Microsoft

Microsoft Azure API for FHIR

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Principal Program Manager, Microsoft Health Cloud and Data

https://aka.ms/michael-devdays

Two offerings to meet your needs

Open source, full control

Built managed and maintained by the Microsoft Healthcare engineering team.

Designed to enable you to operate and manage compliance.

FHIR Server for Azure

Fully managed Azure offering

Distribution of the open source project, offered as a Platform-as-a-Service in Azure.

Meets regulatory compliance requirements for Protected Healthcare Information (PHI).

Azure API for FHIR

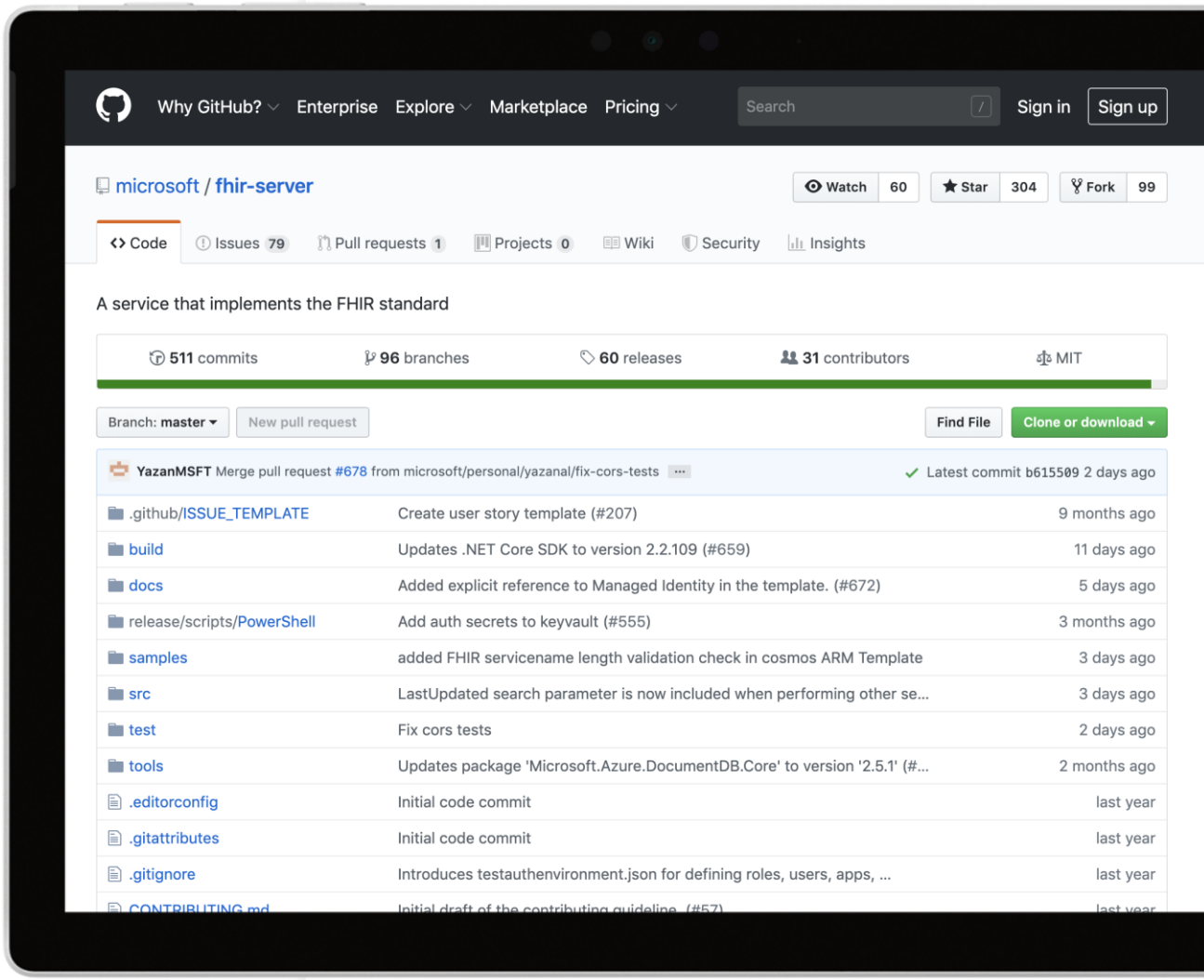
FHIR Server for Azure

Open source implementation of the industry HL7 Fast Healthcare Interoperability Resources (FHIR) specification.

Supports FHIR STU3 and FHIR R4 versions.

Easily deployable into your Azure subscription

An extensible persistence provider model enables multiple options for how data is stored, including Azure Cosmos DB and Azure SQL.



http://github.com/Microsoft/fhir-server

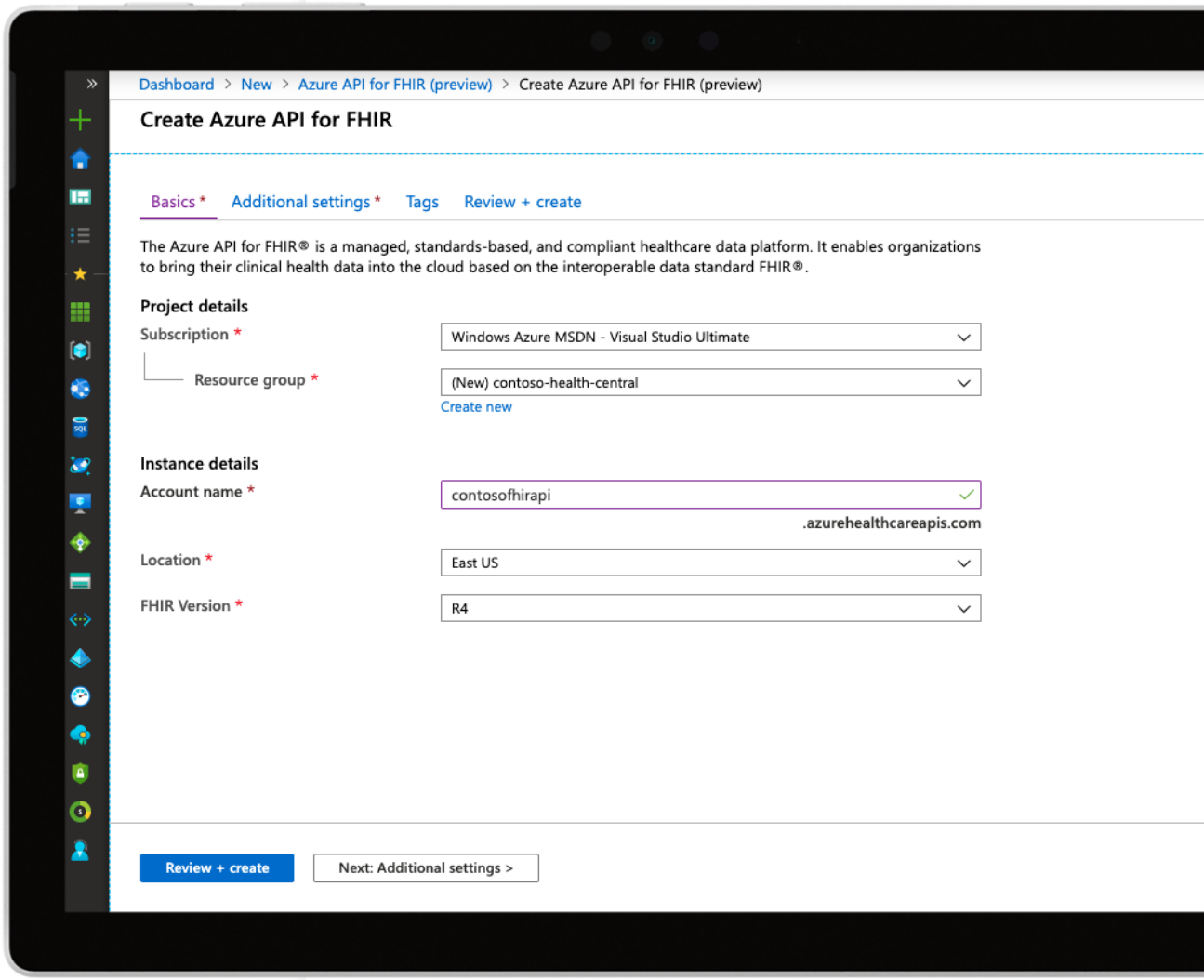
Azure API for FHIR

Fully managed, enterprise-grade FHIR service. Provisioned in the cloud in less than 5 minutes

Enables bringing together health data from disparate systems using industry standard HL7 FHIR (Fast Healthcare Interoperability Resources).

