



# XMASDEV

<oh>oh</oh>



**XMAS DEV 2023**



**MONITORA LA FABBRICA DI BISCOTTI PER BABBO NATALE CON I SERVIZI GRATUITI AZURE**

Nicola Paro

## Platinum Sponsor



## Gold Sponsor



## Silver Sponsor



## Technical Sponsor



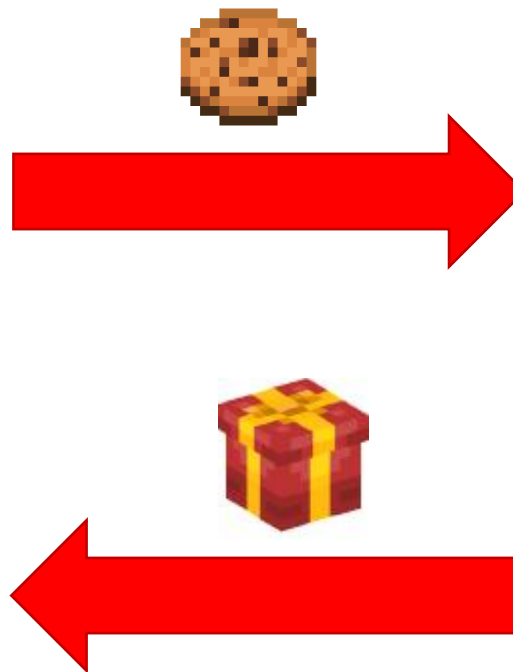
## Community





# A VIRTUAL LIFE STORY

Il Natale è alle porte...

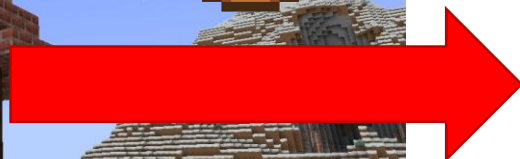






# A VIRTUAL LIFE STORY

Il Natale è alle porte...





# A VIRTUAL LIFE STORY

Il Natale è alle porte...



## PROBLEMI

(o Opportunità?)

- Se finisce il cioccolato, la produzione si ferma
- La produzione ogni tanto si inceppa ed è richiesto un intervento manuale per ripristinarla
- Nessuno si accorge dei problemi, perché non sono notificati
- Necessaria una soluzione di monitoraggio, ma Azure non si può pagare con i biscotti





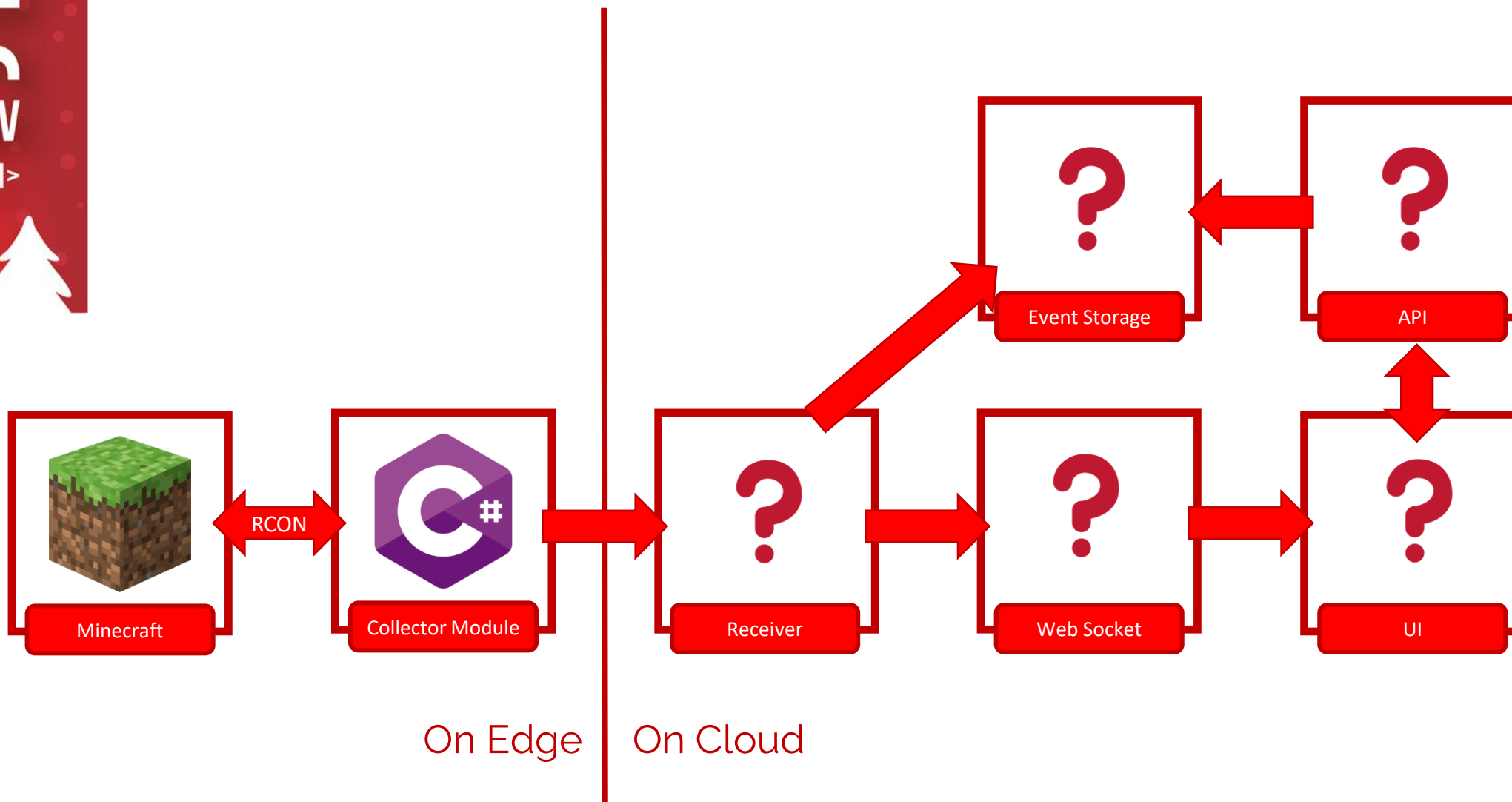
## AZURE FREE SERVICES



<https://azure.microsoft.com/en-us/pricing/free-services>



# MONITORING PLATFORM OVERVIEW

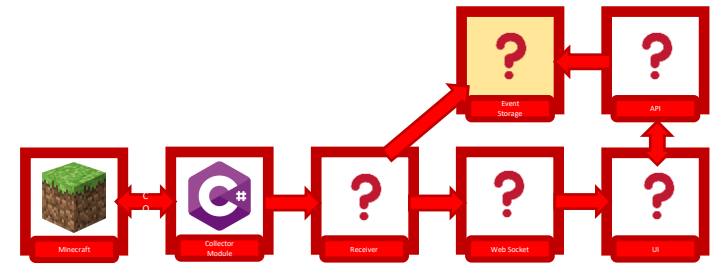






# MONITORING PLATFORM – EVENT STORAGE

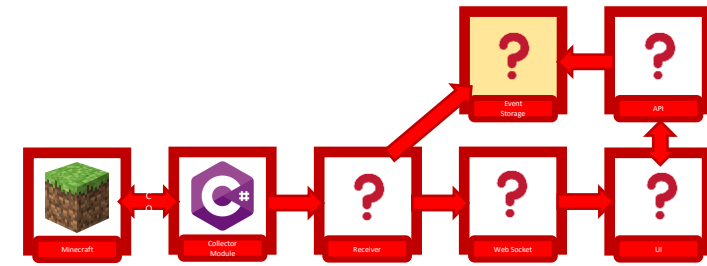
- Deve persistere gli eventi dell'impianto produttivo per poterli successivamente interrogare
- Deve permettere analitiche in modo semplice





