

# Introducing the Azure Cloud Debugging Tool

© Tore Nestenius Datakonsult AB. All Rights Reserved.

<https://www.tn-data.se>

1

## Important Notes!

- **Interrupt me!**
- **Discuss!**
- **Ask questions!**

<https://www.tn-data.se>

7



First some background!

<https://www.tn-data.se>

9



## AZ-204 Azure Developer Associate

**You've earned your Microsoft Certified: Azure Developer Associate certification**


Microsoft certification ID: 7319380

Congratulations! You've earned your Microsoft Certified: Azure Developer Associate certification.


<https://www.tn-data.se>

10

## Studying for AZ-204 the hard way!

How are we going to learn all of this? 

Azure SDKs API Gateway Content Delivery Network (CDN) Consistency Models (Strong, Eventual) OAuth Authorization Server Deployment Slots (App Service) Quotas and Throttling Azure App Service Application Insights Retry Pattern GitHub Actions IPsec A/B Testing Data Encryption (In-Transit, At-Rest) Infrastructure as a Service (IaaS) Application Gateway Message Brokers Log Analytics Role-Based Access Control (RBAC) Azure Activity Log Network Watcher Azure SQL Database Metrics and Alerts Azure Repos Azure DevOps Pipelines Service Principals Azure Kubernetes Service (AKS) Azure Portal SOAP Caching (Redis Cache) Application Insights Managed Identity Automatic Failover Groups Azure PowerShell Dependency Injection Azure Data Lake Storage Azure Event Grid JWT (JSON Web Token) CQRS (Command Query Responsibility Segregation) Diagnostic Settings Database Sharding Secrets Management Deployment Stages Continuous Deployment (CD) Continuous Integration (CI) Middleware Build Agents Visual Studio Code Serverless Computing Software as a Service (SaaS) Identity and Access Management (IAM) Azure File Storage Dead-letter Queue (DLQ) NoSQL Databases Circuit Breaker Pattern Shared Access Signature (SAS) Queue and Message TTL (Time-to-Live) Azure DevOps Sharding Autoscale Azure Boards Pub/Sub Pattern Distributed Tracing Azure Functions Azure Monitor OpenAPI/Swagger Data Replication (LRS, ZRS, GRS, RA-GRS) Azure Resource Manager (ARM) Azure Functions Core Tools Canary Release Azure Regions and Availability Zones REST API Azure Table Storage Partition Key Azure Blob Storage Azure Storage Explorer Azure Artifacts External Identity Providers Distributed Tracing Rollback Strategy Microservices Architecture Stateless and Stateful Services Azure Database for PostgreSQL Azure Database for MySQL API Versioning WebSockets Resource Throttling Azure Service Health Azure Cosmos DB Azure Relay Platform as a Service (PaaS) HTTP/HTTPS Rate Limiting Azure Key Vault TCP/IP Azure Notification Hubs OData SQL Elastic Pools Azure API Management Azure Queue Storage Durable Functions Geo-replication Multi-Factor Authentication (MFA) Azure SignalR Service Azure Container Instances (ACI) Resource Groups Azure Logic Apps Retry Policies Azure SQL Managed Instance Policies (XML-based policy configuration) Blue-Green Deployment Backend Service Azure Event Hubs Topic and Subscription API Gateway Pattern OAuth 2.0 Azure Monitor Logs Hot, Cool, and Archive Storage Tiers Infrastructure as Code (IaC) Azure Service Bus Serverless Orchestration Managed Identity Authentication App Service Plan Azure Function Triggers and Bindings Connection Strings Continuous Monitoring Access Tokens Service Endpoint Policy-Based Authorization ARM Template Deployment Mode Blob Storage Lifecycle Management Durable Task Framework Function Chaining Event Sourcing Authorization Code Flow Load Testing Static Web Apps....

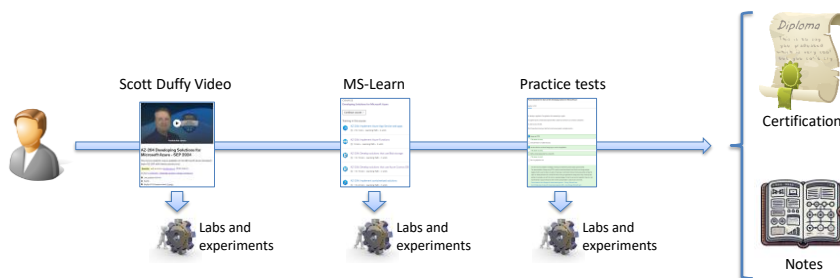
What are our options? 


<https://www.tn-data.se>

11

## Studying for AZ-204

We could do it the usual way:



How did I do it? 

<https://www.tn-data.se>

12

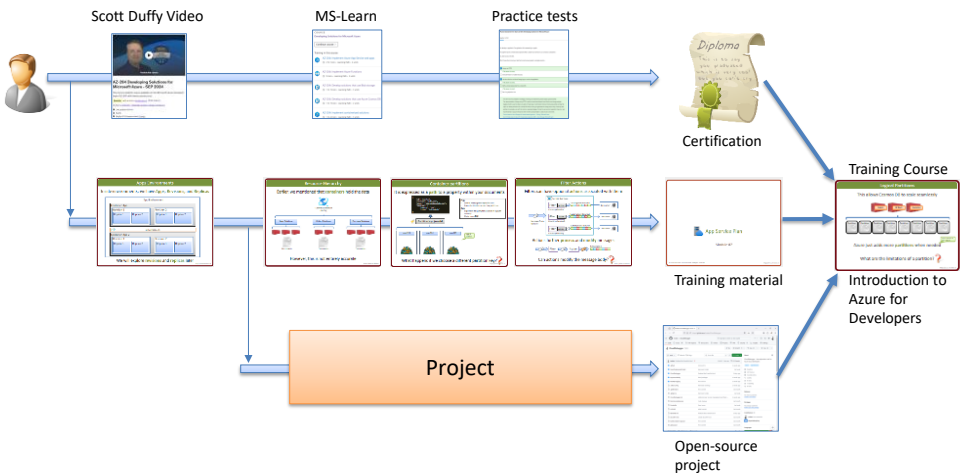
You don't know something until you can explain it to others!



13

Studying for AZ-204 the hard way!

My study process



What project did I write?