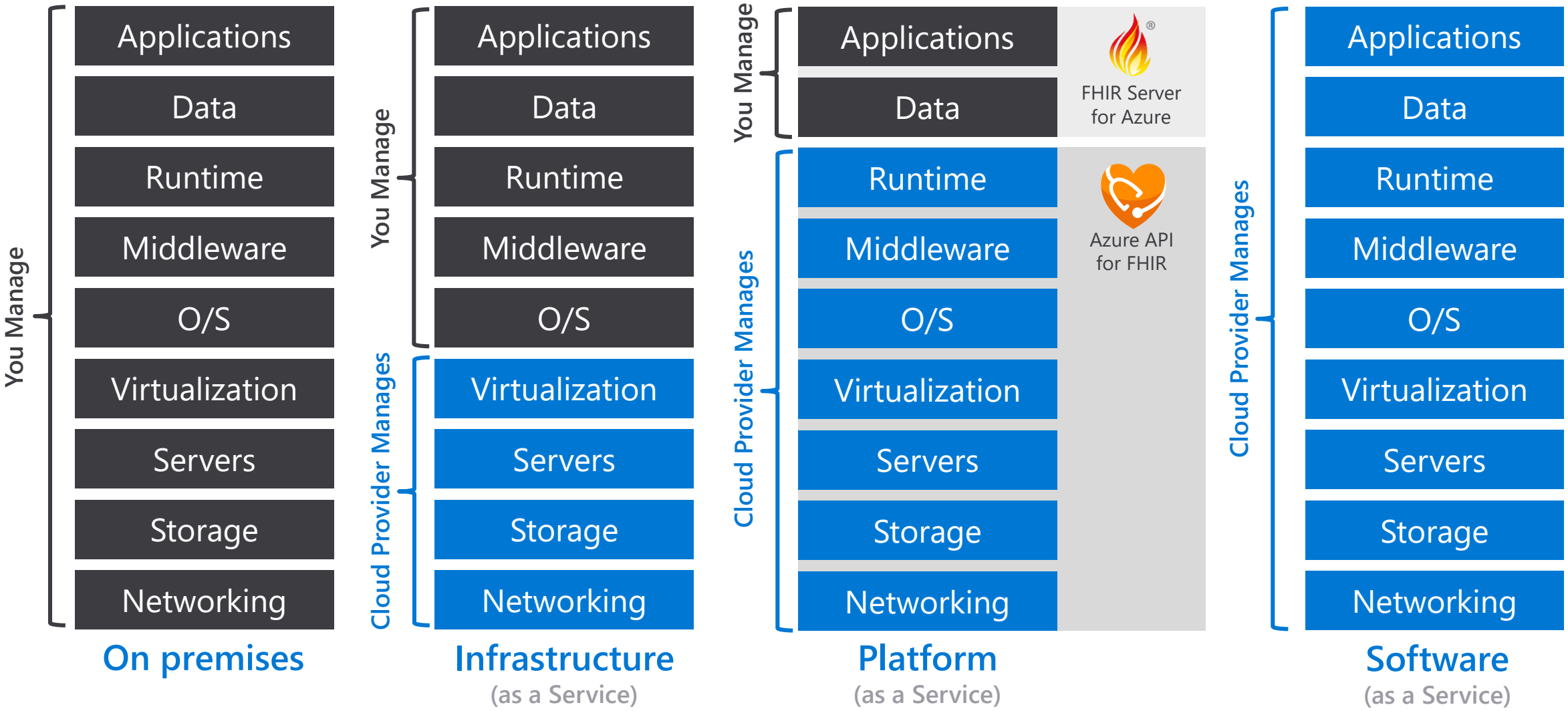
Supports FHIR STU3 and FHIR R4 versions.

Data is isolated and protected with layered, in-depth defense and advanced threat protection according to the most stringent industry compliance standards.



http://aka.ms/fhir

Cloud Models



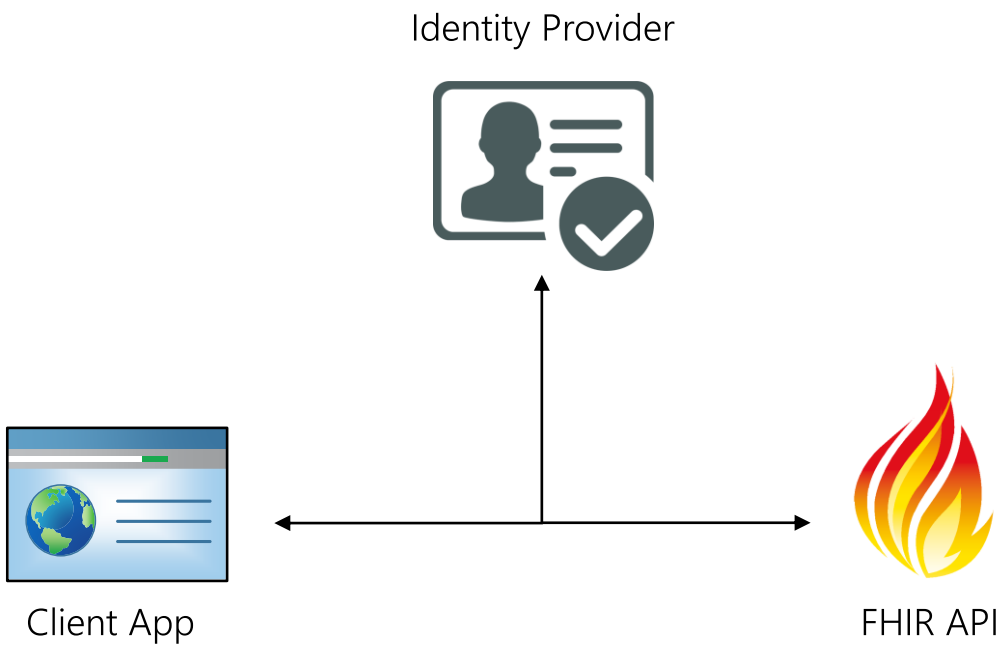
54 regions worldwide **140** available in 140 countries

Azure API for FHIR

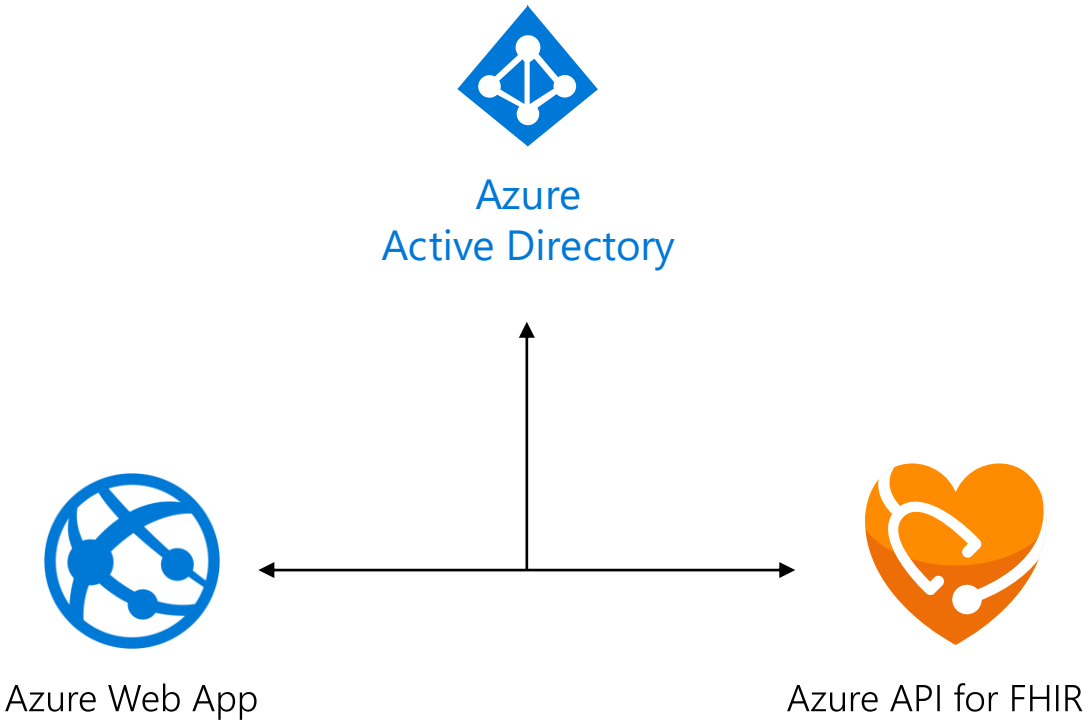
Available in 10 Regions, expanding to >20