# COSMOS DB

- Database gestito sia NoSQL che relazionale
- Globalmente distribuito, altamente responsive e sempre online
- Puoi usare l'API che preferisci



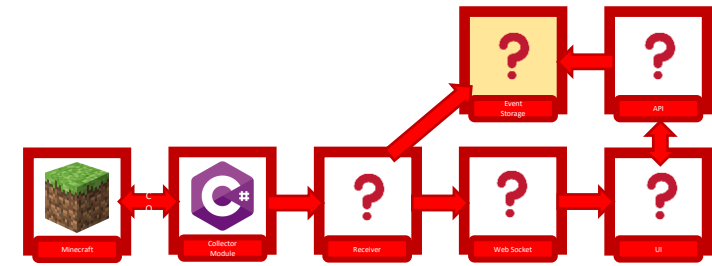
NoSQL	MongoDB	Apache Cassandra
Apache Gremlin	Table	PostgreSQL

- Free Tier: Max throughput 1000 RU/s + 25 GB storage



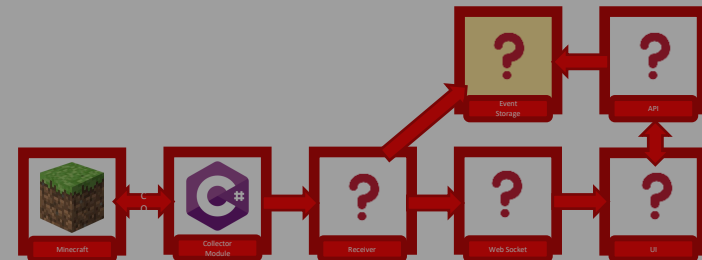
# AZURE SQL

- Database relazionale totalmente gestito
- Costituito sullo stesso engine di SQL Server
- Free Tier con 100,000 secondi \* vCore e 32GB di storage limit al mese per sempre
  - Puoi scegliere di metterlo in auto-pause quando il limite è raggiunto
  - Oppure continuare ad utilizzarlo e pagare solamente per la parte extra





# AZURE SQL DB - FREE TIER



Basics Networking Security Additional settings



## Cost summary

### General Purpose (GP\_Gen5\_2)

Cost per vCore (in EUR) <sup>1</sup> 114.41  
vCores selected x 2

Cost per GB (in EUR) 0.13  
Max storage selected (in GB) x 41.6

ESTIMATED COST / MONTH 234.16 EUR

### NOTES

<sup>1</sup> The dev/test discount has been automatically applied for your selected subscription. [Learn more](#)



## Cost summary

### General Purpose (GP\_S\_Gen5\_2)

Cost per GB (in EUR) 0.00  
Max storage selected (in GB) x 41.6

First 32 GB storage free  
 First 100,000 vCore seconds free

Overage billing <sup>1</sup> Disabled

ESTIMATED STORAGE COST / MONTH 0.00 EUR

COMPUTE COST / VCORE SECOND <sup>2</sup> 0.000000 EUR

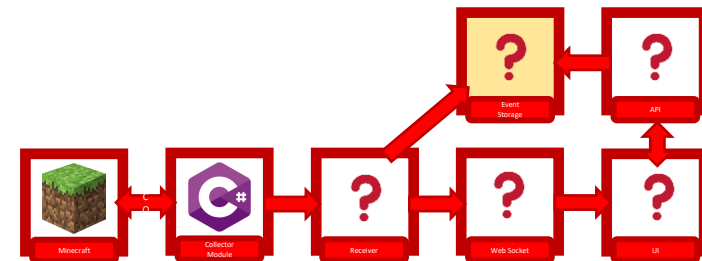
<sup>1</sup> There will be no charges for usage within the free limits. The database will be paused automatically when the free limits are reached.

<sup>2</sup> Serverless databases are billed in vCore seconds based on a combination of CPU and memory utilization. [Learn more about serverless billing](#)



# MONITORING PLATFORM – EVENT STORAGE

Cosmos o SQL ?

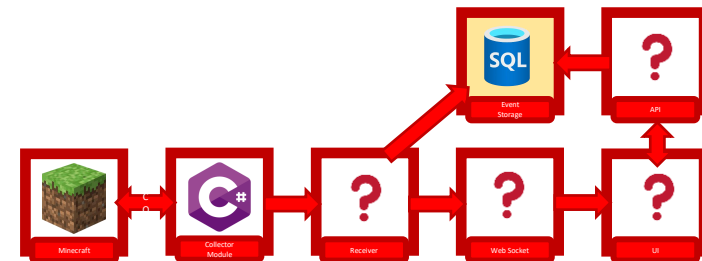






# MONITORING PLATFORM – EVENT STORAGE

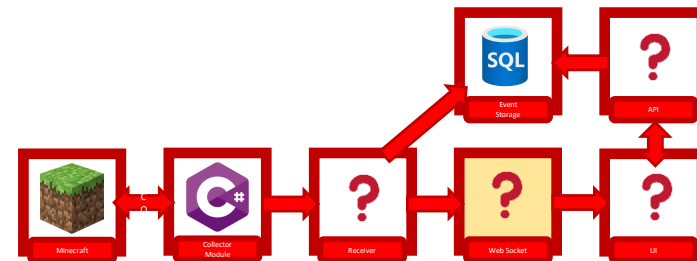
Cosmos o SQL ?





# MONITORING PLATFORM – WEB SOCKET

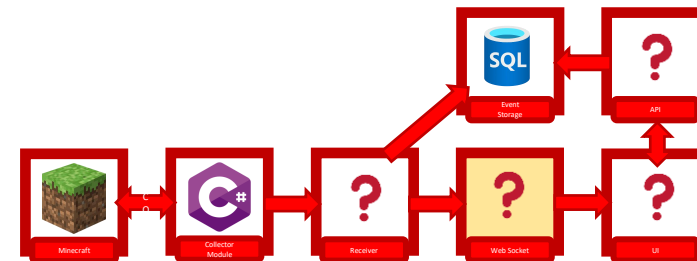
- Deve notificare gli eventi dell'impianto al frontend per garantire un rapido intervento





