



# ➤ Case Study: How Flight Built a Cloud-native Living World Thanks to Azure

# ➤ Dream: Create the most realistic next-gen Flight Simulator



True topography



Air model & weather



Visual fidelity & VFR



Multiplayer



Real-time air traffic, navigation data, and smooth skies

# ➤ Plan: Design a virtual world at Earth-scale

**Create the most realistic Earth digital twin ever seen from the air.**

Distribute this data to players around the globe...

Geography  
Sky, air model, & weather  
Real-time activities

...and gather all the pilots in this one, unified world connected by our service.



# ➤ Build: Using Azure technologies as the backbone.



Recreate the world



Collect real-time data



Distribute the data



Unified world for multi



Services (account management, store, analytics, TTS, and even project management)

# ➤ Recreate the world



Azure Bing Map



Azure Compute



# ➤ Azure Compute





# ➤ Azure Compute



# ➤ Azure Compute





# ➤ Azure Compute

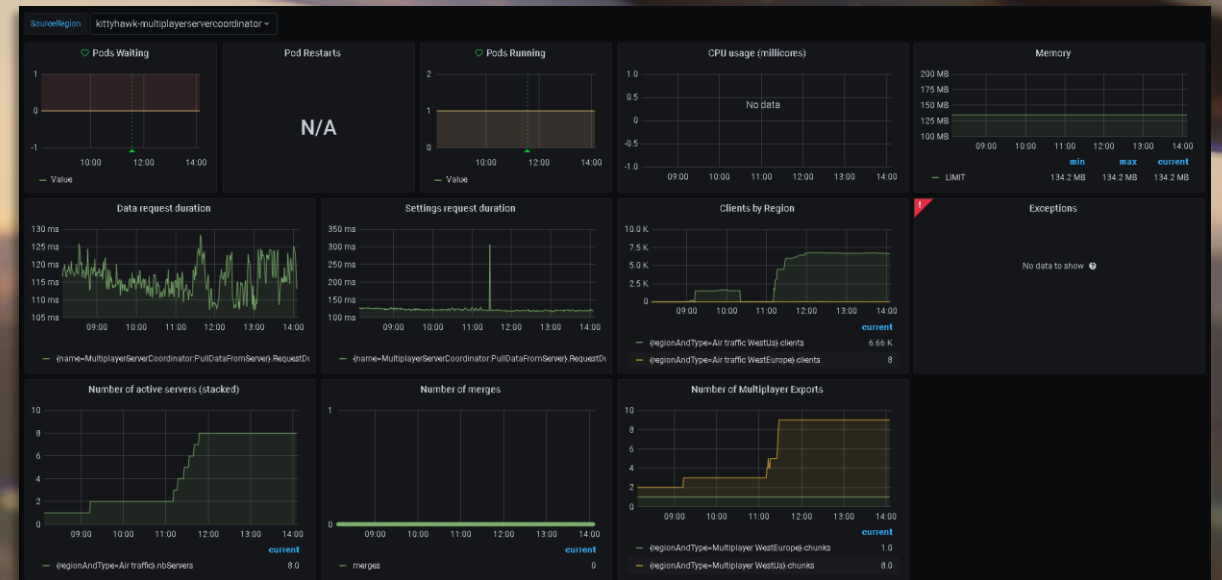
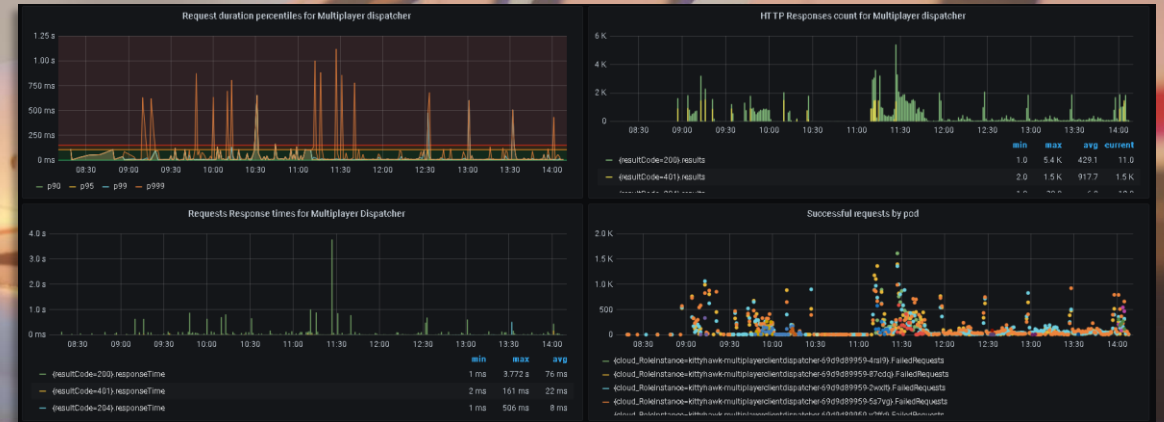