<https://www.tn-data.se>

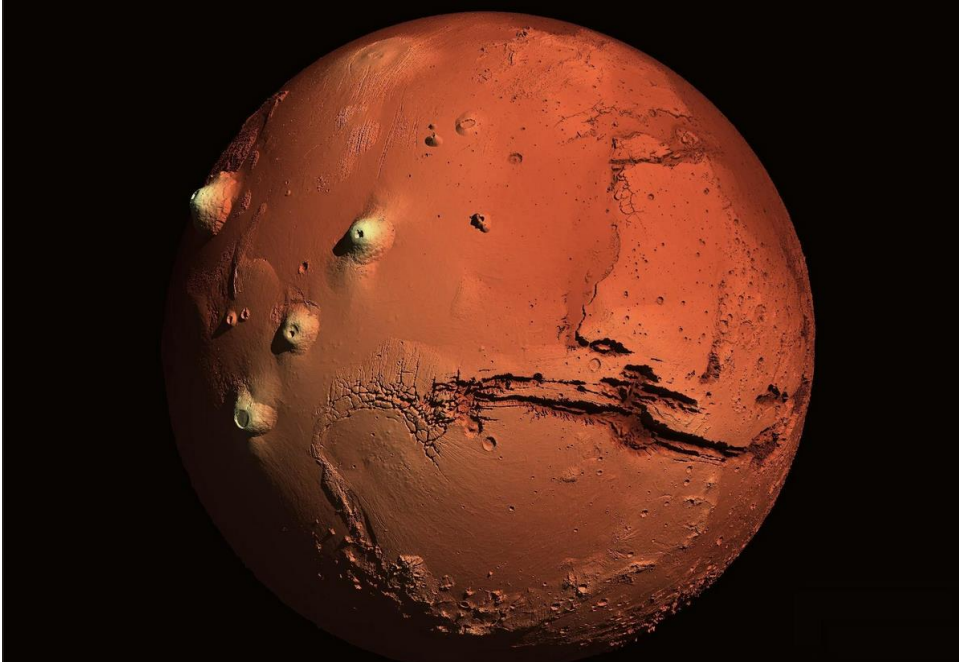
14

## Introducing the project

<https://www.tn-data.se>

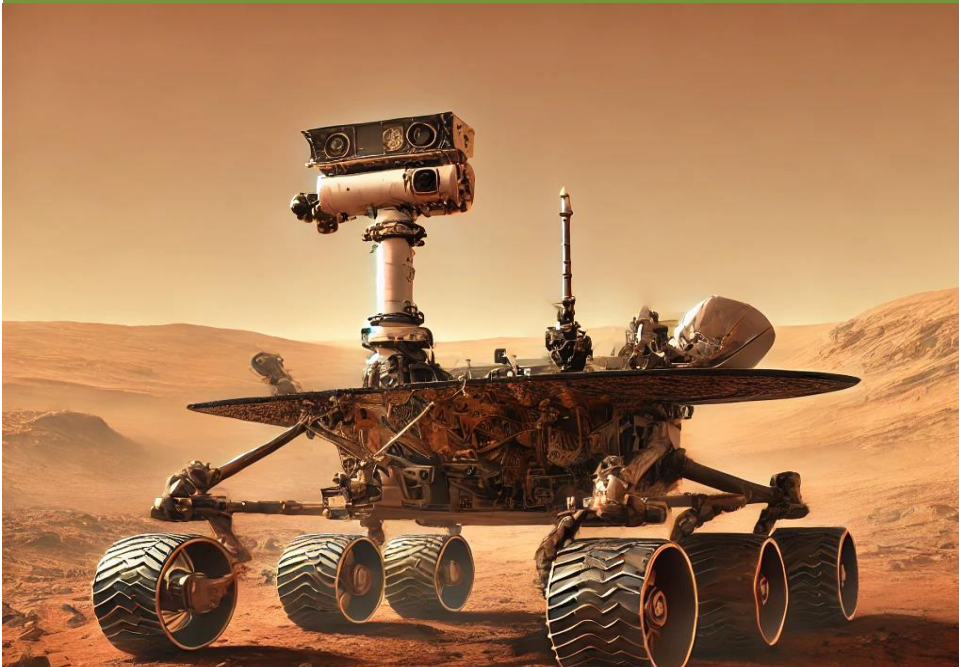
15

## Exploring Mars



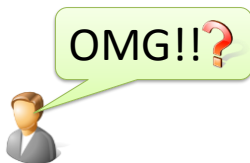
16

## Mars Rover



17


## How should we explore Azure?



18

## Introducing the Cloud Debugger



What can it do? 















<https://www.tn-data.se>

19

## What can it do?

- Logging
- REST API
- Calling APIs
- File system
- Local cache
- Credentials caching
- DefaultAzureCredentials
- Runtime details
- Environment variables
- Configuration
- Network
- Logging
- Error handling
- Caching
- User Delegation SAS Token
- Web Hooks
- Data Protection API
- Connection Strings
- ...

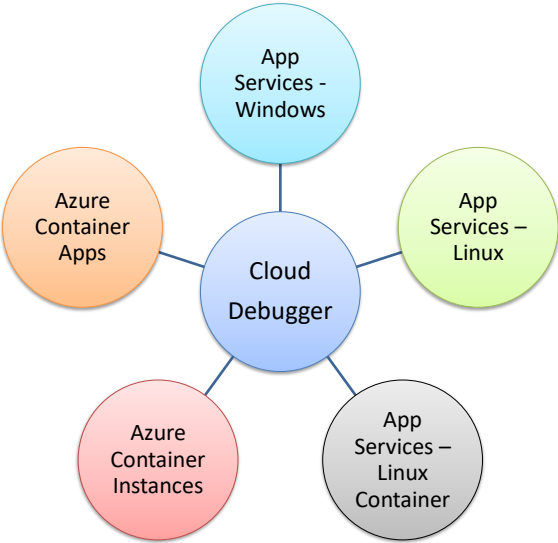


-  App Services
-  Azure Functions
-  Azure Container Instances
-  Container Apps
-  Cosmos DB
-  Azure SQL Server
-  Redis
-  Entra ID
-  API Gateway
-  Blob Storage
-  Azure CDN
-  Event Hub
-  Event Grid
-  Log analytics Workspace
- ...

<https://www.tn-data.se>

20

Deployment Targets



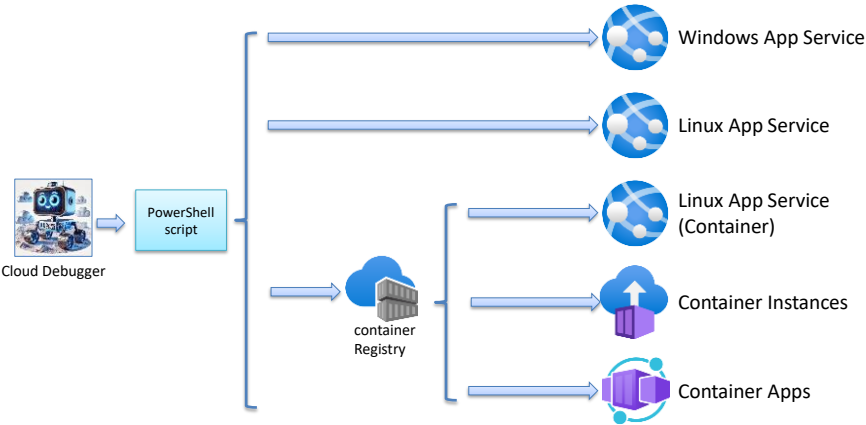
How is this deployed?

<https://www.tn-data.se>

21

Deployment

The deployment setup



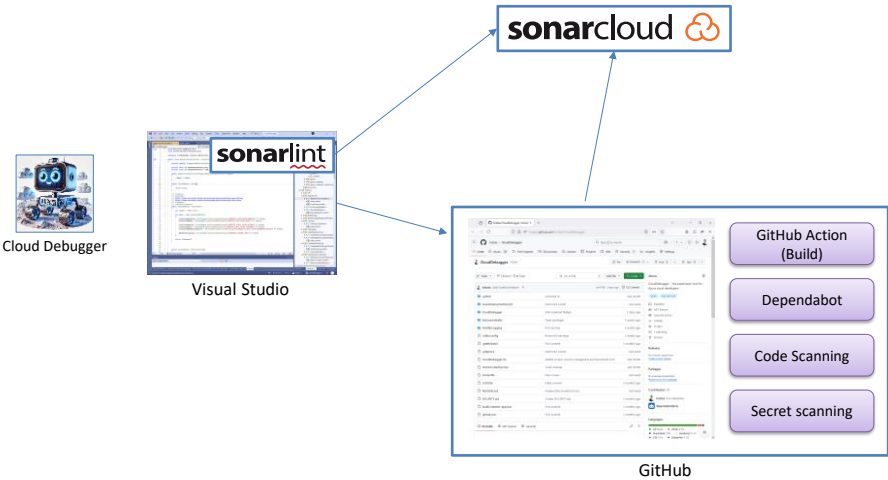
<https://www.tn-data.se>

22



# Deployment

## Secure Development Practices



<https://www.tn-data.se>

## The Tools

<https://www.tn-data.se>



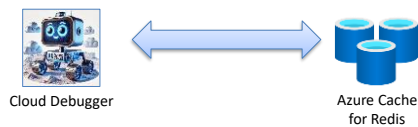
## Redis Tool

<https://www.tn-data.se>

25

## Azure Cache for Redis

We can **read** and **write** keys to **Redis** instances



Supports both **access keys** and **managed identity**

<https://www.tn-data.se>

26



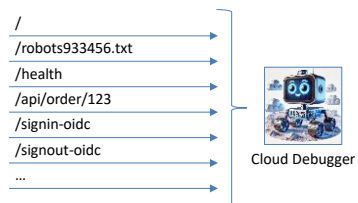
## Request Logger

<https://www.tn-data.se>

27

## Request Logger

Our tool will receive a lot of request during its lifetime



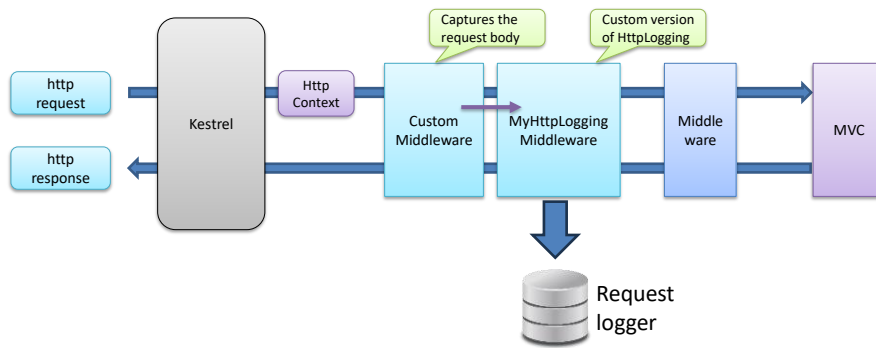
This tool will capture and log all the **requests** and **responses**

<https://www.tn-data.se>

28

## Request Logger

Internally two **middleware** modules are use



Important, this tool will capture sensitive information!