# AZURE SIGNALR & WEB PUBSUB

Pensati per applicazioni che richiedono dati in tempo reale



High  
frequency  
updates

Live  
dashboards e  
monitoring

Cross-  
platform live  
chat

Real-time  
location on  
map

Real-time  
targeted ads

Collaborative  
apps

Push  
notifications

Real-time  
broadcasting

IoT

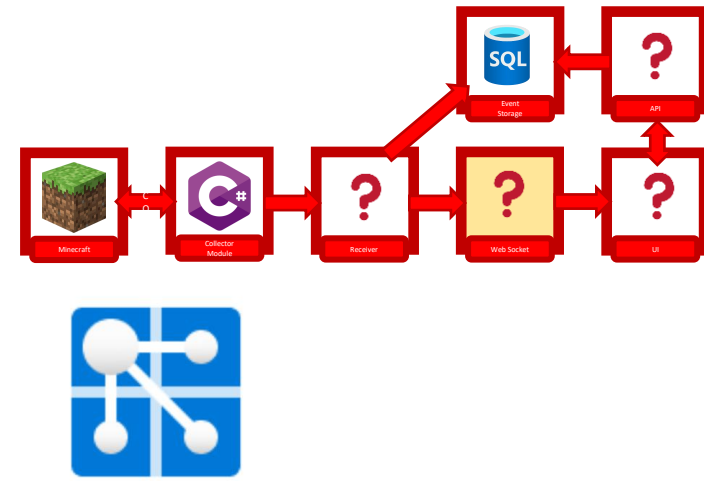
Automation



# SIGNALR VS AZURE WEB PUBSUB



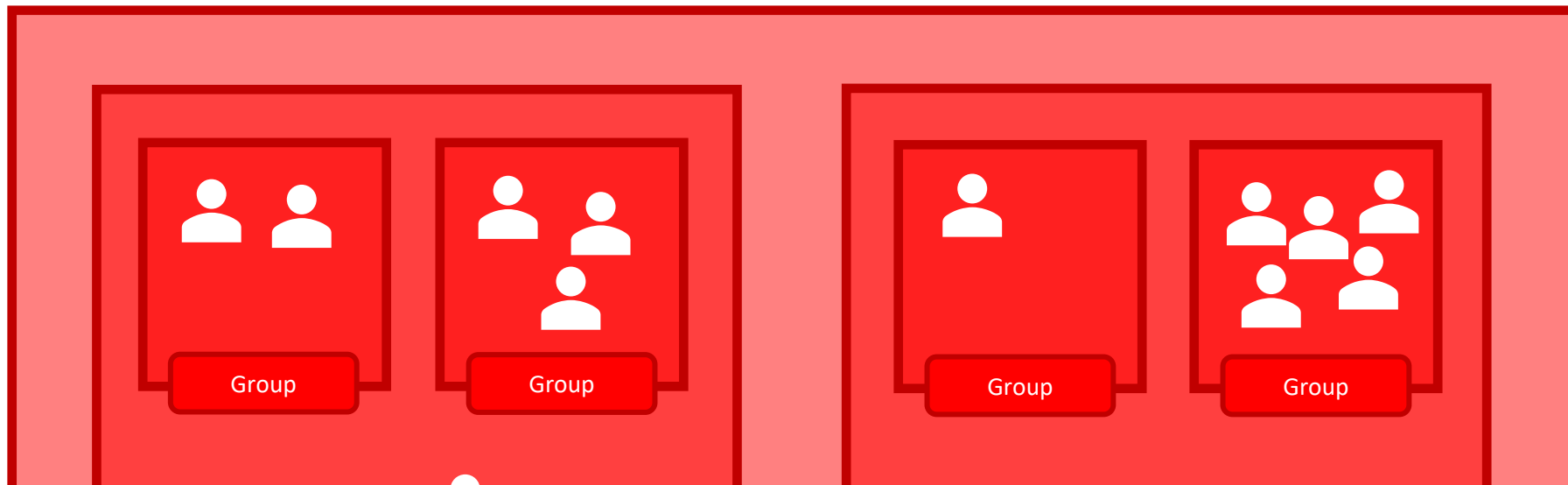
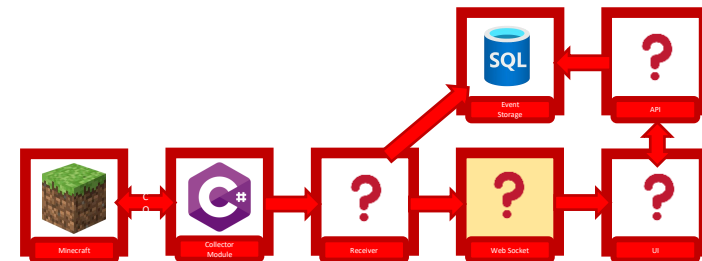
- Stai già usando SignalR
  - Esiste un client SignalR nel linguaggio scelto
    - Clients supportati da MS:
- 
- 
- 
- Hai necessità di più protocolli di trasporto
    - WebSocket
    - Server sent events
    - Long polling



- Hai bisogno solo di WebSocket
- Subprotocollo custom over WebSocket
  - MQTT over WebSocket
  - AMQP over WebSocket
- È sufficiente un'infrastruttura «lite» per la tua applicazione



# INSIDE AZURE WEB PUBSUB



## Client URL Generator

Hub \*

Hub

User ID

User ID

Token Lifetime (Minutes) \*

60

Select Sign Key

Primary

Secondary

Roles



Send To Groups



Allow Sending To All Groups



Allow Sending To Specific Groups



Join/Leave Groups



Allow Joining/Leaving All Groups



Allow Joining/Leaving Specific Groups

Client Access URL

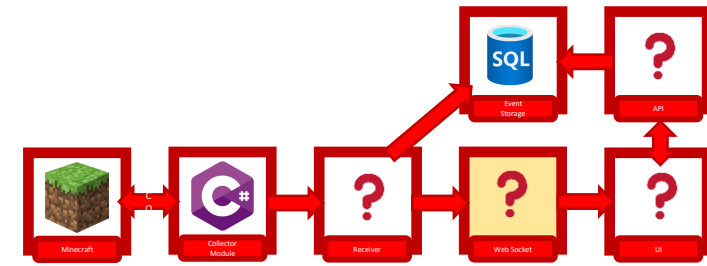
[wss://xmasdev-events.webpubsub.azure.com/client/hubs/Hub?access\\_token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJhdWQiOiJ3c3M6Ly94bWFzZGV2LWV2ZW50cy53ZWJwdWJzdWlu...](wss://xmasdev-events.webpubsub.azure.com/client/hubs/Hub?access_token=eyJhbGciOiJIUzI1NiIsInR5cCI6IkpXVCJ9.eyJhdWQiOiJ3c3M6Ly94bWFzZGV2LWV2ZW50cy53ZWJwdWJzdWlu...)





# SENDING DATA WITH AZURE WEB PUBSUB

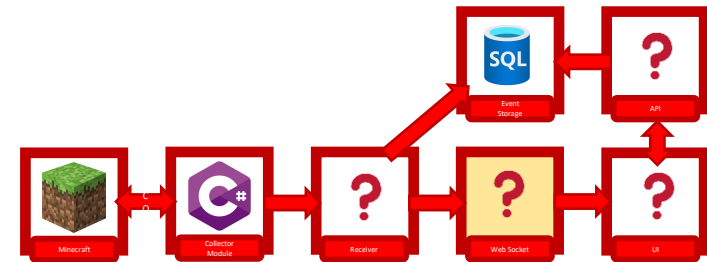
- ServiceClient C#  
Azure.Messaging.WebPubSub
- AzFunction Bindings  
Microsoft.Azure.WebJobs.Extensions.WebPubSub



```
[FunctionName(nameof(EventNotifier))]  
public static async Task NotifyEventAsync(  
    [ServiceBusTrigger("%TopicName%", "%SubscriptionName%", Connection = "ServiceBusConnectionString")] string rawpayload  
    , [WebPubSub(Hub = "alarms", Connection = "WebPubSubConnectionString")] IAsyncCollector<WebPubSubAction> alarms  
    , ILogger log  
)  
{  
    var payload = Payloads.DeserializePayload(rawpayload);  
  
    if (payload is null)  
        return;  
  
    if (payload is AlarmPayload)  
    {  
        await alarms.AddAsync(WebPubSubAction.CreateSendToAllAction(rawpayload));  
        await alarms.FlushAsync();  
    }  
}
```



# AZURE WEB PUBSUB PRICING

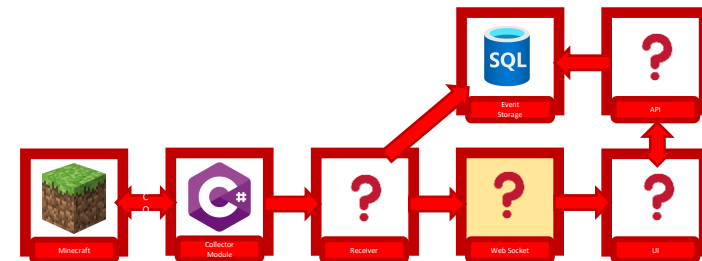


Pricing tier	<input checked="" type="radio"/> Free For individual dev/test	<input type="radio"/> Standard For production workloads	<input type="radio"/> Premium(Preview) For production workloads with more supported features
Features			
Connections	Up to 20 connections	1,000 connections/unit	1,000 connections/unit
Included Messages	20,000/Day	1,000,000/Unit/Day	1,000,000/Unit/Day
Additional Messages	-	Unlimited	Unlimited
SLA	-	99.9%	99.95%
SSL	✓	✓	✓
Autoscale ⓘ	-	-	✓
Availability Zone ⓘ	-	-	✓ (In supported regions) ↗
Custom Domains	-	-	✓
Pricing			
Estimated Price	-	41.41 EUR/Month/Unit	51.44 EUR/Month/Unit
Additional Message Costs ⓘ	-	0.84 EUR per million messages	0.84 EUR per million messages