* Two Azure Government Secret region locations undisclosed

A SIMPLE FHIR SANDBOX

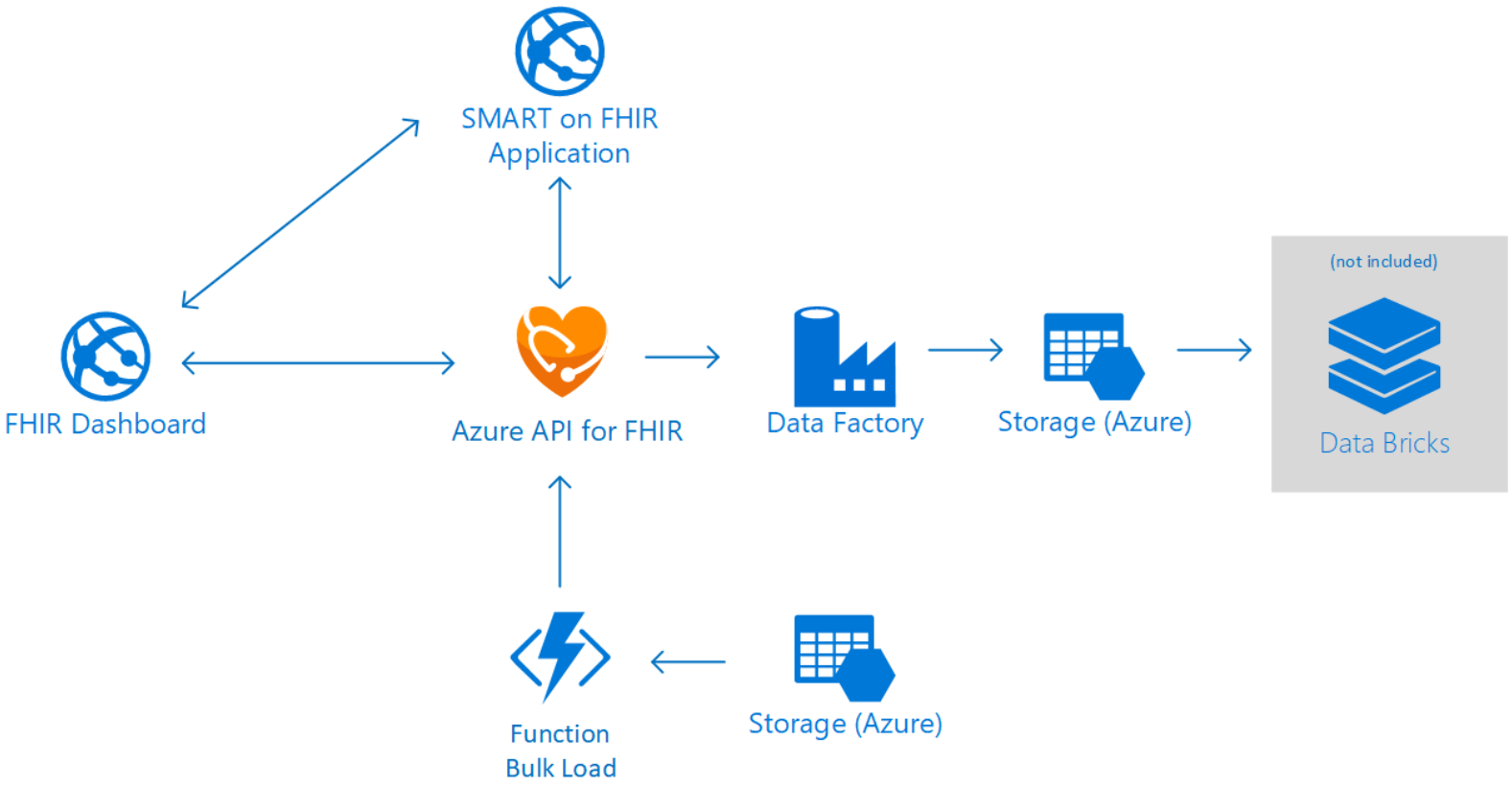


TINY SANDBOX



https://github.com/hansenms/FHIRDevDays-Amsterdam2019

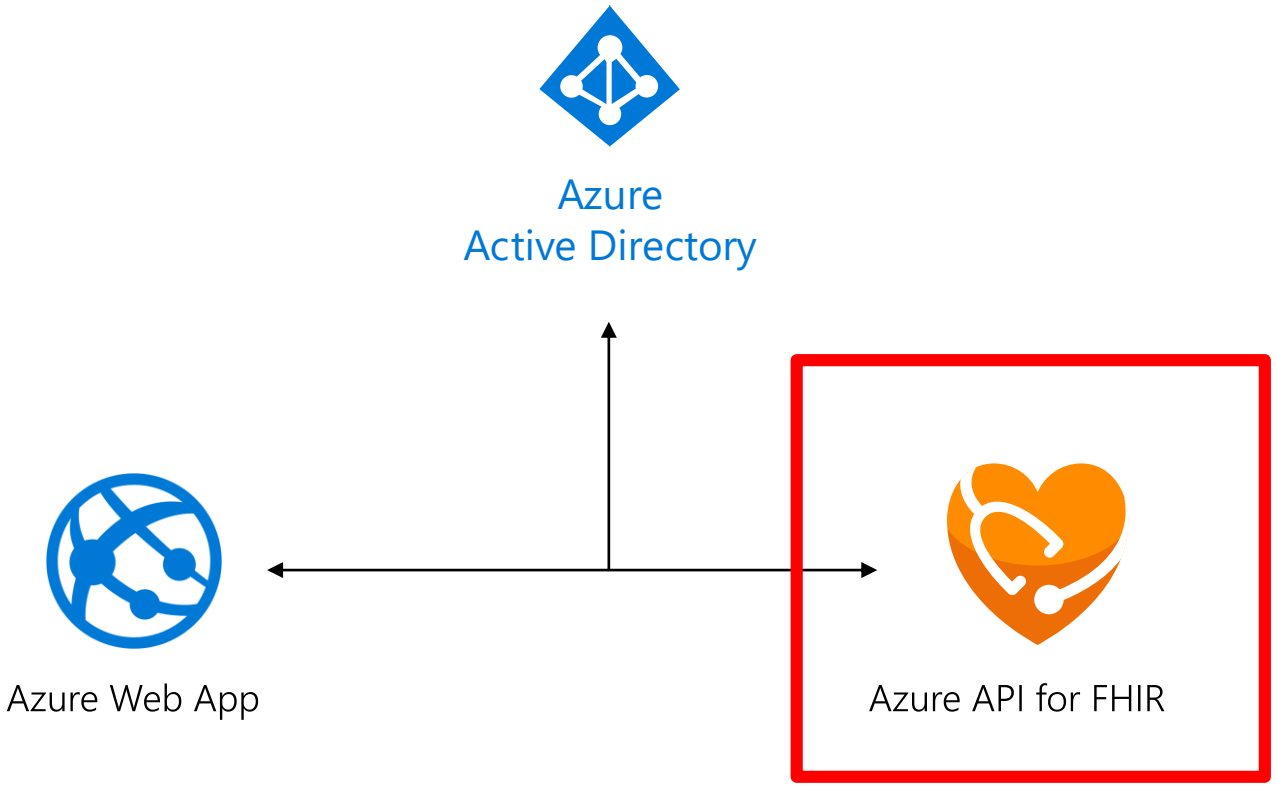
LARGE SANDBOX



https://github.com/Microsoft/fhir-server-samples

FHIR API

TINY SANDBOX



https://github.com/hansenms/FHIRDevDays-Amsterdam2019

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https://portal.azure.com/#home

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Recent resources

NAME	TYPE	LAST VIEWED
allstarsports.fun	Resource group	Just now
allstarsports	App Service	3 mo ago
MSDN Personal	Subscription	5 mo ago
kostelbsearch	Search service	6 mo ago
kostelbcosmos	Azure Cosmos DB account	6 mo ago
brendas	Resource group	6 mo ago

Navigate

- Subscriptions
- Resource groups
- All resources
- Dashboard

Tools

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Learn Azure with free online training from Microsoft

Azure Monitor
Monitor your apps and infrastructure

Security Center
Secure your apps and infrastructure

Cost Management
Analyze and optimize your cloud spend for free

Useful links

Technical Documentation
Azure Services
Recent Azure Updates
Azure Migration Tools
Find an Azure expert
Quickstart Center

Azure mobile app

Download on the App Store
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New - Microsoft Azure

https://portal.azure.com/#create/hub

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New

fhir

- Azure API for FHIR
- Firewall
- Fairwinds Polaris
- CloudGuard IaaS - Firewall & Threat Prevention
- md test 1017

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Internet of Things
Media
Mixed Reality
IT & Management Tools
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Azure API for FHIR
Microsoft

Azure API for FHIR

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Microsoft

Create

The Azure API for FHIR® is a managed, standards-based, and healthcare data platform. It enables organizations to bring their clinical health data into the cloud based on the interoperable data standard FHIR®.

FHIR helps unlock the value of data and respond to changing business dynamics more easily.

Organizations are able to bring together clinical data from multiple systems of records, normalize the data using common models and specifications, and use that data in AI workloads to derive insight and power new systems of engagement, including clinician and patient dashboards, diagnostic assistants, population health insights, and connected healthcare scenarios, such as Remote Patient Monitoring.

The Azure API for FHIR is capable of powering Internet of Medical Things (IoMT) scenarios, population health research projects, AI-powered diagnostic solutions and much more.

Security and privacy features are embedded into the service. Customers own and control patient data, knowing how it is stored and accessed.