<https://www.tn-data.se>

29

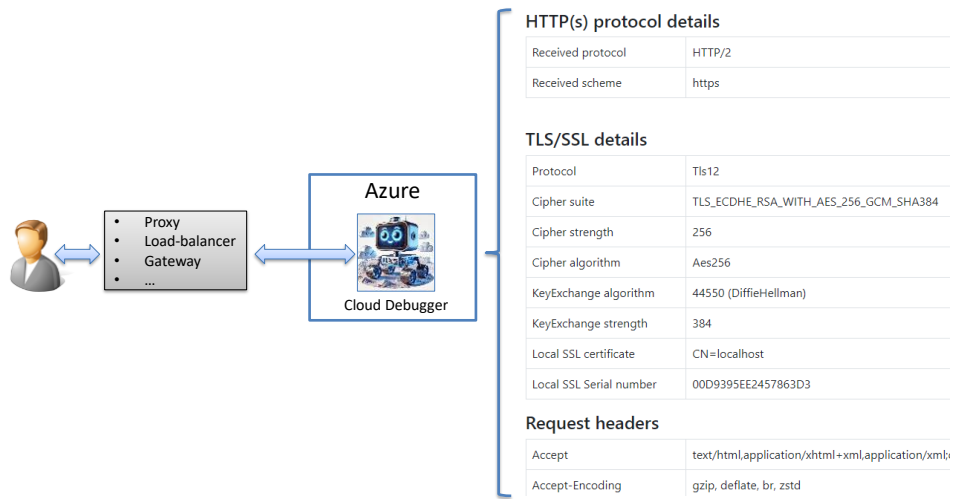
## Current Request Viewer

<https://www.tn-data.se>

30

Current Request Viewer

This tool displays the received **request headers**



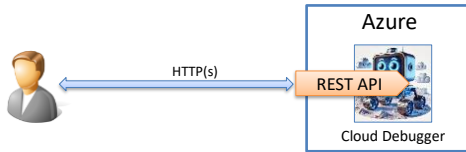
Azure often rewrites and adds headers to the request



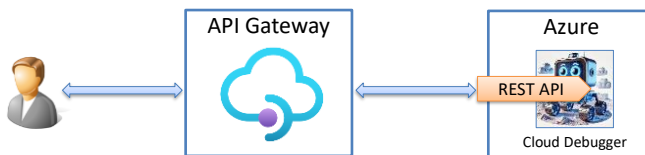
REST API Tool

## REST API Tool

This tool exposes a simple REST API



This can be useful for testing with an **API Gateway**



Allows us to verify that we can send traffic to an API

<https://www.tn-data.se>

33

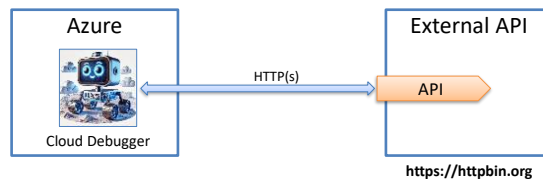
## Calling External APIs

<https://www.tn-data.se>

34

## Calling External APIs

Makes HTTP requests to an external API outside of Azure



**httpbin** is a simple HTTP Request & Response Service

<https://www.tn-data.se>

35

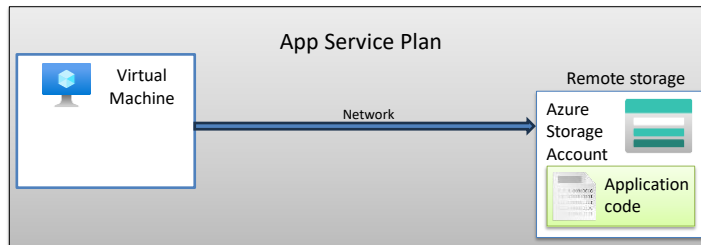
## App Services Tools – Local Cache

<https://www.tn-data.se>

36


## App Services Tools – Local Cache

By default, the application code is stored in a remote storage



Some of the problems with this are:

- Increased Latency
- Higher Load on Remote Storage
- Reduced Performance
- Scalability Challenges
- ...

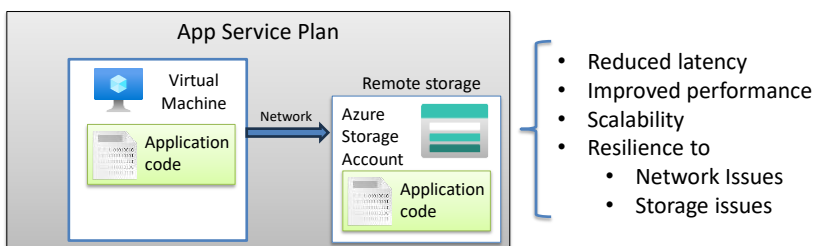
How can we improve this? 

<https://www.tn-data.se>

37


## App Services Tools – Local Cache

We can enable an optional **local cache** feature



When enabled, Azure will make a local copy of the App

A feature for Windows non-container-based apps

How do we enable this feature? 

<https://www.tn-data.se>

38



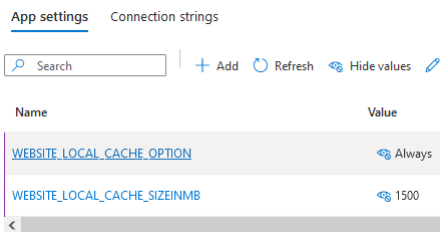
App Services Tools – Local Cache

To enable it, we need to set this configuration setting:

Setting name	Value
WEBSITE_LOCAL_CACHE_OPTION	Always
WEBSITE_LOCAL_CACHE_SIZEINMB	1000

Optional, 1000 is the default (1GB)

It can for example, be set in the portal:



What does this tool do?

<https://www.tn-data.se>

App Services Tools – Local Cache

This tool will display the current local cache settings:

App Service Local Cache details	
If enabled	
LocalCache Option	<b>Always</b> (Default, Always, Disabled)
LocalCache Size	<b>[Not set]</b> MB (1-2000 MB)
LocalCache Read-Write options	<b>[Not set]</b> Available options are: - ReadOnly: Cache is read-only. - WriteButDiscardChanges: Allow writes to local cache but discard changes made locally.
LocalCache Enabled	<b>True</b>
LocalCache Ready	<b>TRUE</b> (Read-only flag indicating if the app using local cache).
Website Volume Type	<b>LocalCache</b> (Shows the storage volume type currently in use. Should either be PrimaryStorageVolume or LocalCache if set).

<https://www.tn-data.se>



App Services Tools – Show File System

<https://www.tn-data.se>

41

App Services Tools – Show File System

This tool will display the core App Service directories

App Service details

Operating System	Microsoft Windows 10.0.20348
Home Directory	C:\home
Temp Directory	C:\local\Temp
Application Directory	C:\home\site\wwwroot\

Home Directory	Application directory	Temp directory
\.ssh \ASP.NET \ShutdownSentinel \data \logfiles \site	\\wwwroot  Azure.Core.Amqp.dll Azure.Core.dll Azure.Identity.dll Azure.Messaging.EventGrid.dll Azure.Messaging.EventHubs.dll Azure.Storage.Blobs.ChangeFeed.dll Azure.Storage.Blobs.dll Azure.Storage.Common.dll CloudDebugger.deps.json CloudDebugger.dll CloudDebugger.exe CloudDebugger.pdb CloudDebugger.runtimeconfig.json Flurl.Http.dll Flurl.dll Humanizer.dll Microsoft.AI.DependencyCollector.dll Microsoft.AI.EventCounterCollector.dll Microsoft.AI.PerfCounterCollector.dll ...	\siteExtLogs

<https://www.tn-data.se>

42



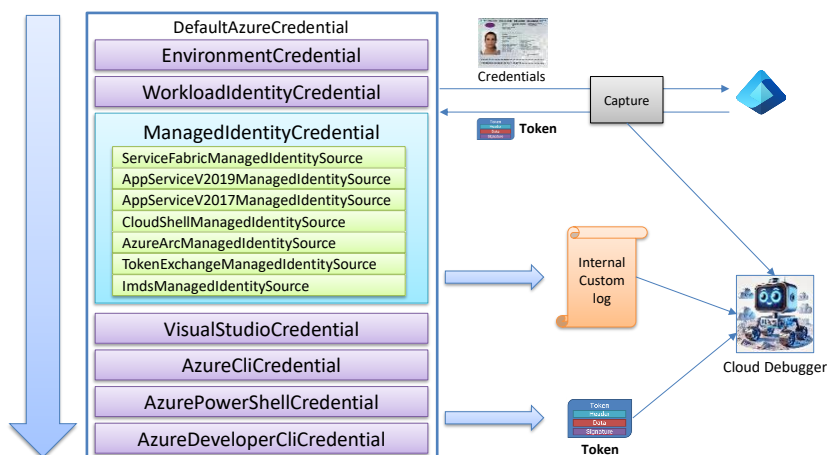
## Credentials - DefaultAzureCredentials

<https://www.tn-data.se>

43

## Credentials - DefaultAzureCredentials

This tool will try to get an **access token** from Entra ID



This tool will give you insights in how this credential work

<https://www.tn-data.se>

44



Credentials – Token caching

<https://www.tn-data.se>

45

Credentials – Token caching

This tool explores the caching of access tokens



Different credentials handle caching differently!