# MONITORING PLATFORM – WEB SOCKET

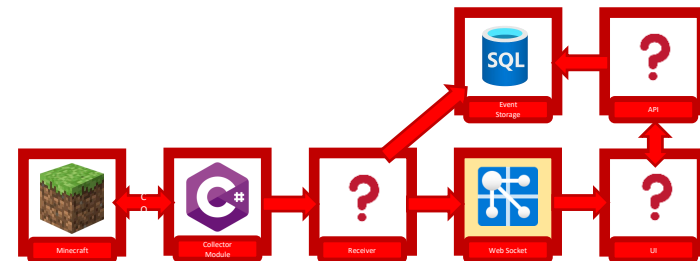
Web Pub Sub o SignalR





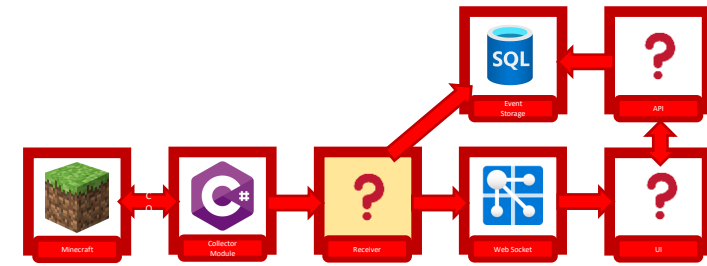
# MONITORING PLATFORM – WEB SOCKET

Web Pub Sub o SignalR





# MONITORING PLATFORM - RECEIVER



- Deve ricevere degli eventi sporadici dall'impianto produttivo
- Deve persistere questi eventi sull'Event Storage
- Deve notificare via WebSocket ogni evento

```
[FunctionName("ReceiverFunction")]
public static async Task<IActionResult> Run(
    [HttpTrigger(AuthorizationLevel.Function, "post", Route = null)] HttpRequest req,
    [WebPubSub(Hub = "CookieFactoryEvents", Connection = "WebPubSubConnectionString")] IAsyncCollector<WebPubSubAction> pubsub,
    [Sql("CookieFactoryEvents", "SqlConnectionString")] IAsyncCollector<CookieFactoryEvent> database,
    ILogger log)
{
    string requestBody = await new StreamReader(req.Body).ReadToEndAsync();
    var cloudEvent = JsonSerializer.Deserialize<CloudEvent>(requestBody);
    await pubsub.AddAsync(WebPubSubAction.CreateSendToAllAction(requestBody));
    await pubsub.FlushAsync();

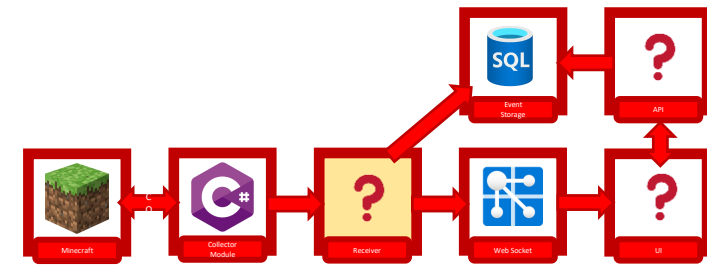
    var cookieFactoryEvent = cloudEvent.Data.Deserialize<CookieFactoryEvent>();
    await database.AddAsync(cookieFactoryEvent);
    await database.FlushAsync();

    return new OkResult();
}
```





# AZURE FUNCTIONS FREE GRANT

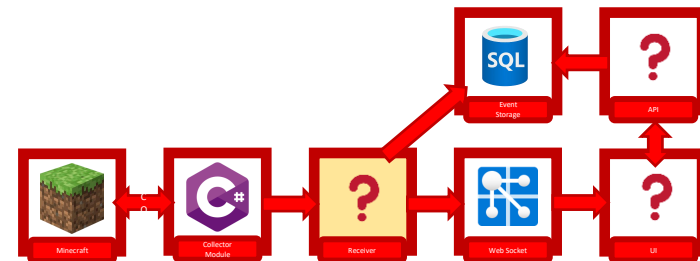


- Solamente con **Consumption Plan** in sottoscrizioni **Pay As You Go**
- Fino a 400.000 GBs ed 1 milioni di invocazioni
- Oppure le posso hostare in un AppServicePlan free
- Nonostante abbiano un free grant, le Azure Functions richiedono sempre lo **Storage Account** per funzionare (che non è gratuito)



# MONITORING PLATFORM - RECEIVER

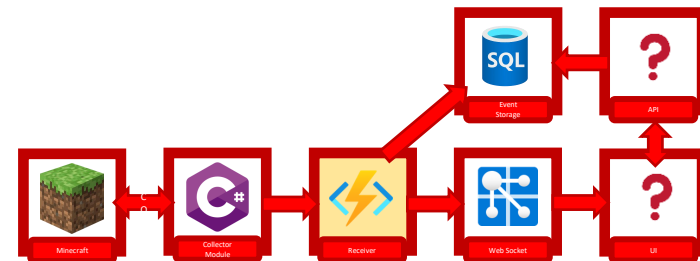
Azure Functions





# MONITORING PLATFORM - RECEIVER

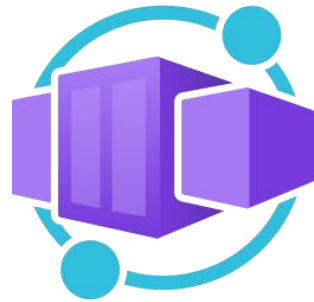
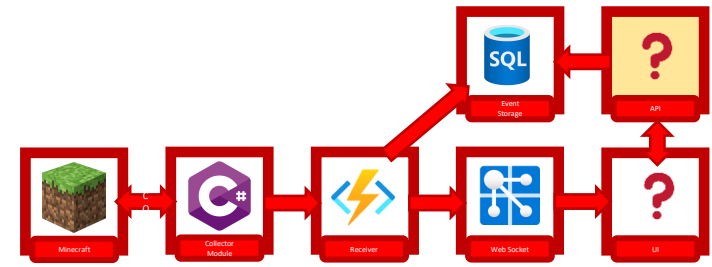
Azure Functions





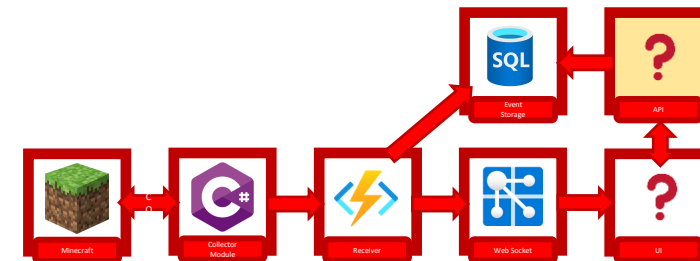
# MONITORING PLATFORM - API

- Deve leggere gli eventi dall'Event Storage
- Deve fare delle piccole aggregate
- Deve esporre i contenuti via REST per renderli disponibili alla UI





# AZURE CONTAINER APPS

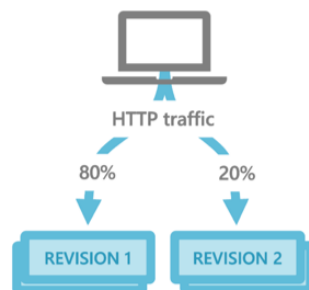


Piattaforma serverless per l'esecuzione di applicazioni containerizzate



## Azure Container Apps: Example scenarios

### PUBLIC API ENDPOINTS



HTTP requests are split between two versions of the container app where the first revision gets 80% of the traffic, while a new revision receives the remaining 20%.