# ➤ Azure Compute

➤ Ingest real-time data



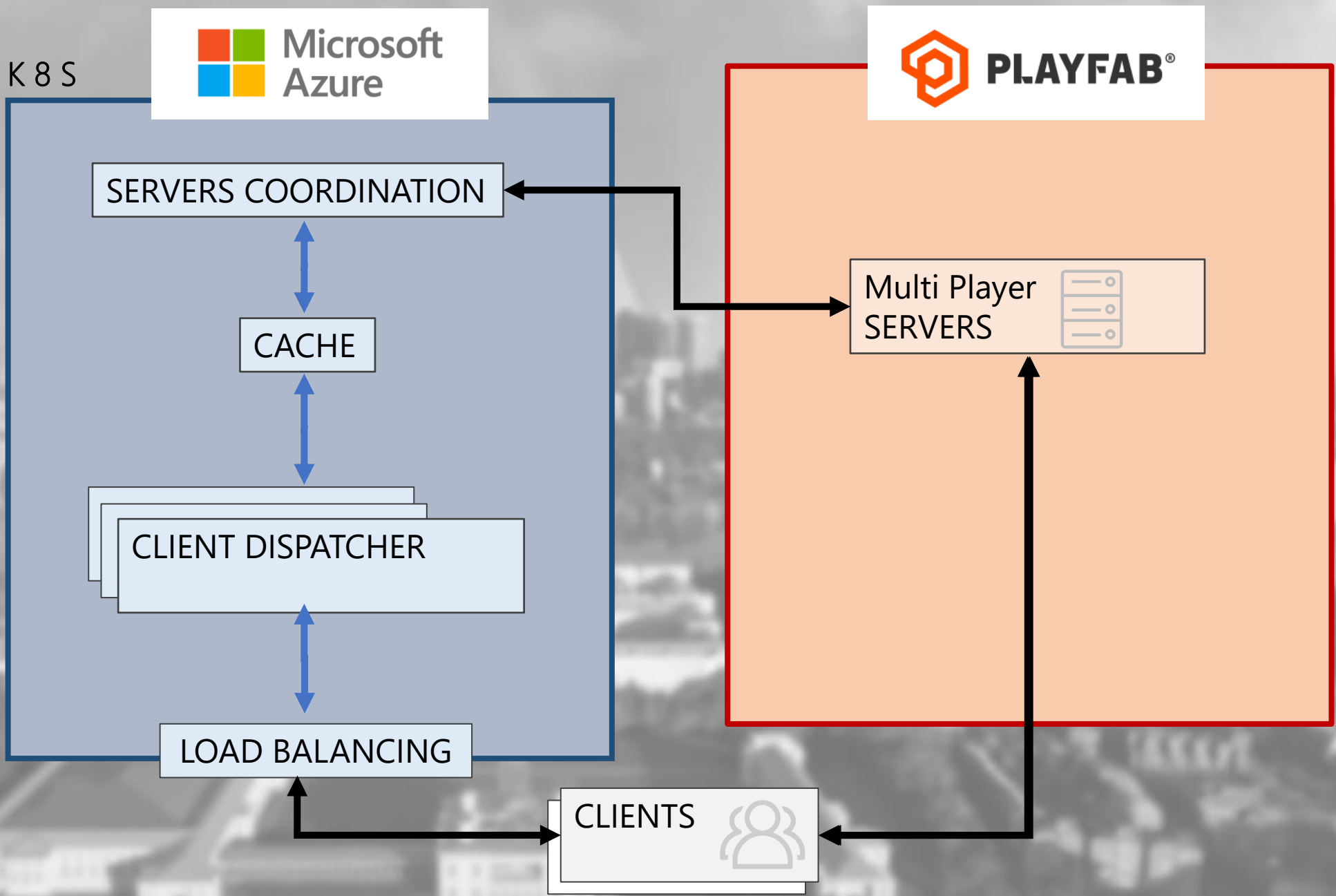
# ➤ Scalable data distribution



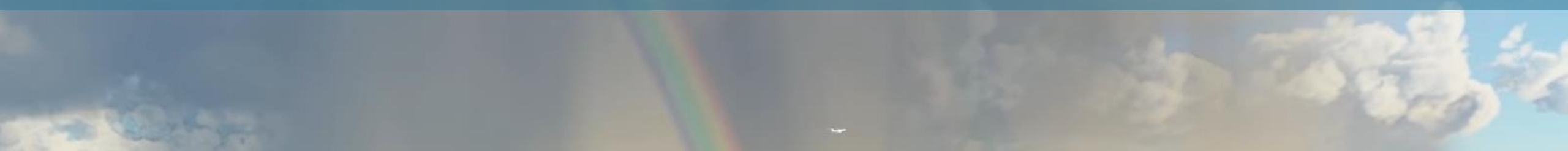
# ➤ One unified world for multiplayer



- Persistency of the experience
- No visible instance
- Need to dynamically share the planet