<https://www.tn-data.se>

46



## Credentials – TokenCredentials Explorer

https://www.tn-data.se

47

## Credentials – TokenCredentials Explorer

This tool allows you to execute different **TokenCredentials**

Token Credentials	EnvironmentCredential
<p>Select a token credentials to explore.</p> <p><a href="#">AzureCliCredential</a></p> <p><a href="#">AzureDeveloperCliCredential</a></p> <p><a href="#">AzurePowerShellCredential</a></p> <p><a href="#">DefaultAzureCredential</a></p> <p><b><a href="#">EnvironmentCredential</a></b></p> <p><a href="#">InteractiveBrowserCredential</a></p> <p><a href="#">ManagedIdentityCredential</a></p> <p><a href="#">VisualStudioCodeCredential</a></p> <p><a href="#">VisualStudioCredential</a></p> <p><a href="#">WorkloadIdentityCredential</a></p>	<p>Refer to the documentation for the required environment variables that must be set.</p> <p><b>Internal Execution log</b></p> <p>EnvironmentCredential - tenantId = 567d82a1-7f61-4da2-b955-d3244ea6e976</p> <ul style="list-style-type: none"><li>- clientId = 03f98a87-c617-46b7-9958-44aa412b60e5</li><li>- clientSecret = [REDACTED]</li><li>- clientCertificatePath =</li><li>- clientCertificatePassword = NULL</li><li>- sendCertificateChain = False</li><li>- username =</li><li>- password = NULL</li></ul> <p>Based on the provided environment variables, this TokenCredential will select either: ClientSecretCredential, ClientCertificateCredential, or UsernamePasswordCredential.</p> <p>Selected ClientSecretCredential based on the provided environment variables</p> <p>ClientSecretCredential</p> <ul style="list-style-type: none"><li>- TenantId = 567d82a1-7f61-4da2-b955-d3244ea6e976</li><li>- ClientId = 03f98a87-c617-46b7-9958-44aa412b60e5</li><li>- ClientSecret = [REDACTED]</li></ul>

Perfect to try out in different environments

https://www.tn-data.se

48



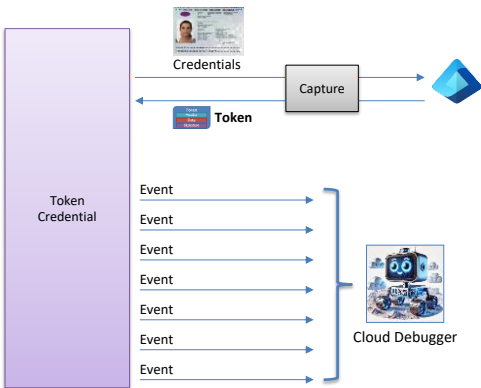
Credentials – Event Log viewer

<https://www.tn-data.se>

49

Credentials – Event Log Viewer

Captures the internal events from the **TokenCredentials**



Including the internal communication with Entra ID

<https://www.tn-data.se>

50



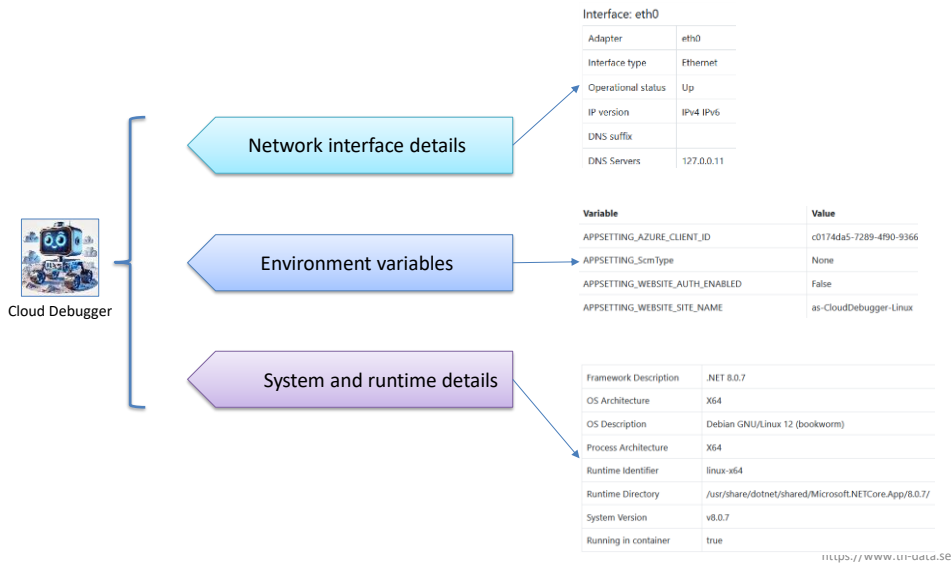
Diagnostics and system information

<https://www.tn-data.se>

51

Diagnostics and system information

These tools will display details like:



52



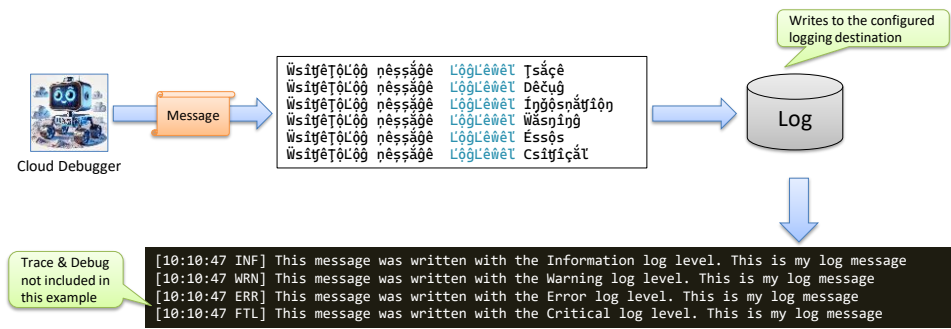
Logging – Write message to the logs

<https://www.tn-data.se>

53

Logging – Write message to the logs

This tool writes a log message with the six different log levels



Perfect for troubleshooting logging issues

<https://www.tn-data.se>

54





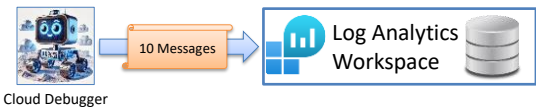
Logging – Log Analytics Workspaces

<https://www.tn-data.se>

55

Logging – Log Analytics Workspaces

This tool will send 10 log entries to a **Log Analytics Workspace**



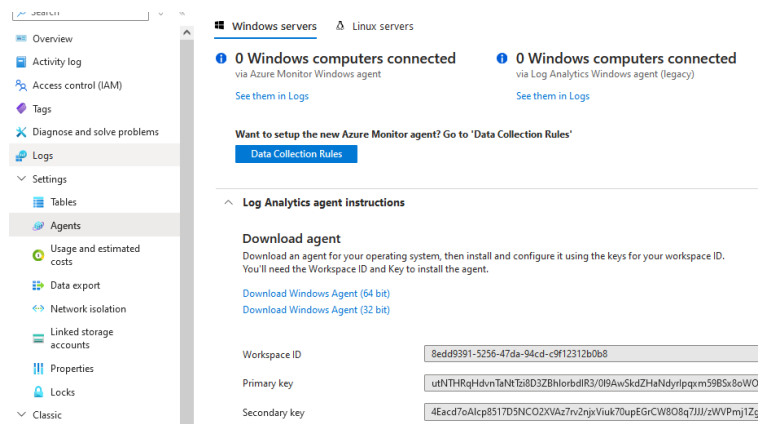
Where do I get the Log Analytics **ID** and **key**? 

<https://www.tn-data.se>

56

# Logging – Log Analytics Workspaces

The key can be found under **Settings -> Agents**



What does the events look like in the workspace?