Useful Links
HL7 FHIR Specification
FHIR Server for Azure
Documentation

Create Azure API for FHIR - Micr

https://portal.azure.com/#create/Microsoft.HealthcareAPIs

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Home > New > Azure API for FHIR > Create Azure API for FHIR

Create Azure API for FHIR

Basics * | Additional settings * | Tags | Review + create

The Azure API for FHIR® is a managed, standards-based, and compliant healthcare data platform. It enables organizations to bring their clinical health data into the cloud based on the interoperable data standard FHIR®.

Project details

Subscription * MSDN Personal

Resource group * (New) fhirdevdays-amsterdam

Create new

Instance details

Account name * amsterdam1

.azurehealthcareapis.com

Location * West Europe

FHIR Version * R4

Review + create | Next: Additional settings >

Microsoft.HealthcareAPIs-20191

https://portal.azure.com/#blade/HubsExtension/DeploymentDetailsBlade/overview/id/%2Fsubscriptions%2F2e992723-c586-4fac-8843-3b8ece43d6da%2FresourceGroups%2Ffhirdevdays-amsterdam%...

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Home > Microsoft.HealthcareAPIs-20191106130338 - Overview

Microsoft.HealthcareAPIs-20191106130338 - Overview

Deployment

Search (Ctrl+/)

- Overview
- Inputs
- Outputs
- Template

Delete | Cancel | Redeploy | Refresh

Your deployment is complete

Deployment name: Microsoft.HealthcareAPIs-20191106130338
Subscription: MSDN Personal
Resource group: fhirdevdays-amsterdam

Start time: 11/6/2019, 1:03:43 PM
Correlation ID: f202538d-b462-4bae-a2d9-974cfb42cd3c

Deployment details (Download)

Next steps

Go to resource

Security Center
Secure your apps and infrastructure
Go to Azure security center >

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Work with an expert
Azure experts are service provider partners who can help manage your assets on Azure and be your first line of support.
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amsterdam1 - Microsoft Azure

https://portal.azure.com/#@cloudynerd.onmicrosoft.com/resource/subscriptions/2e992723-c586-4fac-8843-3b8ece43d6da/resourcegroups/fhirdevdays-amsterdam/providers/Microsoft.HealthcareApi...

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amsterdam1

Azure API for FHIR

Search (Ctrl+/)

- Overview
- Activity log
- Access control (IAM)
- Tags

Settings

- Authentication
- CORS
- Cosmos DB
- Locks
- Export template

Monitoring

- Metrics
- Diagnostic settings
- Logs

Support + troubleshooting

- New support request

Refresh | Move | Delete

Resource group (change)	: fhirdevdays-amsterdam
Status	: Online
Location	: West Europe
Subscription (change)	: MSDN Personal
Subscription ID	: 2e992723-c586-4fac-8843-3b8ece43d6da
Tags (change)	: Click here to add tags
FHIR metadata endpoint	: https://amsterdam1.azurehealthcareapis.com/metadata
Cosmos DB throughput ...	: 400
FHIR Version	: R4

Links

Getting started with your FHIR service.
Learn how to access your FHIR service.

How to obtain your OAuth access token
How to access your service using Postman

amsterdam1 - CORS - Microsoft

https://portal.azure.com/#@cloudynerd.onmicrosoft.com/resource/subscriptions/2e992723-c586-4fac-8843-3b8ece43d6da/resourcegroups/fhirdevdays-amsterdam/providers/Microsoft.HealthcareApi...

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Home > Microsoft.HealthcareAPIs-20191106130338 - Overview > amsterdam1 - CORS

amsterdam1 - CORS

Azure API for FHIR

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- Tags

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Save | Discard | Refresh

Cross-origin resource sharing (CORS) is a security mechanism that allows a web page from one domain or origin to access a resource with a different domain (a cross-domain request). Without features like CORS, websites are restricted to accessing resources from the same origin through what is known as same-origin policy. Please refer to https://docs.microsoft.com/azure/healthcare-apis/configure-cross-origin-resource-sharing for details on how to configure CORS.

Origins: *

Headers: *

Methods: 6 selected

Max age: 600

Allow credentials: ☐

New - Microsoft Azure

https://portal.azure.com/#create/hub

Microsoft Azure

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Home > New

New

log a

- Log Analytics
- Log Analyzer
- Activity Log Analytics
- Azure Log Analytics Agent Health
- FortiAnalyzer Centralized Log Analytics

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https://portal.azure.com/#create/hub

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Home > New > Log Analytics

Log Analytics
Microsoft

Log Analytics

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Create

Create a new workspace
Workspace provides visibility and insight across all the machines you manage through Operations Management Suite, including Log Analytics. Workspace stores collected machine data in a region you have specified. To create a new workspace, select the Create button below.

Link an existing workspace to Azure subscription
Do you have an existing workspace in the OMS portal? You can link your workspace with your Azure subscription by selecting the Create button below.

About Log Analytics
The Microsoft Operations Management Suite (OMS) takes IT management solutions to the cloud and gives you greater control and new capabilities across your hybrid cloud. Manage and protect Azure or AWS, Windows Server or Linux, VMware or OpenStack with a cost-effective, all-in-one cloud IT management solution

Useful Links
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Documentation

Log Analytics workspace - Micro

https://portal.azure.com/#create/Microsoft.LogAnalyticsOMS

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Home > New > Log Analytics > Log Analytics workspace

Log Analytics workspace

Create new or link existing workspace

Create New Link Existing

Log Analytics Workspace *

fhirdevdays

Subscription *

MSDN Personal

Resource group *

fhirdevdays-amsterdam

Create new

Location *

West Europe

*Pricing tier

Per GB (2018)

OK

amsterdam1 - Diagnostic setting

https://portal.azure.com/#@cloudynerd.onmicrosoft.com/resource/subscriptions/2e992723-c586-4fac-8843-3b8ece43d6da/resourcegroups/fhirdevdays-amsterdam/providers/Microsoft.HealthcareApi...

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amsterdam1 - Diagnostic settings

Azure API for FHIR

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Support + troubleshooting

- New support request

Refresh

Subscription *	Resource group	Resource type	Resource
MSDN Personal	fhirdevdays-amsterdam	0 selected	amsterdam1

MSDN Personal > fhirdevdays-amsterdam > amsterdam1

Diagnostics settings

Name	Storage account	Event hub	Log analytic	Edit setting
No diagnostic settings defined				

+ Add diagnostic setting

Click 'Add Diagnostic setting' above to configure the collection of the following data:

- AuditLogs
- Errors
- Traffic
- Availability
- Saturation

Diagnostics settings - Microsoft

https://portal.azure.com/#@cloudynerd.onmicrosoft.com/resource/subscriptions/2e992723-c586-4fac-8843-3b8ece43d6da/resourcegroups/fhirdevdays-amsterdam/providers/Microsoft.HealthcareApi...

Microsoft Azure

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Home > amsterdam1 - Diagnostic settings > Diagnostics settings

Diagnostics settings

Save Discard Delete

Name *

fhir-logging

- [ ] Archive to a storage account
- [ ] Stream to an event hub
- [x] Send to Log Analytics

Subscription

MSDN Personal

Log Analytics Workspace

fhirdevdays (westeurope)

