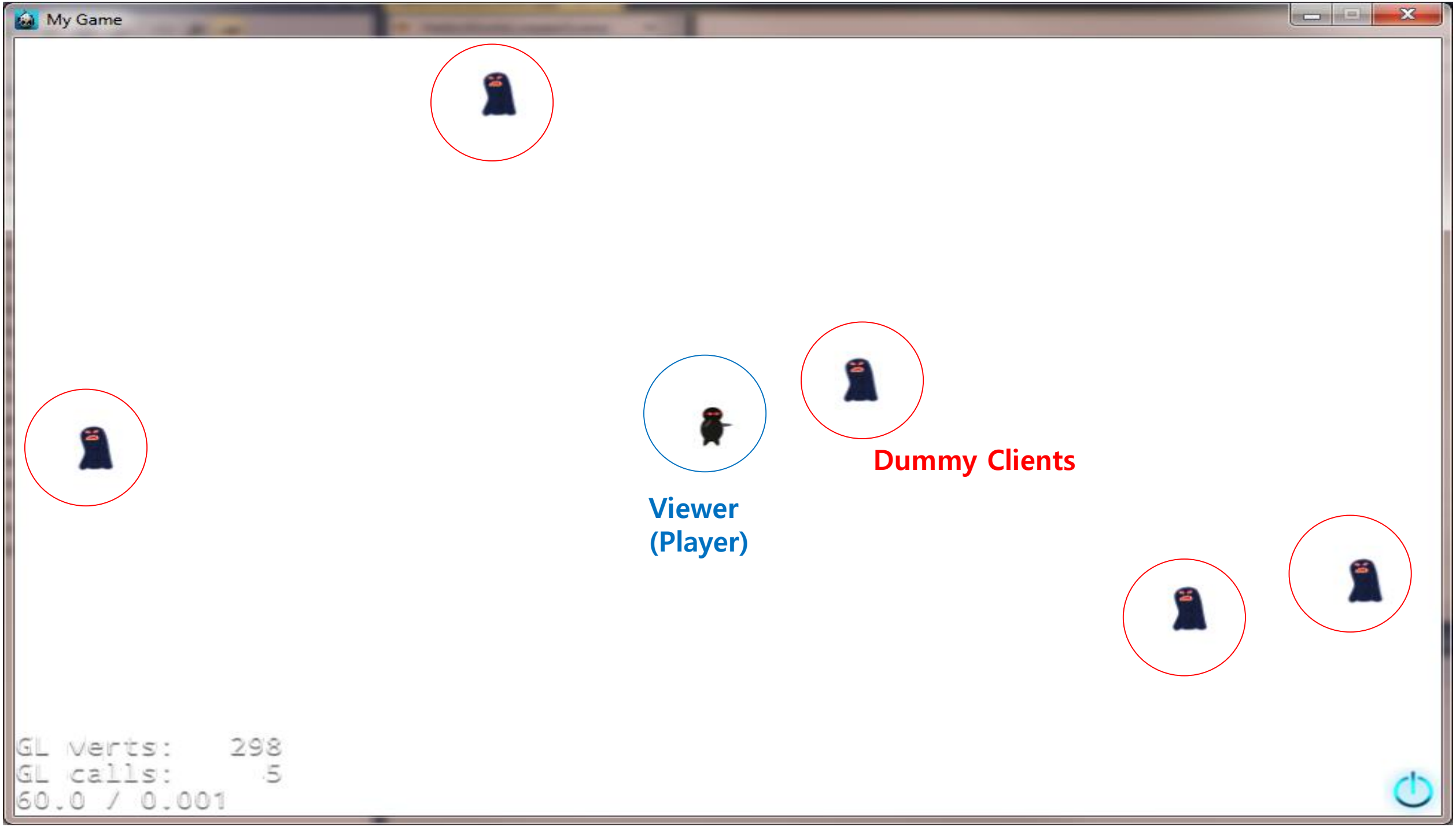
My Game
Dummy Clients
Viewer
(Player)
GL verts: 298
GL calls: 5
60.0 / 0.001

Thank You

lumberyard

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