57

# Logging – Log Analytics Workspaces

This is the result:

Results Chart				
TimeGenerated [UTC] ↑↓	Message	Severity_s	Timestamp_t [UTC]	Type
25/09/2024, 09:31:08.508	This is my custom message #0	Error	25/09/2024, 09:31:07.802	MyApplicationLog_CL
TenantId	8edd9391-5256-47da-94cd-c9f12312b0b8			
SourceSystem	RestAPI			
TimeGenerated [UTC]	2024-09-25T09:31:08.5083338Z			
Message	This is my custom message #0			
Severity_s	Error			
Timestamp_t [UTC]	2024-09-25T09:31:07.8021112Z			
Type	MyApplicationLog_CL			
> 25/09/2024, 09:31:08.508	This is my custom message #1	Error	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #2	Error	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #3	Error	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #4	Warning	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #5	Information	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #6	Information	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #7	Error	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #8	Error	25/09/2024, 09:31:07.802	MyApplicationLog_CL
> 25/09/2024, 09:31:08.508	This is my custom message #9	Information	25/09/2024, 09:31:07.802	MyApplicationLog_CL

https://www.tn-data.se

58



Blob Storage - Create a User Delegation SAS Token

<https://www.tn-data.se>

59

Blob Storage - Create a User Delegation SAS Token

This tool creates a **SAS token** to a given blob in blob storage

Storage account and blob details

Storage account name

clouddebuggerstorage

Container name

clouddebugger

Blob name

MyBlob.txt

Generate token

User delegation SAS token

SAS token

skoid=1dc7a951-446c-4572-8275-30561ef281f7&sktid=567d82a1-7f61-4da2-b955-d3244ea6e976&skt=20

Blob URL

https://clouddebuggerstorage.blob.core.windows.net/clouddebugger/MyBlob.txt

Internals of the user delegation key

SignedObjectId

1dc7a951-446c-4572-8275-30561ef281f7 (The Azure Active Directory object ID in GUID format.)

SignedTenantId

567d82a1-7f61-4da2-b955-d3244ea6e976 (The Azure Active Directory tenant ID in GUID format.)

SignedStartsOn

09/25/2024 11:00:41 +00:00 (The time at which the key becomes valid.)

SignedExpiresOn

09/26/2024 11:00:41 +00:00 (The time at which the key becomes invalid.)

SignedService

b (The service that accepts the key, b for blob.)

SignedVersion

2024-11-04 (The service version that created the key.)

Key

M0obwH166zuq4bdO6wwjRDBdEISROfS+rETcGGXU6AU= (The key as a base64 string.)

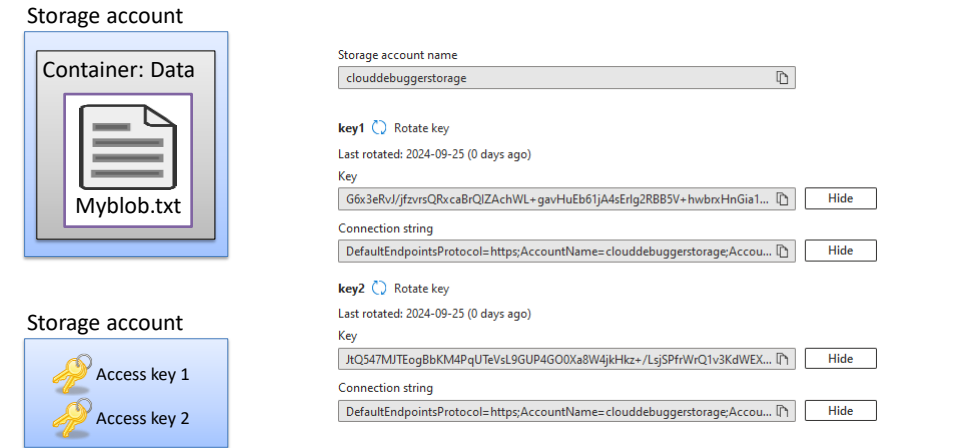
What is the problem with standard SAS tokens?

<https://www.tn-data.se>

60

## Blob Storage - Create a User Delegation SAS Token

A storage account includes two access keys:



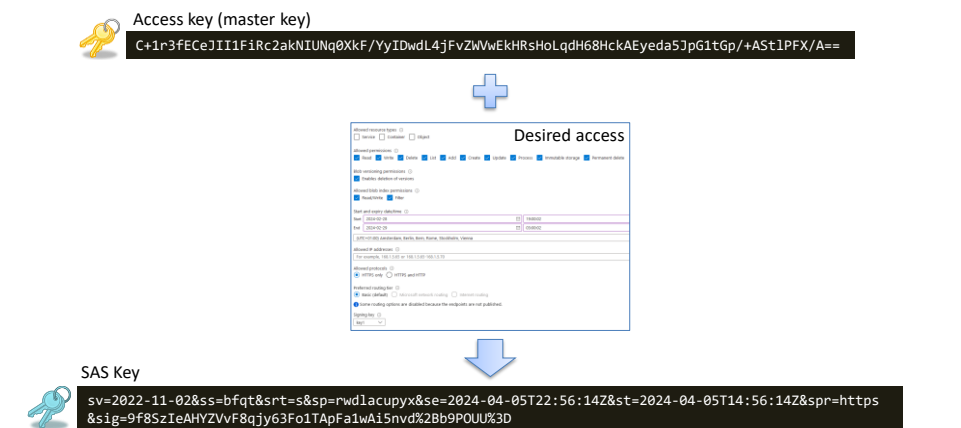
How do you generate a SAS token from these keys?


<https://www.tn-data.se>

61

## Blob Storage - Create a User Delegation SAS Token

You can create a signed SAS token based on these keys



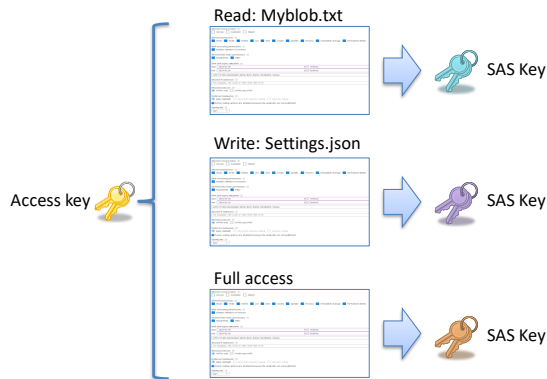
What does this allow us to do? 


<https://www.tn-data.se>

62

## Blob Storage - Create a User Delegation SAS Token

From this access key, we can issue multiple SAS keys



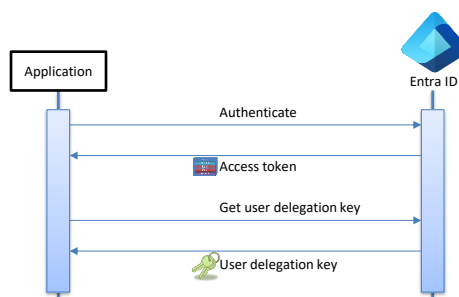
How can delegated access tokens improve this? 

<https://www.tn-data.se>

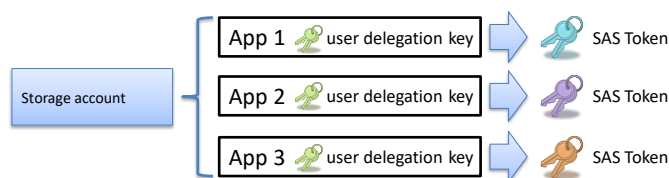
63

## Blob Storage - Create a User Delegation SAS Token

Your application asks for a custom key from Entra ID



From the received **delegation key**, we can issue SAS tokens



<https://www.tn-data.se>

64

## Blob Storage - Create a User Delegation SAS Token

### What are the Benefits of Using delegation SAS tokens?

- **Key Management:**
  - SAS tokens are signed using Entra ID via managed identity, removing the need for manual key management.
- **Limited Lifetime:**
  - Tokens can be short-lived, minimizing unauthorized access risks.
- **Enhanced Auditing:**
  - User Delegation SAS tokens appear in Azure Storage access logs, improving traceability.
- **Least Privilege:**
  - Tokens are issued with limited permissions, adhering to the principle of least privilege.
- **Access Control:**
  - Tokens can't exceed the issuing application's permissions, ensuring proper privilege containment.
- **Reduced Risk:**
  - Eliminates reliance on account keys, reducing the risk of key leakage and compromising the entire storage account.