log

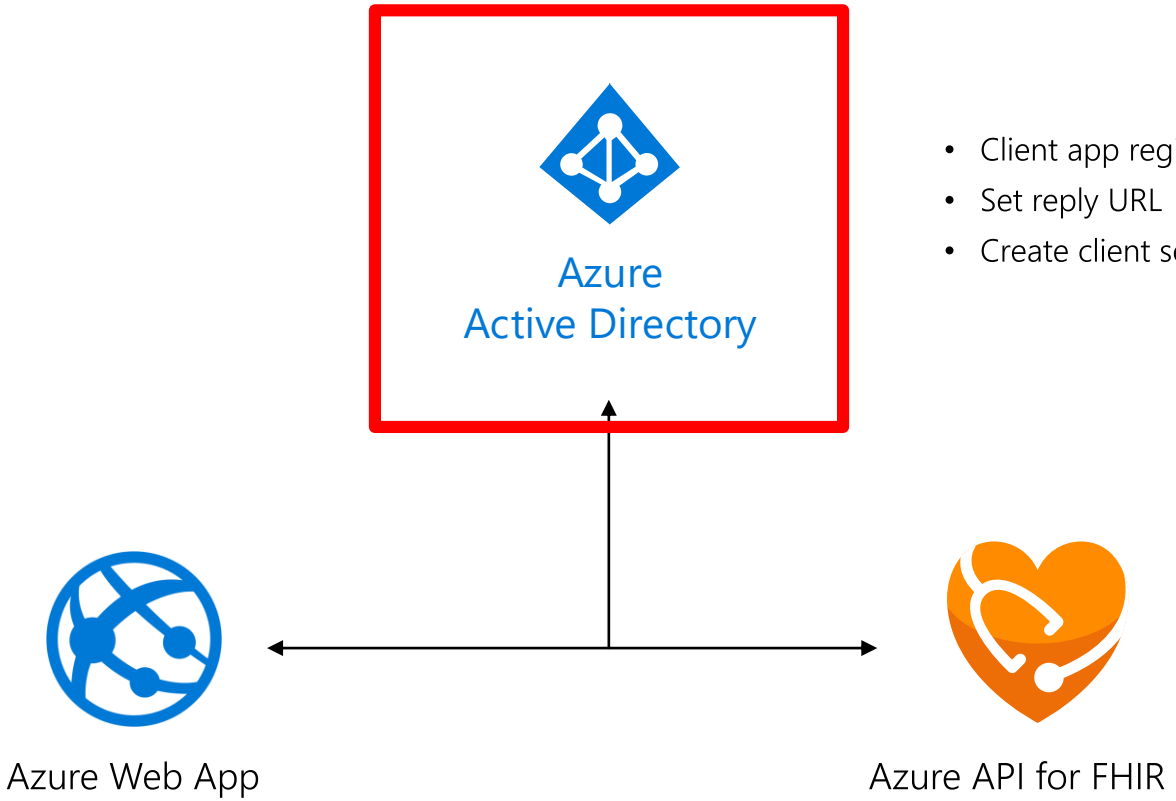
- [x] AuditLogs

metric

- [x] Errors
- [x] Traffic
- [x] Availability
- [x] Saturation

Identity Provider
Client Application Registration

TINY SANDBOX



- Client app registration
- Set reply URL
- Create client secret

https://github.com/hansenms/FHIRDevDays-Amsterdam2019

Home - Microsoft Azure

https://portal.azure.com/#home

Microsoft Azure

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Recent resources

NAME	TYPE	LAST VIEWED
amsterdam1	Azure API for FHIR	4 min ago
allstarsports.fun	Resource group	2 h ago
allstarsports	App Service	3 mo ago
MSDN Personal	Subscription	5 mo ago
kostelbsearch	Search service	6 mo ago
kostelbcosmos	Azure Cosmos DB account	6 mo ago
brendas	Resource group	6 mo ago

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cloudynerd - App registrations

https://portal.azure.com/#blade/Microsoft_AAD_IAM/ActiveDirectoryMenuBlade/RegisteredApps

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Azure Active Directory

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- Overview
- Getting started

Manage

- Users
- Groups
- Organizational relationships
- Roles and administrators
- Enterprise applications
- Devices
- App registrations
- Identity Governance
- Application proxy
- Licenses
- Azure AD Connect
- Custom domain names
- Mobility (MDM and MAM)
- Password reset
- Company branding
- User settings
- Properties
- Notifications settings
- Security

Monitoring

- Sign-ins
- Audit logs
- Provisioning logs (Preview)
- Logs
- Diagnostic settings

+ New registration | Endpoints | Troubleshooting | Got feedback?

Welcome to the new and improved App registrations (now Generally Available). See what's new →

Looking to learn how it's changed from App registrations (Legacy)? Learn more
Still want to use App registrations (Legacy)? Go back and tell us why

All applications | Owned applications | Applications from personal account

Start typing a name or Application ID to filter these results

Display name	Application (client) ID	Created On	Certificates & secrets
OD odataonfhir	99ba41a6-75c3-4c6d-9e80-4a1f4f73c76a	11/4/2019	-

Register an application - Microsc

https://portal.azure.com/#blade/Microsoft_AAD_IAM/ActiveDirectoryMenuBlade/RegisteredApps

Microsoft Azure

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Home > cloudynerd - App registrations > Register an application

Register an application

* Name

The user-facing display name for this application (this can be changed later).

fhir-public-client

Supported account types

Who can use this application or access this API?

- (●) Accounts in this organizational directory only (cloudynerd only - Single tenant)
- ( ) Accounts in any organizational directory (Any Azure AD directory - Multitenant)
- ( ) Accounts in any organizational directory (Any Azure AD directory - Multitenant) and personal Microsoft accounts (e.g. Skype, Xbox)

Help me choose...

Redirect URI (optional)

We'll return the authentication response to this URI after successfully authenticating the user. Providing this now is optional and it can be changed later, but a value is required for most authentication scenarios.

Public client/native (mobile & ... | https://www.getpostman.com/oauth2/callback

By proceeding, you agree to the Microsoft Platform Policies

Register

fhir-public-client - Microsoft Azu

https://portal.azure.com/#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/Overview/quickStartType//sourceType/Microsoft_AAD_IAM/appId/af27cac8-17f3-4fed-b1fe-404a712fffaa/objec...

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Home > cloudynerd - App registrations > fhir-public-client

fhir-public-client

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Manage

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- Authentication
- Certificates & secrets
- API permissions
- Expose an API
- Owners
- Roles and administrators (Previ...
- Manifest

Support + Troubleshooting

- Troubleshooting
- New support request

Delete | Endpoints

Display name	fhir-public-client
Application (client) ID	af27cac8-17f3-4fed-b1fe-404a712fffaa
Directory (tenant) ID	: 0b471a55-87d-4900-8664-6c9b75610fc3
Object ID	: e964b7cf-aadf-482d-a14c-ccccf4930f26
Supported account types	: My organization only
Redirect URIs	: 0 web, 1 public client
Application ID URI	: Add an Application ID URI
Managed application in ...	: fhir-public-client

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Call APIs

Build more powerful apps with rich user and business data from Microsoft services and your own company's data sources.

View API permissions

Documentation

- Microsoft identity platform
- Authentication scenarios
- Authentication libraries
- Code samples
- Microsoft Graph
- Glossary
- Help and Support

Sign in users in 5 minutes

Use our SDKs to sign in users and call APIs in a few steps

View all quickstart guides

fhir-public-client - Authenticatio

https://portal.azure.com/#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/Authentication/appId/af27cac8-17f3-4fed-b1fe-404a712fffaa/isMSAApp/

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Home > cloudynerd - App registrations > fhir-public-client - Authentication

fhir-public-client - Authentication

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- New support request

Save | Discard | Try out the new experience | Got feedback?

Redirect URIs

The URIs that we will accept as destinations when returning authentication responses (tokens) after successfully authenticating users. Also referred to as reply URLs.
Learn more about adding support for web, mobile and desktop clients

Type	Redirect URI
Public client/native (mobile & desktop)	http://localhost:9090/index.html
Public client/native (mobile & desktop)	https://www.getpostman.com/oauth2/callback
Web	e.g. https://myapp.com/auth

Suggested Redirect URIs for public clients (mobile, desktop)

If you are using the Microsoft Authentication Library (MSAL) or the Active Directory Authentication Library (ADAL) to build applications for desktop or mobile devices, you may select from the suggested Redirect URIs below or enter a custom redirect URI above. For more information, refer to the library documentation.

- [ ] msalaf27cac8-17f3-4fed-b1fe-404a712fffaa://auth (MSAL only)
- [ ] https://login.microsoftonline.com/common/oauth2/nativeclient
- [ ] https://login.live.com/oauth20_desktop.srf (LiveSDK)

Advanced settings

Logout URL: e.g. https://myapp.com/logout

Implicit grant

Allows an application to request a token directly from the authorization endpoint. Recommended only if the application has a single page architecture (SPA), has no backend components, or invokes a Web API via JavaScript. Learn more about the implicit grant flow

To enable the implicit grant flow, select the tokens you would like to be issued by the authorization endpoint:

- [x] Access tokens
- [x] ID tokens

Default client type

Treat application as a public client.
Required for the use of the following flows where a redirect URI is not used:

Yes | No

fhir-public-client - API permissio

https://portal.azure.com/#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/CallAnAPI/quickStartType//sourceType/Microsoft_AAD_IAM/appId/af27cac8-17f3-4fed-b1fe-404a712fffaa/obje...

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Home > cloudynerd - App registrations > fhir-public-client - API permissions

fhir-public-client - API permissions

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- Owners
- Roles and administrators (Previ...
- Manifest

Support + Troubleshooting

- Troubleshooting
- New support request

API permissions

Applications are authorized to call APIs when they are granted permissions by users/admins as part of the consent process. The list of configured permissions should include all the permissions the application needs.

+ Add a permission

API / Permissions name	Type	Description	Admin Consent Required	Status
Microsoft Graph (1)				
User.Read	Delegated	Sign in and read user profile	-	

These are the permissions that this application requests statically. You may also request user consent-able permissions dynamically through code. See best practices for requesting permissions

Grant consent

These permissions have been granted for undefined but aren't in the configured permissions list. If your application requires these permissions, you should consider adding them to the configured permissions list.

Grant admin consent for cloudynerd

Request API permissions - Micro

https://portal.azure.com/#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/CallAnAPI/quickStartType//sourceType/Microsoft_AAD_IAM/appId/af27cac8-17f3-4fed-b1fe-404a712fffaa/obje...

Microsoft Azure

Search resources, services, and docs (G+/)

cloudynerd@outlook.co...
CLOUDYNERD (CLOUDYNERD.O...