#### AUTO-SCALE CRITERIA

Scaling is determined by the number of concurrent HTTP requests.

### BACKGROUND PROCESSING



A background job that transforms data in a database.

#### AUTO-SCALE CRITERIA

Triggered by a schedule, on demand, or based on events.

### EVENT-DRIVEN PROCESSING

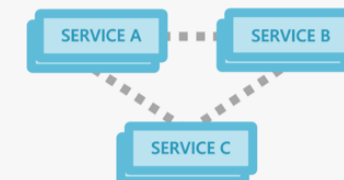


A queue reader application that processes messages as they arrive in a queue.

#### AUTO-SCALE CRITERIA

Scaling is determined by the number of messages in the queue.

### MICROSERVICES



Deploy and manage a microservices architecture with the option to integrate with Dapr.

#### AUTO-SCALE CRITERIA

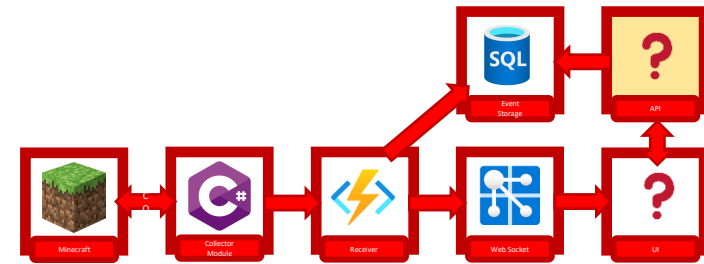
Individual microservices can scale according to any KEDA scale triggers.





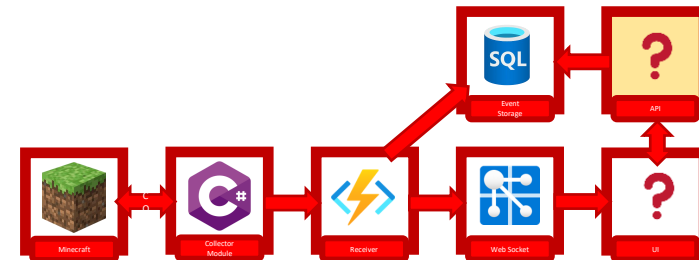
# AZURE CONTAINER APPS FREE GRANT

- Ogni mese, gratis:
  - Fino a 180,000 vCPU-seconds
  - 360,000 GiB-seconds
  - 2 million di richieste
- Altre opzioni per ~~non pagare~~ pagare di meno:
  - Scalare a 0 il numero di repliche
  - Quando non ci sono richieste HTTP in ingresso ed il numero di repliche è al minimo, viene applicato un prezzo ridotto





# AZURE APP SERVICE WEB APPS



Servizio gestito per hostare applicazioni web e REST API

Vasta scelta di  
linguaggi  
utilizzabili

Supporta container  
docker

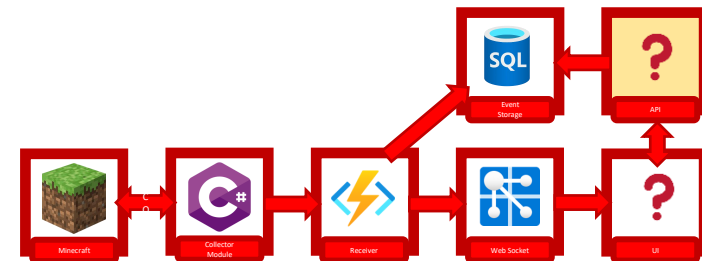
Aggiornamenti e  
patch di sicurezza  
gestite

Supporto  
all'autenticazione  
senza modificare il  
codice applicativo

Gestione del CORS  
out of the box



# AZURE APP SERVICE PLAN FREE TIER



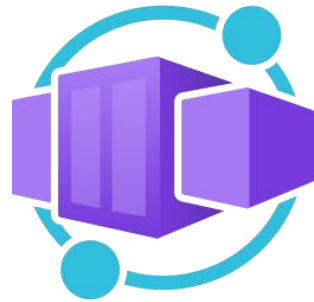
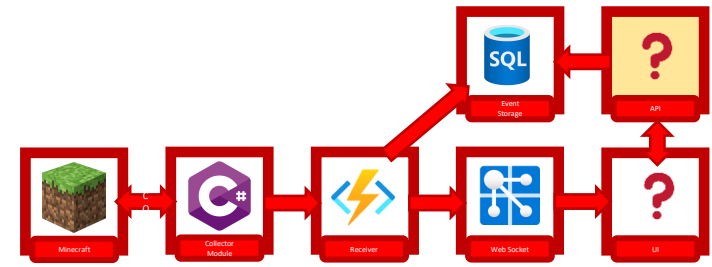
Posso avere solo un'istanza di App Service Plan Free per sottoscrizione

	Name	ACU/vCPU	vCPU	Memory (GB)	Remote Storage (GB)	Scale (instance)	Cost per hour (instance)	Cost per month (instance)
▼	Dev/Test (For less demanding workloads)							
✓	Free F1	60 minutes/day...	N/A	1	1	N/A	Free	Free
	Basic B1	100	1	1.75	10	3	0.017 EUR	12.30 EUR
	Basic B2	100	2	3.5	10	3	0.034 EUR	24.60 EUR
	Basic B3	100	4	7	10	3	0.066 EUR	48.516 EUR
▼	Production (For most production workloads)							
	Premium v3 P0V3	195*	1	4	250	30	0.079 EUR	57.809 EUR
	Premium v3 P1V3	195	2	8	250	30	0.127 EUR	92.932 EUR
	Premium v3 P2V3	195	4	16	250	30	0.255 EUR	185.864 EUR
	Premium v3 P3V3	195	8	32	250	30	0.509 EUR	371.728 EUR
	Standard S1	100	1	1.75	50	10	0.089 EUR	64.915 EUR
	Standard S2	100	2	3.5	50	10	0.178 EUR	129.831 EUR
	Standard S3	100	4	7	50	10	0.356 EUR	259.662 EUR



# MONITORING PLATFORM - API

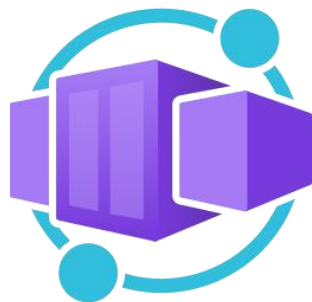
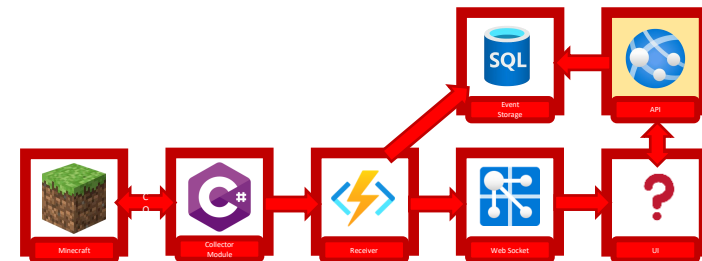
Container Apps o Web Apps





# MONITORING PLATFORM - API

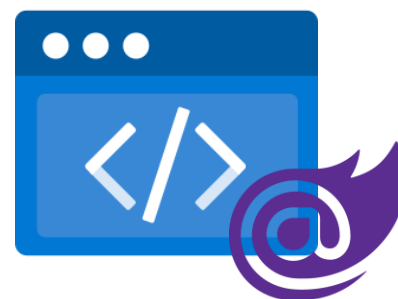
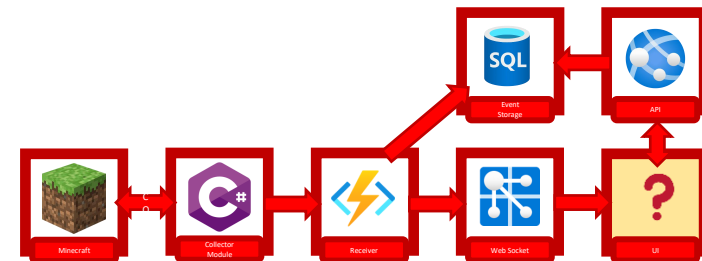
Container Apps o Web Apps