<https://www.tn-data.se>

65

## Blob Storage – Accessing Blobs

<https://www.tn-data.se>

66

## Blob Storage – Accessing Blobs

This tool allows you to **list**, **read** and **create** blobs

Storage account name

clouddebuggerstorage

Container name

clouddebugger

SAS Access key or  
SAS Token/URL

(If missing it will authenticate using DefaultAzureCredential)

Blobs in this container

Name	Size
MyBlob.txt	518
MyBlob2.txt	518
MyBlob3.txt	518
MyBlob4.txt	1554

MyBlob4.txt

Load

Save

File content

```
var options = new BlobClientOptions()
{
    //TODO:
};

var storageUri = new
Uri($"https://{model.StorageAccountName}.blob.core.
windows.net");
```

<https://www.tn-data.se>

67



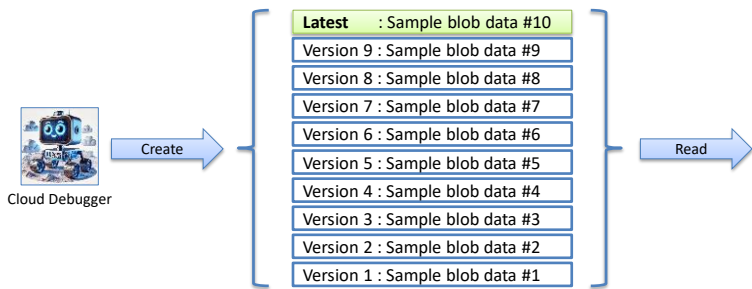
## Blob Storage – Versioning Tool

<https://www.tn-data.se>

68

## Blob Storage – Versioning Tool

This tool allows us to create a blob with 10 version



It also allows us to display all the blob versions

<https://www.tn-data.se>



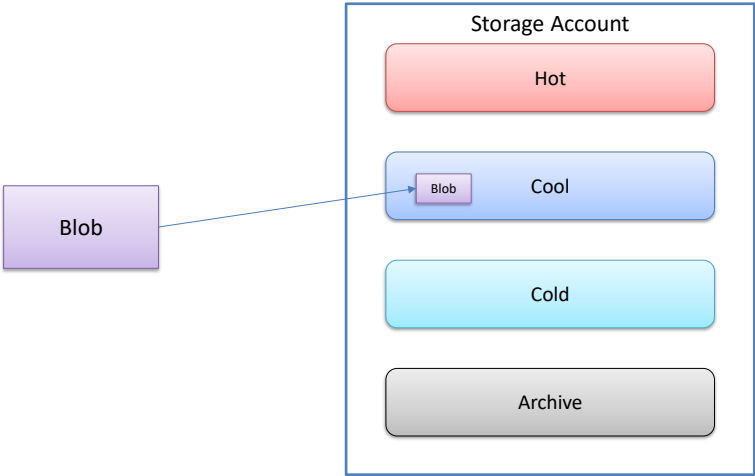
## Blob Storage – Access Tiers

<https://www.tn-data.se>



Blob Storage – Access Tiers

A blob is always assigned to one of these access tiers.



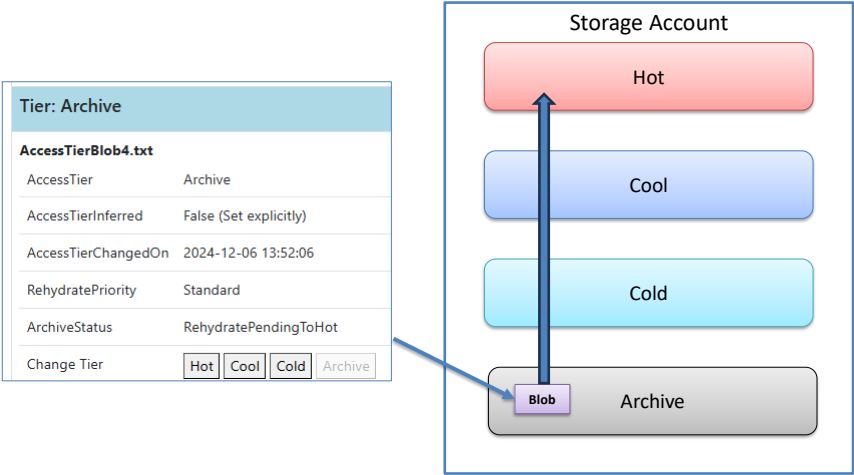
What can I do with this tool?

<https://www.tn-data.se>

71

Blob Storage – Access Tiers

This tool allows you to explore and move blobs across tiers



<https://www.tn-data.se>

72

## Blob Storage – Access Tiers

<https://www.tn-data.se>

73

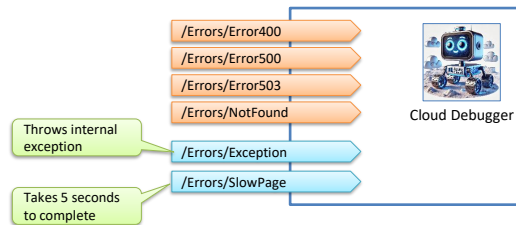
## Error Pages

<https://www.tn-data.se>

74

## Error Pages

This tool generates various HTTP errors and exceptions



Useful for various testing purposes

<https://www.tn-data.se>

75

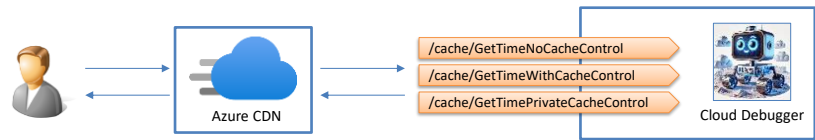
## Caching and Azure CDN

<https://www.tn-data.se>

76

Caching and Azure CDN

This tool is useful for testing browser and CDN caching



URL	Response content
ՀԱՇԻՔԻ ԳԵՄԴԻՆԵՆՈՒԿԱՇԻՔԻՇՈՒՄՍՈՒՄ	No caching response headers
ՀԱՇԻՔԻ ԳԵՄԴԻՆԵՎԻՄԻԿԱՇԻՔԻՇՈՒՄՍՈՒՄ	ՀԱՇԻՔԻ ՇՈՒՄՍՈՒՄ ԻՄՇԼԻՇ ՆԱՅ ԱԳԵ _
ՀԱՇԻՔԻ ԳԵՄԴԻՆԵՐՏԻՎԱՏԻՔԻՇՈՒՄՍՈՒՄ	ՀԱՇԻՔԻ ՇՈՒՄՍՈՒՄ ՊՈ ՏԴՐՈՏԵ ՊՈ ՀԱՇԻՔԻ ՆԱՅ ԱԳԵ . ՈՍՏԿ ՏԵՎԱՆԻԴԱՏԻՔԻ ԵՄԻՏԵՏ ԻՏՈՅԿ ՏԵՎԱՆԻԴԱՏԻՔԻ ԻՏԻՎԱՏԻՔԻ ԻՏԱԳՆԱ ՊՈ ՀԱՇԻՔԻ

Cache for 5 seconds

No caching

<https://www.tn-data.se>

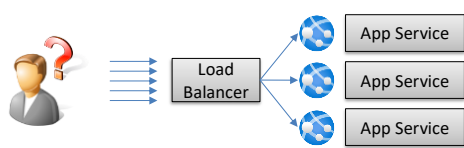


Scale-out

<https://www.tn-data.se>

Scale-out

How can we tell if a service is load balanced? ?