Home > cloudynerd - App registrations > fhir-public-client - API permissions

fhir-public-client - API permissions

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- Overview
- Quickstart

Manage

- Branding
- Authentication
- Certificates & secrets
- API permissions
- Expose an API
- Owners
- Roles and administrators (Previ...
- Manifest

Support + Troubleshooting

- Troubleshooting
- New support request

API permissions

Applications are authorized to call APIs when they are granted permissions by users/admins as part of the consent process. The list of c
all the permissions the application needs.

+ Add a permission

API / Permissions name	Type	Description	Admin Consent Re
Microsoft Graph (1)			
User.Read	Delegated	Sign in and read user profile	-

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Grant admin consent for cloudynerd

Request API permissions

Select an API

Microsoft APIs | APIs my organization uses | My APIs

Apps in your directory that expose APIs are shown below

Azure He

Name	Application (client) ID
Azure Healthcare APIs	4f6778d8-5aef-43dc-a1ff-b073724b9495

Request API permissions - Micro

https://portal.azure.com/#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/CallAnAPI/quickStartType//sourceType/Microsoft_AAD_IAM/appId/af27cac8-17f3-4fed-b1fe-404a712fffaa/obje...

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fhir-public-client - API permissions

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Grant admin consent for cloudynerd

Request API permissions

< All APIs

AH Azure Healthcare APIs
https://azurehealthcareapis.com

What type of permissions does your application require?

Delegated permissions
Your application needs to access the API as the signed-in user.

Application permissions
Your application runs as a background service or daemon without a signed-in user.

Select permissions

expand all

Type to search

Permission	Admin Consent Required
☑ user_impersonation Access Azure Healthcare APIs	-

Add permissions | Discard

fhir-public-client - API permissio

https://portal.azure.com/#blade/Microsoft_AAD_RegisteredApps/ApplicationMenuBlade/CallAnAPI/quickStartType//sourceType/Microsoft_AAD_IAM/appId/af27cac8-17f3-4fed-b1fe-404a712fffaa/obje...

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Home > cloudynerd - App registrations > fhir-public-client - API permissions

fhir-public-client - API permissions

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Support + Troubleshooting

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- New support request

Permissions have changed, please wait a few minutes and then grant admin consent. Users and/or admins will have to consent even if they have already done so previously.

API permissions

Applications are authorized to call APIs when they are granted permissions by users/admins as part of the consent process. The list of configured permissions should include all the permissions the application needs.

+ Add a permission

API / Permissions name	Type	Description	Admin Consent Required	Status
Azure Healthcare APIs (1)				
user_impersonation	Delegated	Access Azure Healthcare APIs	-	
User.Read	Delegated	Sign in and read user profile	-	

These are the permissions that this application requests statically. You may also request user consent-able permissions dynamically through code. See best practices for requesting permissions

Grant consent

These permissions have been granted for undefined but aren't in the configured permissions list. If your application requires these permissions, you should consider adding them to the configured permissions list.

Grant admin consent for cloudynerd

Testing FHIR API

Postman

File Edit View Help

New Import Runner My Workspace Invite Upgrade

No Environment

Untitled Request

Comments (0)

GET https://amsterdam1.azurehealthcareapis.com/metadata Send Save

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies Code

TYPE

No Auth

This request does not use any authorization. Learn more about authorization

Body Cookies Headers (8) Test Results Status: 200 OK Time: 441ms Size: 488.11 KB Save Response

Pretty Raw Preview Visualize BETA JSON


```
{
    "resourceType": "CapabilityStatement",
    "id": "#metadata",
    "url": "https://amsterdam1.azurehealthcareapis.com/metadata",
    "version": "1.0.0.0",
    "name": "Microsoft FHIR Server Capability Statement",
    "status": "active",
    "experimental": true,
    "publisher": "Microsoft Corporation",
    "contact": [
        {
            "telecom": [
                {
                    "system": "url",
                    "value": "http://www.microsoft.com"
                }
            ]
        }
    ],
    "software": {
        "name": "Microsoft FHIR Server",
        "version": "1.0.0.0"
    },
    "fhirVersion": "4.0.0",
    "format": [
        "application/fhir+json"
    ],
    "rest": [
        {
            "mode": "server",
            "documentation": "Microsoft implementation of the FHIR Specification",
            "security": {
                "extension": [
```


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Postman

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New Import Runner My Workspace Invite Upgrade

No Environment

Untitled Request

Comments (0)

GET https://amsterdam1.azurehealthcareapis.com/Patient Send Save

Params Authorization Headers (7) Body Pre-request Script Tests Settings Cookies Code

TYPE

No Auth

This request does not use any authorization. Learn more about authorization

Body Cookies Headers (9) Test Results

Status: 401 Unauthorized Time: 4ms Size: 562 B Save Response

Pretty Raw Preview Visualize BETA JSON


```
{
    "resourceType": "OperationOutcome",
    "id": "b850b5af2956b941bb5ea39b29c3fcd4",
    "issue": [
        {
            "severity": "error",
            "code": "login",
            "diagnostics": "Authentication failed."
        }
    ]
}
```


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No Environment

Untitled Request

Comments (0)

GET https://amsterdam1.azurehealthcareapis.com/Patient Send Save

Params Authorization Headers (7) Body Pre-request Script Tests Cookies Code

TYPE

OAuth 2.0

The authorization data will be automatically generated when you send the request. Learn more about authorization

Add authorization data to

Request Headers

Preview Request

Access To... ENlRlZxeWFHckdOdWVoSklpTDRkZmp6dyIsImtpZCI6IkJCOENlRl... Available Tokens

Body Cookies Headers (9) Test Results Status: 401 Unauthorized Time: 454ms Size: 562 B Save Response

Pretty Raw Preview Visualize BETA JSON


```
{
    "resourceType": "OperationOutcome",
    "id": "b850b5af2956b941bb5ea39b29c3fcd4",
    "issue": [
        {
            "severity": "error",
            "code": "login",
            "diagnostics": "Authentication failed."
        }
    ]
}
```


GET NEW ACCESS TOKEN

Token Name	FHIR Service
Grant Type	Authorization Code
Callback URL	https://www.getpostman.com/oauth2/callback
Auth URL	https://login.microsoftonline.com/cloudynerd.onmicrosoft.com/oauth2/authorize?resource=https://azurehealthcareapis.com
Access Token URL	https://login.microsoftonline.com/cloudynerd.onmicrosoft.com/oau...
Client ID	af27cac8-17f3-4fed-b1fe-404a712fffaa
Client Secret	Client Secret
Scope	e.g. read:org
State	State
Client Authentication	Send client credentials in body

Request Token

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New Import Runner My Workspace Invite Upgrade

No Environment

Untitled Request

GET https://amsterdam1.azurehealthcareapis.com/Patient Send Save

Params Authorization Headers (7) Body Pre-request Script Tests Cookies Code

TYPE

OAuth 2.0

The authorization data will be automatically generated when you send the request. Learn more about authorization

Add authorization data to

Request Headers

Preview Request

Sign in to your account

File Edit View Help

Microsoft

Sign in

cloudynerd@outlook.com

Can't access your account?

Sign-in options

Back Next

Terms of use Privacy & cookies ...

Body Cookies Headers (9) Test Results

Status: 401 Unauthorized Time: 454ms Size: 562 B Save Response

Pretty Raw Preview Visualize BETA JSON


```
{
    "resourceType": "OperationOutcome",
    "id": "b850b5af2956b941bb5ea39b29c3fcd4",
    "issue": [
        {
            "severity": "error",
            "code": "login",
            "diagnostics": "Authentication failed."
        }
    ]
}
```


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New Import Runner My Workspace Invite Upgrade

No Environment

Untitled Request

GET https://amsterdam1.azurehealthcareapis.com/Patient Send Save

Comments (0)

Params Authorization Headers (7) Body Pre-request Script Tests Cookies Code

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Preview Request

...ommend using variables. Learn more about variables

...eWFHckdOdWVoSklpTDRkZmp6dyIsImtpZCI6IkJCOENlRl... Available Tokens

Sign in to your account

File Edit View Help

Microsoft

cloudynerd@outlook.com

Permissions requested

fhir-public-client

App info

This app would like to:

- Access Azure Healthcare APIs
- Sign you in and read your profile
- Consent on behalf of your organization

Accepting these permissions means that you allow this app to use your data as specified in their terms of service and privacy statement. You can change these permissions at https://myapps.microsoft.com. Show details

Cancel Accept

Terms of use Privacy & cookies ...