# LiveOps: Azure PlayFab



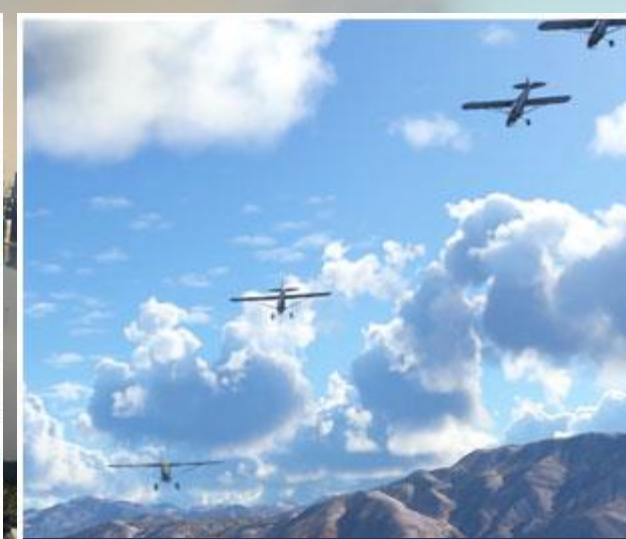
Accounts management



In-game store



Analytics



Multiplayer



# Project Management: Azure DevOps

**Azure DevOps** mskittyhawk / KittyHawk / Boards / Work Items

Work Items

Recently updated | + New Work Item | Open in Queries | Column Options | Import Work Items | Recycle Bin