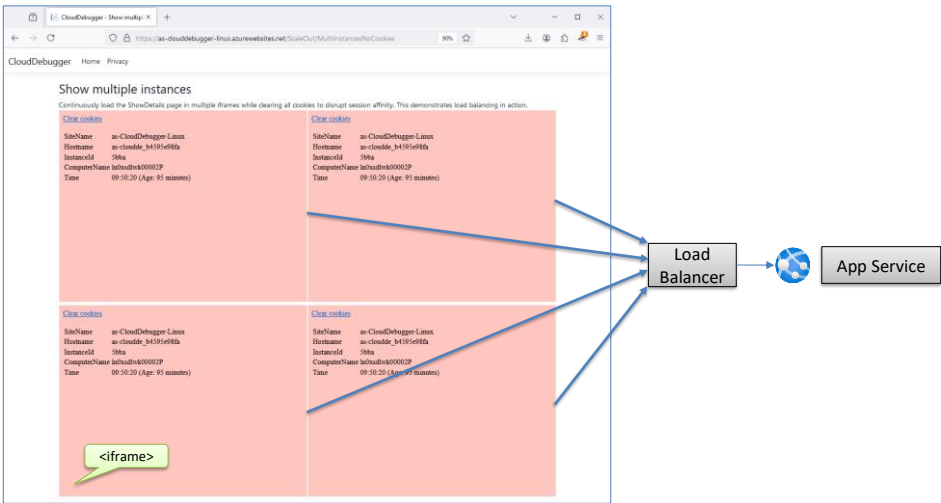


<https://www.tn-data.se>

79

Scale-out

This tool will help you visualize service scale-out

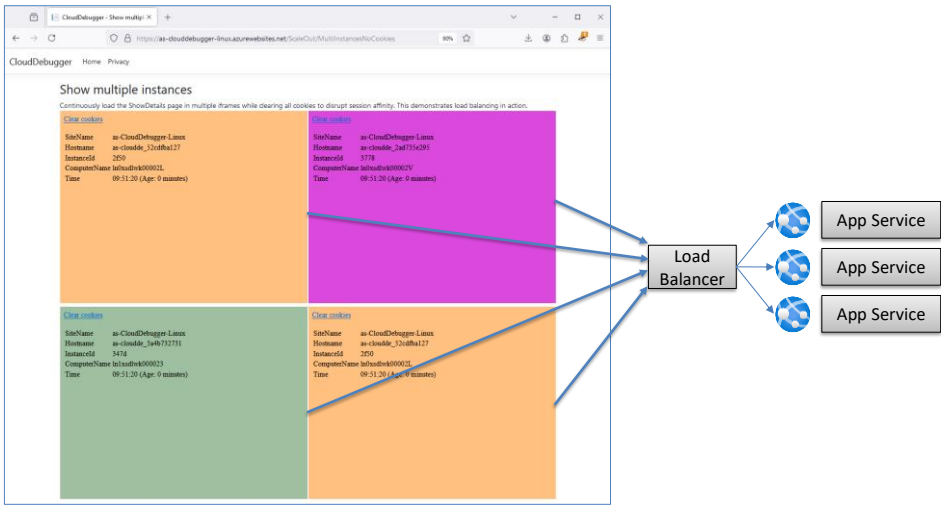


<https://www.tn-data.se>

80

# Scale-out

When we scale out, each instance is assigned a unique color



<https://www.tn-data.se>

81

# 

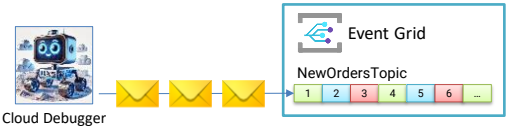
## Event Grid

<https://www.tn-data.se>

82

# Event Grid

This tool will send events to a given **Event Grid topic**



## Send Events to Event Grid

This tool will allow you to send events to an Event Grid topic

[Back](#)

AccessKey	<input type="text"/>
(Optional, if missing it will authenticate using DefaultAzureCredential/ServicePrincipal)	
Topic endpoint	<input type="text" value="https://eventgridschematopic.swedencentral-1.eventgrid.azure.net/api/events"/>
Start event number	<input type="text" value="1"/>
Number of events to send	<input type="text" value="10"/>

It support both **EventGrid** and **CloudEvents** schemas

<https://www.tn-data.se>

83



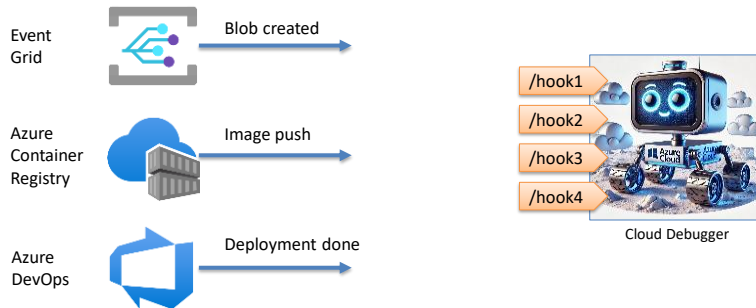
## Webhooks


<https://www.tn-data.se>

84

## Webhooks

This tool exposes **four endpoints** for exploring **webhooks**



What does a webhook request look like? 


<https://www.tn-data.se>

85

## Webhooks

Here is a sample webhook request



What about events from **EventGrid**? 

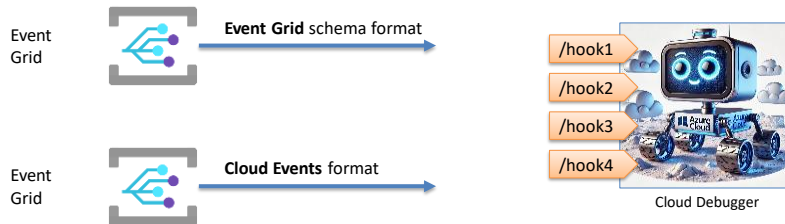
<https://www.tn-data.se>


86



## Webhooks

Event Grid supports two webhook formats



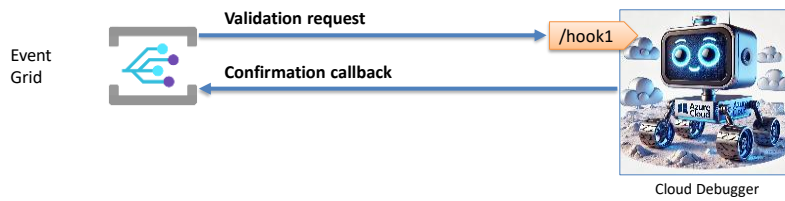
What must happen before EventGrid can send requests? 


<https://www.tn-data.se>

87

## Webhooks

The webhook must first respond to a validation requests



What does this look like? 

<https://www.tn-data.se>


88

## Webhooks

### The initial validation request

```
POST /hook1
Content-Type: application/json; charset=utf-8
Host: as-clouddebugger-linux.azurewebsites.net
aeg-subscription-name: EVENTGRIDSUBSCRIPTION

[
  {
    "id": "0588c8e0-193c-4c19-99ab-40f905173d12",
    "topic": "/subscriptions/b78d216b-d714-4664-b39a-26ef8dbcfd1/resourceGroups/rg-CloudDebugger/providers/Microsoft.Storage/storageAccounts/clouddebuggerstorage",
    "subject": "",
    "data": {
      "validationCode": "194A76BD-17E0-41E4-BAEE-7FD21E27CE85",
      "validationUrl": "https://rp-swedencentral.eventgrid.azure.net:553/events/subscriptions/eventgridsubscription/validate?id=194A76BD-17E0-41E4-BAEE-7FD21E27CE85&t=2024-10-04T09:28:29.2050157Z&apiVersion=2023-12-15-preview&token=egZvMTdTiaZJ5%2fKgBI1%2bh4xzaaGnci0Xt30Yr9qJTmE%3d"
    },
    "eventType": "Microsoft.EventGrid.SubscriptionValidationEvent",
    "eventTime": "2024-10-04T09:28:29.2050821Z",
    "metadataVersion": "1",
    "dataVersion": "2"
  }
]
```

What happens next? 

<https://www.tn-data.se>

89


## Webhooks

Next, we need to send a request to the **validationUrl**

```
GET https://rp-swedencentral.eventgrid.azure.net:553/events/subscriptions/eventgridsubscription/validate?id=194A76BD-17E0-41E4-BAEE-7FD21E27CE85&t=2024-10-04T09:28:29.2050157Z&apiVersion=2023-12-15-preview&token=egZvMTdTiaZJ5%2fKgBI1%2bh4xzaaGnci0Xt30Yr9qJTmE%3d
```

Then, EventGrid will respond with:

```
"Webhook successfully validated as a subscription endpoint."
```

What else can this tool do? 

<https://www.tn-data.se>

90

# Webhooks

## Webhook endpoint failures can be simulated

Web hook #1 log

[Back](#)

Webhook #1 endpoint: **/hook1**

WebHook endpoint: Functional ([make hook endpoint fail](#)) ⓘ

Headers: [hide](#) Body: [hide](#)

POST /hook1

```
HTTP/1.1 500 Internal Server Error
Content-Type: application/problem+json; charset=utf-8
Date: Thu, 03 Oct 2024 13:31:48 GMT
Server: Kestrel
Request-Context: appId=
Content-Length: 223


{
  "type": "https://tools.ietf.org/html/rfc9110#section-15.6.1",
  "title": "An error occurred while processing your request.",
  "status": 500,
  "traceId": "00-74ac1c1f0197c8cb803e391254d507f4-8a02faf1b9504f1a-00"
}
```

/hook1

/hook2

/hook3

/hook4



Cloud Debugger

<https://www.tn-data.se>



## Webhooks overview tool

<https://www.tn-data.se>





## File System Explorer

<https://www.tn-data.se>

95



## File System Explorer

This tool allows you to explore the local file system

File System - ReadWriteFiles

HomePath: [Unknown]

App Path: Z:\GitHubTN\CloudDebugger\CloudDebugger\bin\Debug\net8.0

Path: Z:\GitHubTN\CloudDebug

Change path/refresh

Create folder

Folders and files in this directory

\.git

\.github

\.vs

\AzureDeploymentScripts

\CloudDebugger

\MyAzureIdentity

\MyHttpLogging

\publish

.editorconfig

.gitattributes

.gitignore

CloudDebugger.sln

CloudDebugger.v3.ncrunchsolution.user

Directory.Build.props

Dockerfile

LICENSE

README.md

SECURITY.md

buildContainer-app.bat

global.json

12754

806

7344

2481

162

395

1044

1092

4532

103

65

113

global.json

Load file

Create file

File content

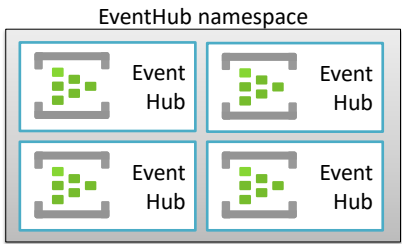
{  
 "sdk": {  
 "version": "8.0.100",  
 "rollForward": "latestMinor",  
 "allowPrerelease": false  
 }  
}

<https://www.tn-data.se>

96



## Event Hub

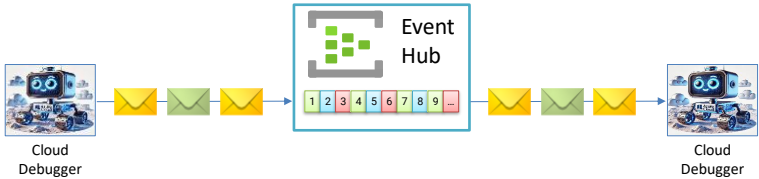



<https://www.tn-data.se>

97

## Event Hub

This tool allows you to send and consume **Event Hub** events



What does this tool look like? 