Body Cookies Headers (9) Test Results

Status: 401 Unauthorized Time: 454ms Size: 562 B Save Response

Pretty Raw Preview Visualize BETA JSON


```
{
    "resourceType": "OperationOutcome",
    "id": "b850b5af2956b941bb5ea39b29c3fcd4",
    "issue": [
        {
            "severity": "error",
            "code": "login",
            "diagnostics": "Authentication failed."
        }
    ]
}
```


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No Environment

Untitled Request

Comments (0)

GET https://amsterdam1.azurehealthcareapis.com/Patient Send Save

Params | Authorization | Headers (7) | Body | Pre-request Script | Cookies | Code

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dOdWVoSklpTDRkZmp6dyIsImtpZCI6IkJCOENlRl... | Available Tokens

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Status: 401 Unauthorized | Time: 454ms | Size: 562 B | Save Response

Pretty | Raw | Preview | Visualize BETA | JSON


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{
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    "issue": [
        {
            "severity": "error",
            "code": "login",
            "diagnostics": "Authentication failed."
        }
    ]
}
```


MANAGE ACCESS TOKENS

ALL TOKENS

Token Name

Token Name

Token Name

Token Name

Token Name

Token Name

Token Name

FHIR Service

FHIR Service

Token Name: FHIR Service

Access Token:

eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsIng1dCI6IkJCOENlRlZxeWFHckdOdWVoSklpTDRkZmp6dyIsImtpZCI6IkJCOENlRlZxeWFHckdOdWVoSklpTDRkZmp6dyJ9.eyJhdWQiOiJodHRwczovL2F6dXJlaGVhbHRoY2FyZWFwaXMuY29tIiwiaXNzIjoiaHR0cHM6Ly9zdHMud2luZG93cy5uZXQvMGI0NzFhNTUtODdmZC00OTAwLTg2NjQtNmM5Yjc1NjEwMWMzLyIsImlhdCI6MTU3MzA4MjU5NiwibmJmIjoxNTczMDgyNTk2LCJleHAiOjE1NzMwODY0OTYsImFjciI6IjEiLCJhaW8iOiJBVVFBdS84TkFBQUFhRFEVWNYYmtiZ3BNOWxGVDNvelZZZklrT1NuL3pKZEZocmtvSDJJanM2Y0FTMUQzbElTWFlmOVhvRXdlVy93KzZiRmZ6ZSs5UlhPYk1OK3NCUzNzZz09IiwiYWx0c2VjaWQiOiIxOmxpdmUuY29tOjAwMDM0MDAxOTlDRUFEM0QiLCJhbXIiOlsicHdkIl0sImFwcGlkIjoiYWYyN2NhYzgtMTdmMy00ZmVkLWIxZmUtNDA0YTcxMmZmZmFhIiwiYXBwaWRhY3IiOiIwIiwiZW1haWwiOiJjbG91ZHluZXJkQG91dGxvb2suY29tIiwiZmFtaWx5X25hbWUiOiJlYW5zZW4iLCJnaXZlbl9uYW

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New | Import | Runner | My Workspace | Invite | Upgrade

No Environment

Untitled Request

Comments (0)

GET https://amsterdam1.azurehealthcareapis.com/Patient

Send | Save

Params | Authorization | Headers (8) | Body | Pre-request Script | Tests | Settings | Cookies | Code

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Preview Request

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Access Token

eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsIng1dCI6IkJCOENlRlZxeWFHckdOdWVoSklpTDRkZmp6dyIsImtpZCI6IkJCOENlRl...

Available Tokens

Get New Access Token

Body | Cookies | Headers (10) | Test Results

Status: 200 OK | Time: 1308ms | Size: 653 B | Save Response

Pretty | Raw | Preview | Visualize BETA | JSON


```
{
    "resourceType": "Bundle",
    "id": "b6b9fb967d23d8499f6fbc6e559b3b31",
    "meta": {
        "lastUpdated": "2019-11-06T23:28:50.338885+00:00"
    },
    "type": "searchset",
    "link": [
        {
            "relation": "self",
            "url": "https://amsterdam1.azurehealthcareapis.com/Patient"
        }
    ]
}
```


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File Edit View Help

New | Import | Runner | My Workspace | Invite | Upgrade

No Environment

Untitled Request

Comments (0)

POST https://amsterdam1.azurehealthcareapis.com/Patient

Send | Save

Params | Authorization | Headers (9) | Body | Pre-request Script | Tests | Settings | Cookies | Code

none | form-data | x-www-form-urlencoded | raw | binary | GraphQL BETA | JSON | Beautify

```
{
    "resourceType": "Patient",
    "active": true,
    "name": [
        {
            "use": "official",
            "family": "Kirk",
            "given": [
                "James",
                "Tiberious"
            ]
        },
        {
            "use": "usual",
            "given": [
                "Jim"
            ]
        }
    ],
    "gender": "male",
    "birthDate": "1960-12-25"
}
```

Body | Cookies | Headers (10) | Test Results

Status: 200 OK | Time: 1308ms | Size: 653 B | Save Response

Pretty | Raw | Preview | Visualize BETA | JSON

```
{
    "resourceType": "Bundle",
    "id": "b6b9fb967d23d8499f6fbc6e559b3b31",
    "meta": {
        "lastUpdated": "2019-11-06T23:28:50.338885+00:00"
    },
    "type": "searchset",
    "link": [
        {
            "relation": "self",
            "url": "https://amsterdam1.azurehealthcareapis.com/Patient"
        }
    ]
}
```

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File Edit View Help

New | Import | Runner | My Workspace | Invite | Upgrade

No Environment

Untitled Request

Comments (0)

POST https://amsterdam1.azurehealthcareapis.com/Patient Send Save

Params | Authorization | Headers (10) | Body | Pre-request Script | Tests | Settings | Cookies | Code

none | form-data | x-www-form-urlencoded | raw | binary | GraphQL BETA | JSON | Beautify


```
{
    "resourceType": "Patient",
    "active": true,
    "name": [
        {
            "use": "official",
            "family": "Kirk",
            "given": [
                "James",
                "Tiberious"
            ]
        },
        {
            "use": "usual",
            "given": [
                "Jim"
            ]
        }
    ],
    "gender": "male",
    "birthDate": "1960-12-25"
}
```


Body | Cookies | Headers (13) | Test Results

Status: 201 Created | Time: 1354ms | Size: 900 B | Save Response

Pretty | Raw | Preview | Visualize BETA | JSON


```
{
    "resourceType": "Patient",
    "id": "9f0a133f-8fbe-4969-9700-bd5e4f324e84",
    "meta": {
        "versionId": "1",
        "lastUpdated": "2019-11-06T23:30:14.33+00:00"
    },
    "active": true,
    "name": [
        {
            "use": "official",
            "family": "Kirk",
            "given": [
                "James",
                "Tiberious"
```


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File Edit View Help

New | Import | Runner | My Workspace | Invite | Upgrade

No Environment

Untitled Request

Comments (0)

GET https://amsterdam1.azurehealthcareapis.com/Patient

Send | Save

Params | Authorization | Headers (10) | Body | Pre-request Script | Tests | Settings | Cookies | Code

TYPE

OAuth 2.0

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Available Tokens

Get New Access Token

Body | Cookies | Headers (10) | Test Results

Status: 200 OK | Time: 335ms | Size: 1.08 KB | Save Response

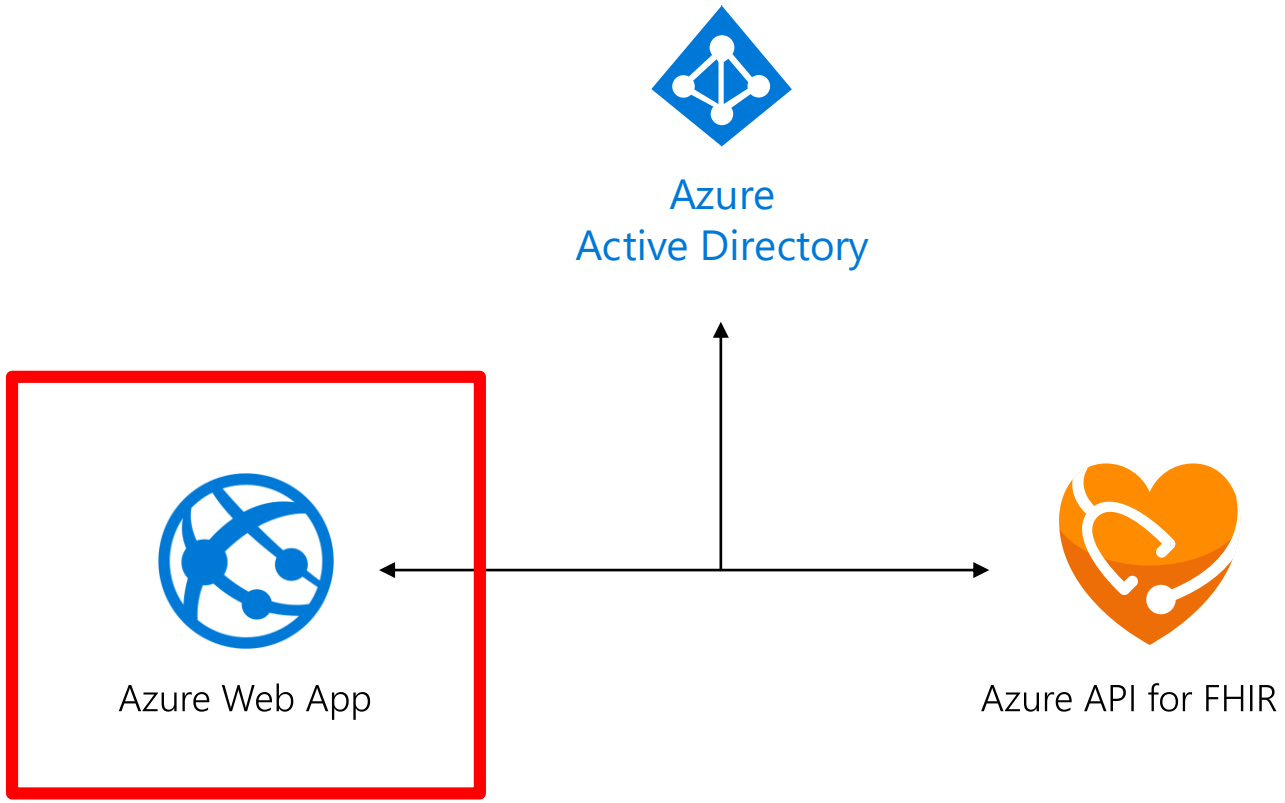
Pretty | Raw | Preview | Visualize BETA | JSON