# MONITORING PLATFORM - UI

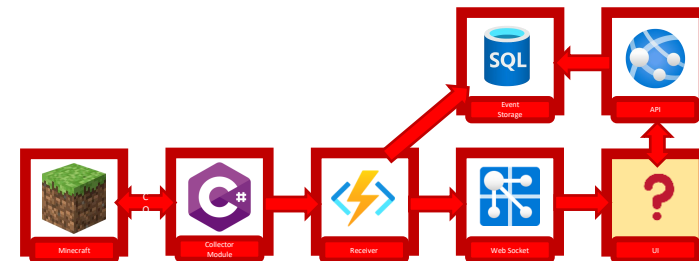
- Applicativo per la consultazione degli eventi storici e la ricezione delle notifiche a partire dall'impianto produttivo
- Non ha necessità di un backend applicativo. Si può appoggiare alle API già implementate
- Può essere un'app statica





# AZURE STATIC WEBAPP

È un servizio che consente di creare applicazioni Web statiche.



Pubblicazione di contenuti statici con HTML, CSS e JavaScript

Supporto alle API

CI/CD con GitHub and Azure DevOps

Contenuto statico distribuito globalmente

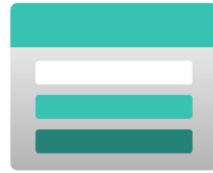
Certificato SSL gratuito

Gestione di ambiente di Staging

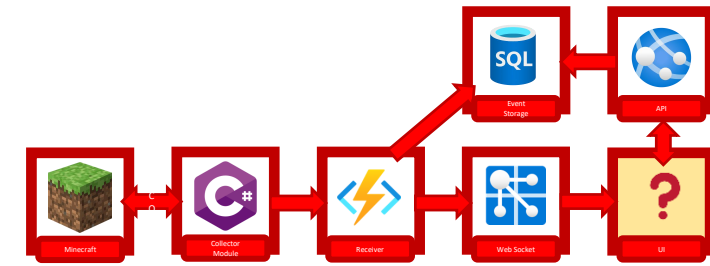
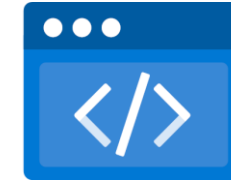




# AZURE BLOB STATIC WEBSITE VS AZURE STATIC WEBAPP



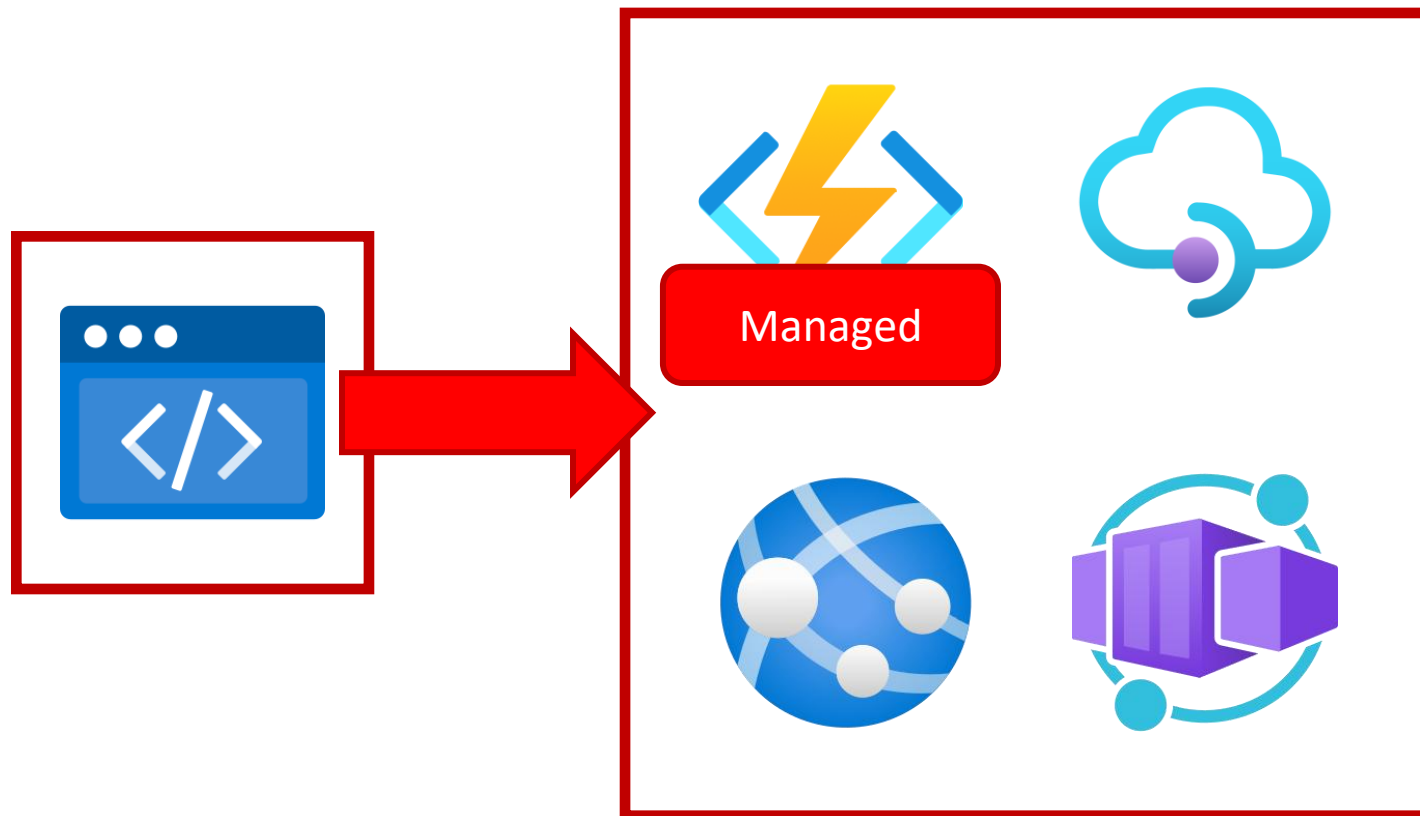
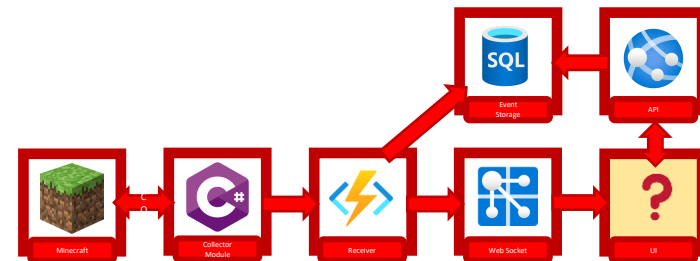
- ✓ SSL
- 😞 CI/CD non gestito
- ✗ No Multiregion
- ✓ Custom Domain
- ✗ No HTTPS con Custom Domains



- ✓ SSL
- ✓ CI/CD integrate
- ✓ Globalmente distribuito
- ✓ Custom Domain
- ✓ HTTPS con Custom Domain