<https://www.tn-data.se>

98

Event Hub

This is the send tool:

### Send Events to Event Hub

This tool allows you to send events to an Event Hub.  
[Back](#)

Connection String	Endpoint=sb://myeventhubnsp.servicebus.windows.net;/Shared
Start event number	11
Number of events to send	10

Send Events

Events sent!

What does the receive tool look like?

https://www.tn-data.se

Event Hub

The is the consumer tool:

### Consume Event Hub events

This tool allows you to consume events from an Event Hub. 1  
[Back](#)

Connection String	Endpoint=sb://myeventhubr
Consumer Group	\$Default

Partition 0

Offset: 0  
PartitionId: 0

Event Details:  
EnqueuedTime: 2024-10-16T13:24:58.3480000+00:00  
PartitionKey: product  
SequenceNumber: 0  
Diagnostic-Id: 00-c0e724c70e90177896d7efaf341a3bec-349a735761324d6e-00  
x-opt-partition-key: product  
x-opt-sequence-number-epoch: -1  
x-opt-sequence-number: 0  
x-opt-offset: 0  
x-opt-enqueued-time: 10/16/2024 13:24:58 +00:00  
[{"ProductId":1,"ProductName":"Product 1"}]

Offset: 216  
PartitionId: 0

Event Details:  
EnqueuedTime: 2024-10-16T13:24:58.4570000+00:00  
PartitionKey: order  
SequenceNumber: 1  
Diagnostic-Id: 00-c0e724c70e90177896d7efaf341a3bec-08d5261008f332a0-00  
x-opt-partition-key: order  
x-opt-sequence-number-epoch: -1  
x-opt-sequence-number: 1  
x-opt-offset: 216  
x-opt-enqueued-time: 10/16/2024 13:24:58 +00:00  
[{"OrderId":2,"CustomerName":"Customer 2"}]

https://www.tn-data.se



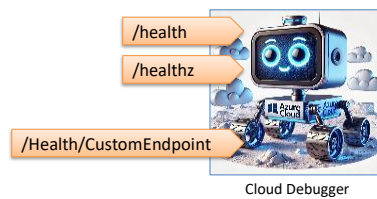
## Health Endpoints

<https://www.tn-data.se>

101

## Health Endpoints

This tool exposes two types of health endpoints



Both are used to monitor the status of applications

How can we control them? 

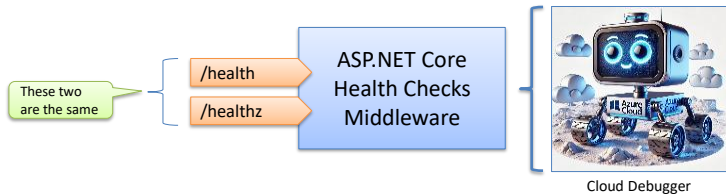
<https://www.tn-data.se>

102

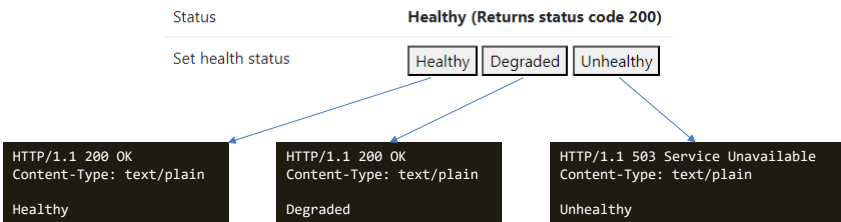


# Health Endpoints

These endpoints use the **Health Checks** Middleware



The health can be controlled using:

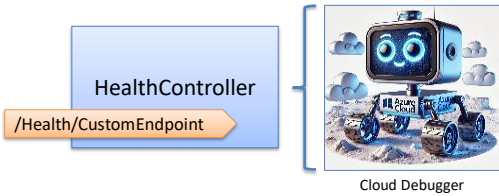


<https://www.tn-data.se>

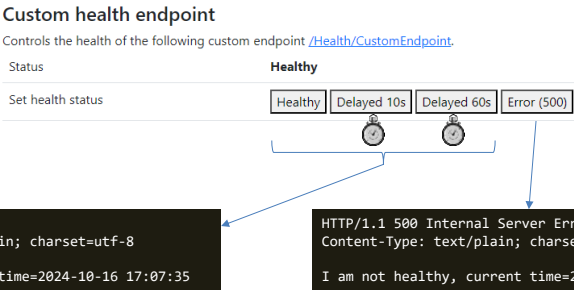
103

# Health Endpoints

The custom endpoint is a plain HTTP endpoint



The health can be controlled using:



<https://www.tn-data.se>

104



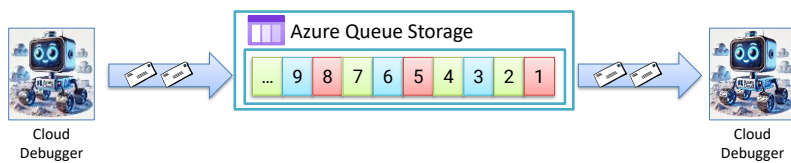
## Azure Queue Storage

<https://www.tn-data.se>

105

## Azure Queue Storage

This tool allows you to interact with **Azure Queue Storage**



You can send and receive messages from a given queue

<https://www.tn-data.se>

106

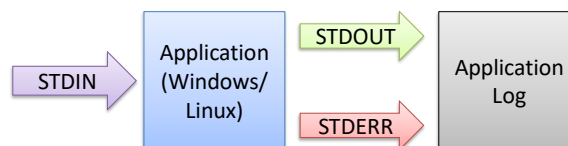
## Write a Message to Standard Output and Error Stream

<https://www.tn-data.se>

107

## Write a Message to Standard Output and Error Stream

Every process exposes these three streams



- **Standard Input (STDIN):**  
Represents input provided to a program
- **Standard Output (STDOUT):**  
Represents the stream where programs send is usual output.
- **Standard Error (STDERR):**  
Represents the stream used for logging error messages or diagnostics.

This tool allows you to write to **STDOUT** and **STDERR**

<https://www.tn-data.se>

108



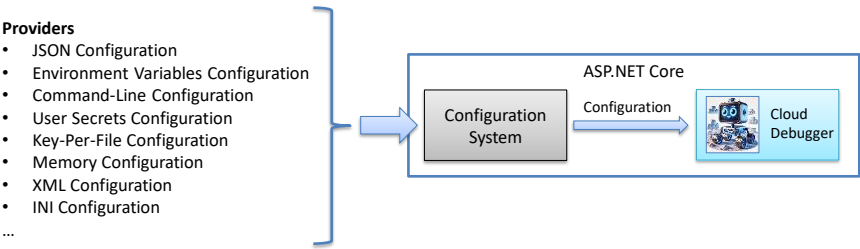
# App Configuration

<https://www.tn-data.se>

109

## App Configuration

This tool lists all the ASP.NET Core configuration data




It summarizes it from all the used configuration providers

<https://www.tn-data.se>

110

Thanks for listening!

Contact me at [tore@tn-data.se](mailto:tore@tn-data.se)

Follow me on LinkedIn 

Cloud Debugger – Open Source at  
<https://github.com/tn-data/CloudDebugger>

- Try it out!
- Submit PR!

[www.tn-data.se](http://www.tn-data.se)



- Email: [tore@tn-data.se](mailto:tore@tn-data.se)
- Web: <https://www.tn-data.se>
- Blog: <https://www.nestenius.se>

<https://www.tn-data.se>

111

Thanks for listening!

### **Exclusive Giveaway: 5 Free Expert Presentations**

Bring valuable insights to your workplace!

 Email: [tore@tn-data.se](mailto:tore@tn-data.se)

Terms:

- **Region:** Copenhagen -> Helsingör
- **Duration:** 1-hour presentation, including Q&A
- **Topics:** Choose from my website
- **Limit:** One presentation per company
- **Deadline:** Email me before 15-December

Questions?  
[tore@tn-data.se](mailto:tore@tn-data.se)



112