Filter by keyword

ID	Title	Assigned To	State	Area Path	Tags	Comments	Activity Date
838297	Admin Tasks	Adam Hartsfield	Active	KittyHawk		1	23/02/2021 18:21:57
853525	Meet with Area Owners to discuss process...	Adam Hartsfield	Proposed	KittyHawk			23/02/2021 18:20:07
853524	Introduce SDET Chris Carter to the team a...	Adam Hartsfield	Proposed	KittyHawk			23/02/2021 18:14:57
853470	Set up STE training for SDET	Adam Hartsfield	Proposed	KittyHawk			23/02/2021 18:12:18
853388	Expers Team Management Tasks	Adam Hartsfield	Proposed	KittyHawk			23/02/2021 18:09:06
106877	[CrashCABN] APPLICATION_FAULT_NULL_C...	Adrien Courtazelles	New	KittyHawk/Platform			
79784	[CrashCABN] BREAKPOINT.exe/memory_le...	Alain Guyot	New	KittyHawk/Platform			
161537	[CrashCABN] BREAKPOINTBreakPoint_Z	Alain Guyot	New	KittyHawk/Platform			
74487	[CrashCABN] APPLICATION_FAULT_NULL_C...	Alain Guyot	New	KittyHawk/Platform			
46143	[CrashCABN] MOAPPLICATION_HANG_Mic...	Alain Guyot	Active	KittyHawk/Platform			
74883	[CrashCABN] APPLICATION_FAULT_NULL_C...	Alain Guyot	New	KittyHawk/Platform			
123405	[CrashCABN] APPLICATION_FAULT_INVAL...	Alain Guyot	Active	KittyHawk/Platform			
151391	[CrashCABN] MOAPPLICATION_HANG_BEF...	Alain Guyot	New	KittyHawk/Platform			
74589	[CrashCABN] APPLICATION_FAULT_BAD_IN...	Alain Guyot	New	KittyHawk/Platform			
159578	[CrashCABN] APPLICATION_FAULT_INVAL...	Alain Guyot	New	KittyHawk/Platform			
853573	20210222_KH_Update11_Stream_1.14.1.0 (...)	Alejandro Rios Marquez	In Progress	KittyHawk			
853389	BVT - 20210222_KH_Update11_Stream_1.14...	Alejandro Rios Marquez	Proposed	KittyHawk			
853373	1.14.0.0 - Area Testing - Aircraft	Alejandro Rios Marquez	In Progress	KittyHawk/Aircraft			
739404	[SCARLETT] 747-Bi Vertical Speed mode os...	Alejandro Rios Marquez	Resolved	KittyHawk/Aircraft			
739693	[SCARLETT] 747-Bi FLCH mode oscillates g...	Alejandro Rios Marquez	Resolved	KittyHawk/Aircraft			
835817	Scenery Editor > Properties - EDIT Button ...	Alyzee ARFEL	New	KittyHawk/SDK Team			
835062	Scenery Editor > Color Extractor is broken	Alyzee ARFEL	New	KittyHawk/SDK Team			
852412	[SCARLET] SubMission: Crash after reaching...	Anthony Botrel	New	KittyHawk/Platform			
849851	[UI] User profile settings reset to default ...	Anthony Botrel	New	KittyHawk/UI			

**Azure DevOps** mskittyhawk / KittyHawk / Overview / Dashboards

KittyHawk MS Quality - Aircraft - Boein... | Refresh


**Aircraft Launch Readiness**

Description Goes here

**Aircraft Bug Dashboard**

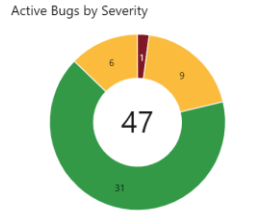
Description Goes here

**Aircraft**



**Boeing 787-10 Dreamliner**

**Active Bugs by Severity**

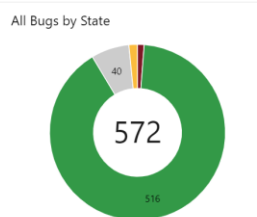


47

**Active Bugs (47)**

ID	Title
157...	[Inputs] Animation of Speed Brake / Spoiler lever not smooth wh...
144...	[787-10][747-8i] Cabine altitude doesn't change fast enough
142...	[787-10] There should be two separated wipers animation control...
142...	[787-10] NAV DATA screen can not be accessed in the Boeing 787...
61379	[787-10] CLB mode doesn't work
56560	[787-10] No way to determine battery voltage in Boeing Dreamli...
30808	[787-10] The Boeing 787-10 interior 2d parallax image will move ...
667...	[PreOrder][TestPilot][Aircraft] Texture on starboard (right) wing flo...
634...	[787-10] : plane starts rolling only with full power - making it diffi...
829...	[Boeing Feedback][B787-10] Some warning message colors do n...
829...	[Boeing Feedback][B787-10] The Airspeed Low warning should b...
829...	[Boeing Feedback][B787-10] Not all buttons on the CDU highligh...
829...	[Boeing Feedback][B787-10] A Green REV message should appea...
828...	[Boeing Feedback][B787-10] Waypoints can not be added to the f...
828...	[Boeing Feedback][B787-10] The flap indicator should be green w...
828...	[Boeing Feedback][B787-10] There is no way to erase the change...
828...	[Boeing Feedback][B787-10] No SPEED BRAKE ARMED message a...