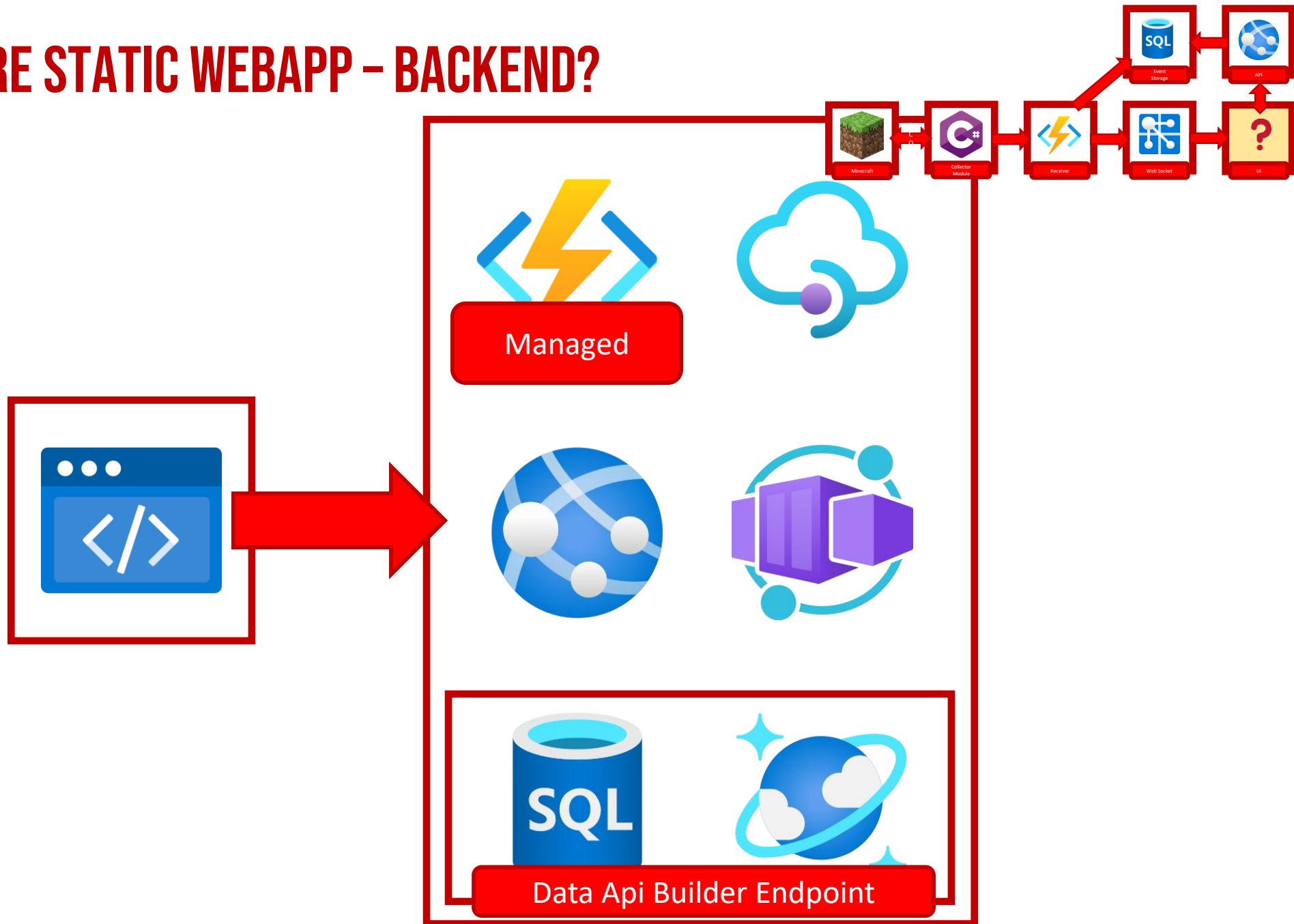


# AZURE STATIC WEBAPP – BACKEND?



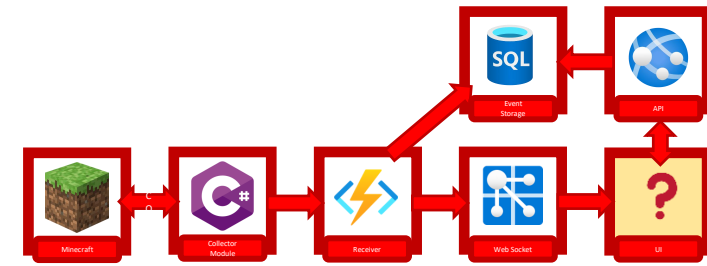
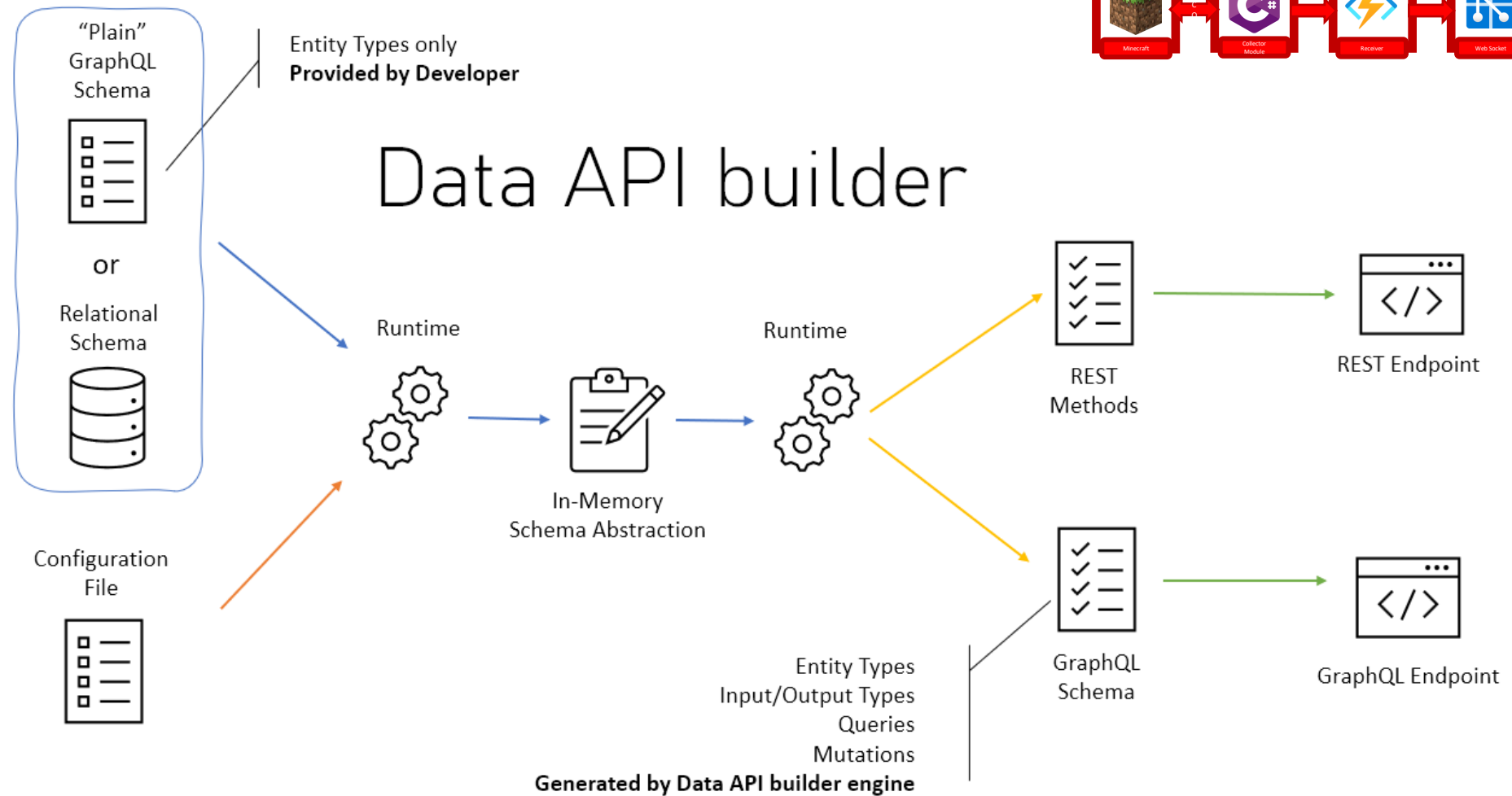


# AZURE STATIC WEBAPP - BACKEND?





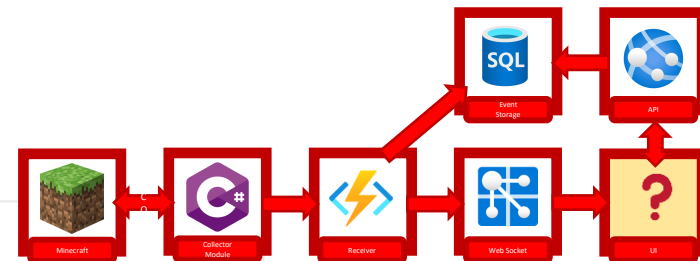
# DATA API BUILDER?




Per utilizzare DAB in locale  
`dotnet tool install -g Microsoft.DataApiBuilder`



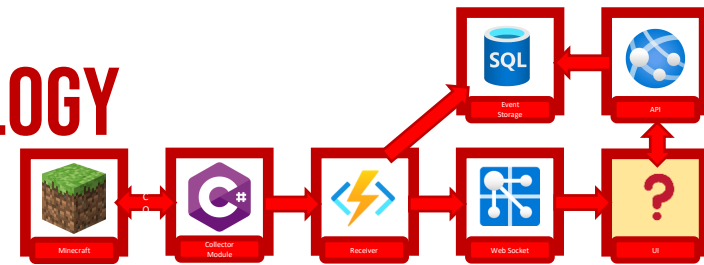
# AZURE STATIC WEBAPP PRICING



Plan/Features	 <b>Free</b> For hobby or personal projects	<b>Standard</b> For general purpose production apps
Price	Free	8.42 EUR per app per month
Included bandwidth	100 GB per subscription	100 GB per subscription
Bandwidth overage	Free	0.19 EUR per GB per subscription
Custom domains	2 per app	5 per app
SSL certificates	Free	Free
Custom authentication	-	✓
Private endpoints	-	✓
Max app size	250 MB	500 MB
Staging environments	3	10
Azure functions	Managed	Managed or Bring your own
Enterprise-grade edge	-	16.40 EUR per app per month



# REQUIRED TOOLS TO WORK WITH THIS TECHNOLOGY



Static Web App Command line tool (swa)

```
npm install -g @azure/static-web-apps-cli
```

Wasm tools to output Blazor wasm

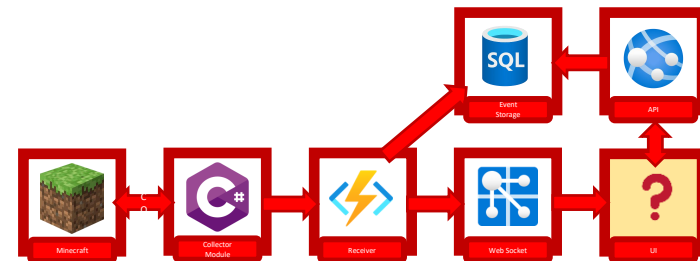
```
dotnet workload install -g wasm-tools-net6
```

<https://azure.github.io/static-web-apps-cli/docs/use/install/>



# MONITORING PLATFORM - UI

Azure Static Web App o Azure Static Web App?

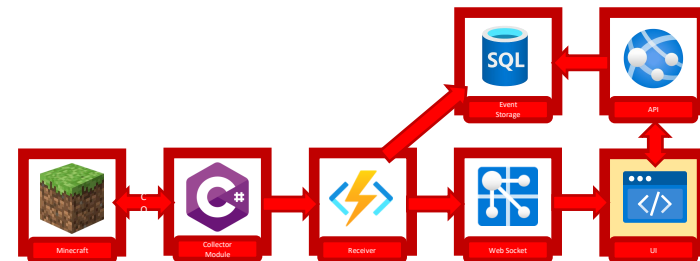






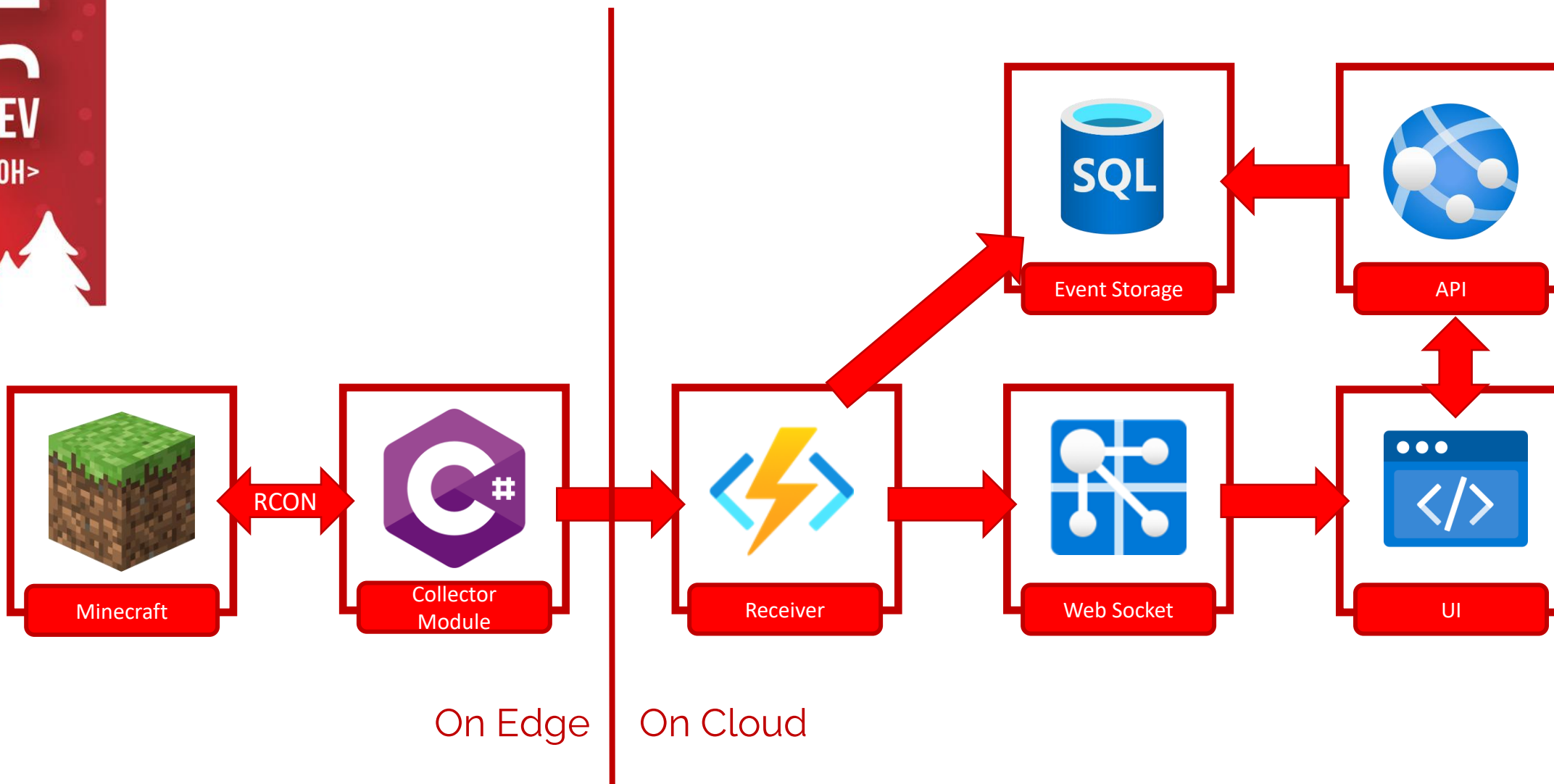
# MONITORING PLATFORM - UI

Azure Static Web App o Azure Static Web App?





# MONITORING PLATFORM OVERVIEW





# XMASDEV

<oh>oh</oh>



## DEMO



## ABOUT ME

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Let's Connect!



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**GRAZIE!**



**Valuta questa sessione**