**All Bugs by State**



572

**Avg Task Grade**

3,5

Average Quality Grade

**QA's Assessment**

5

Average Quality Grade



# ➤ Choice of Azure: Presentation of a use case



# ➤ Use case: Azure Text-to-Speech for ATC

- ATC or Air Traffic Control
- An air traffic controller is a highly trained specialist working with pilots to ensure the safety and efficiency of the airspace
- Communication between pilots and airport control towers
- ATC is a key feature in flight simulations



# ► Use case: Azure Text-to-Speech for ATC



ATC communication sample

# ➤ Use case: Azure Text-to-Speech for ATC

## Challenges of ATC Communication

- Requires a huge amount of information (50k airports, 3,500 aircraft, multitude of weather conditions, etc.)
- ATC needs to be able to voice anything about a particular airport, airspace, aircraft, standard approaches, and departures
- Different speaker voices needed for ATC



# ➤ Use case: Azure Text-to-Speech for ATC

## Possible approaches

- Recording all the VO
- Concatenating recorded speech
- Concatenating TTS
- Cloud Text-to-Speech



# ➤ Use case: Azure Text-to-Speech for ATC

## Why Azure Text-To-Speech?

- Flexible/Extensible
- Supports ability to create own custom voice models
- Creating a custom voice with only 500 samples
- Custom voice is using machine learning: more samples = better quality (used around 2k lines)



# Use case: Azure Text-to-Speech for ATC

In-game demo with custom voice + standard



# Use case: Azure Text-to-Speech for ATC

## Azure Text-to-Speech: costs & flavors

- Used a blend of custom & standard for MSFS
- Standard offers many speakers
- SSML is great to tweak your voice for different flavors (pitch, rate, prosody)!

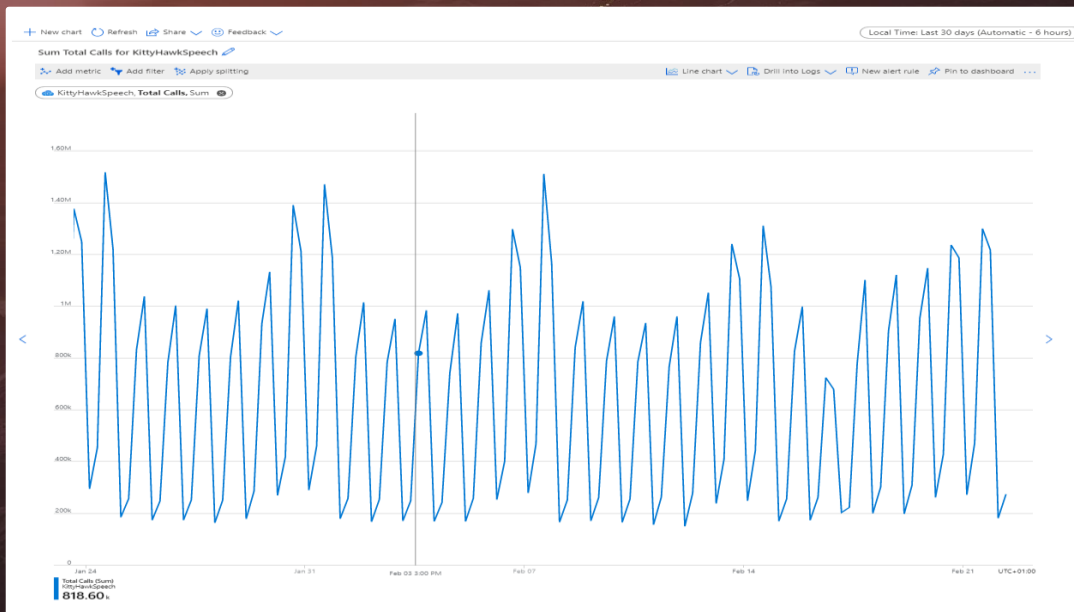
Text to Speech	Standard	\$4 per 1M characters
	Neural	\$16 per 1M <a href="#">characters</a> <sup>5</sup> Long audio creation: N/A per 1M characters
	Custom	\$6 per 1M characters Endpoint hosting: \$0.0537 per model per hour



# Use case: Azure Text-to-Speech for ATC

## Shipping with Azure TTS

- Azure Portal to monitor costs & errors
- Get in touch with Azure for subscription adjustment



# ➤ Use case: Azure Text-to-Speech for ATC



## Next steps

- More variety of voices
- Higher quality of voices

# ➤ Conclusion





THANK YOU FOR YOUR ATTENTION