```
{
    "resourceType": "Bundle",
    "id": "e7081039c6eede438e32f6a6614044be",
    "meta": {
        "lastUpdated": "2019-11-06T23:30:42.9637422+00:00"
    },
    "type": "searchset",
    "link": [
        {
            "relation": "self",
            "url": "https://amsterdam1.azurehealthcareapis.com/Patient"
        }
    ],
    "entry": [
        {
            "fullUrl": "https://amsterdam1.azurehealthcareapis.com/Patient/9f0a133f-8fbe-4969-9700-bd5e4f324e84",
            "resource": {
                "resourceType": "Patient",
                "id": "9f0a133f-8fbe-4969-9700-bd5e4f324e84",
                "meta": {
                    "versionId": "1",
                    "lastUpdated": "2019-11-06T23:30:14.33+00:00"
                },
                "active": true,
```


Bootcamp | Build | Browse

Web Application

TINY SANDBOX



https://github.com/hansenms/FHIRDevDays-Redmond2019

hansenms/FHIRDevDays-Amster

https://github.com/hansenms/FHIRDevDays-Amsterdam2019

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FHIR DevDays Amsterdam 2019 tutorial

Edit

Manage topics

2 commits 1 branch 0 releases 1 contributor

Branch: master New pull request Create new file Upload files Find file Clone or download

hansenms First version of app Latest commit be8b8c3 2 minutes ago

src/fhir-app	First version of app	2 minutes ago
.gitignore	Initial commit	3 days ago
README.md	First version of app	2 minutes ago

README.md

FHIR DevDays November 2019

This is the Azure API for FHIR tutorial for FHIR DevDays in Amsterdam 2019.

The presentation will be on Wednesday, November 20th, 2019 at 11:55am (Wiechert room).

Slides (with tutorial screenshot).

Prerequisites

In order to work through this tutorial, you should have:

1. Azure subscription.
2. Synthea for generating data. You can grab some pre-generated data.
3. (optional) A text editor, e.g. Visual Studio Code
4. (optional) Azure CLI. Available in cloud shell.

File Edit Selection View Go Debug Terminal Help

• index.html - DevDaysNov2019 - Visual Studio Code

.gitignore .\ | README.md | .gitignore ...\fhir-app | package.json | index.html •

src > fhir-app > index.html > html > body > script

```html
<!DOCTYPE html>
<html>

<head>
    <title>FHIR Patient browser sample app</title>
    <script src="https://secure.aadcdn.microsoftonline-p.com/lib/1.0.0/js/msal.js"></script>
</head>

<body>
    <div class="leftContainer">
        <p id="WelcomeMessage">Welcome to the FHIR Patient browsing sample Application</p>
        <button id="SignIn" onclick="signIn()">Sign In</button>
    </div>

    <div id="patientTable">
    </div>

    <script>
        var msalConfig = {
            auth: {
                clientId: '79f92a91-b6d3-4d40-b29d-adb42b3608a4',
                authority: "https://login.microsoftonline.com/microsoft.onmicrosoft.com"
            },
            cache: {
                cacheLocation: "localStorage",
                storeAuthStateInCookie: true
            }
        }

        var FHIRConfig = {
            FHIRendpoint: "https://mihansenfeature1.azurehealthcareapis.com"
        }
        var requestObj = {
            scopes: ["https://azurehealthcareapis.com/user_impersonation"]
        }

        function authRedirectCallBack(error, response) {
            if (error) {
                console.log(error);
            } else {
                if (response.tokenType === "access_token") {
                    callFHIRServer(FHIRConfig.FHIRendpoint + '/Patient', 'GET', null, response.accessToken, FHIRCallback);
                }
            }
        }

        var myMSALObj = new Msal.UserAgentApplication(msalConfig);
        myMSALObj.handleRedirectCallback(authRedirectCallBack);

        function signIn() {
            myMSALObj.loginPopup(requestObj).then(function (loginResponse) {
                showWelcomeMessage();
                acquireTokenPopupAndCallFHIRServer();
            }).catch(function (error) {
                console.log(error);
```

master* ⊗ 0 ⚠ 2 ⓘ 25 | html | index.html | Docs Markdown | Ln 18, Col 13 | Spaces: 4 | UTF-8 | CRLF | HTML

fhir-public-client - Microsoft Azu

FHIR Patient browser sample app

localhost:9090/index.html

InPrivate

Welcome to the FHIR Patient browsing sample Application

Sign In

fhir-public-client - Authenticatio | FHIR Patient browser sample ap

localhost:9090/index.html

Welcome cloudynerd@outlook.com to FHIR Patient Browsing App

Sign Out

1. Kirk, James,Tiberious (9f0a133f-8fbe-4969-9700-bd5e4f324e84)

Home - Microsoft Azure | FHIR Patient browser sample ap

https://portal.azure.com/#home

Microsoft Azure

Search resources, services, and docs (G+/)

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Azure services

Create a resource | Azure Active Directory | Resource groups | Virtual machines | App Services | Storage accounts | SQL databases | Azure Database for PostgreSQL | Azure Cosmos DB | More services

Recent resources

NAME	TYPE	LAST VIEWED
amsterdam1	Azure API for FHIR	32 min ago
allstarsports.fun	Resource group	3 h ago
allstarsports	App Service	3 mo ago
MSDN Personal	Subscription	5 mo ago
kostelbsearch	Search service	6 mo ago
kostelbcosmos	Azure Cosmos DB account	6 mo ago
brendas	Resource group	6 mo ago

Navigate

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https://portal.azure.com/#create/hub

Microsoft Azure

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Home > New > Web App

Web App

Basics | Monitoring | Tags | Review + create

App Service Web Apps lets you quickly build, deploy, and scale enterprise-grade web, mobile, and API apps running on any platform. Meet rigorous performance, scalability, security and compliance requirements while using a fully managed platform to perform infrastructure maintenance. Learn more

Project Details

Select a subscription to manage deployed resources and costs. Use resource groups like folders to organize and manage all your resources.

Subscription * : MSDN Personal

Resource Group * : fhirdevdays-amsterdam

Create new

Instance Details

Name * : fhirdevdays-amsterdam .azurewebsites.net

Publish * : Code | Docker Container

Runtime stack * : .NET Core 3.0 (Current)

Operating System * : Linux | Windows

Region * : West Europe

Can't find your App Service Plan, try a different region.

App Service Plan

App Service plan pricing tier determines the location, features, cost and compute resources associated with your app. Learn more

Windows Plan (West Europe) * : (New) ASP-fhirdevdaysamsterdam-90a8

Create new

Sku and size * : **Standard S1**
100 total ACU, 1.75 GB memory
Change size

Review + create | < Previous | Next : Monitoring >

Microsoft.Web-WebApp-Portal-2 | FHIR Patient browser sample app

https://portal.azure.com/#blade/HubsExtension/DeploymentDetailsBlade/overview/id/%2Fsubscriptions%2F2e992723-c586-4fac-8843-3b8ece43d6da%2FresourceGroups%2Ffhirdevdays-amsterdam%...

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Home > Microsoft.Web-WebApp-Portal-28a1bfdc-8d44 - Overview

Microsoft.Web-WebApp-Portal-28a1bfdc-8d44 - Overview

Deployment

Search (Ctrl+/)

- Overview
- Inputs
- Outputs
- Template

Delete | Cancel | Redeploy | Refresh

Your deployment is complete

Deployment name: Microsoft.Web-WebApp-Portal-28a1bfdc-8d44
Subscription: MSDN Personal
Resource group: fhirdevdays-amsterdam

Start time: 11/6/2019, 3:56:59 PM
Correlation ID: 308753fa-957b-419d-9210-0d2cbe8c6f69

Deployment details (Download)

Next steps

Go to resource

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fhirdevdays-amsterdam - App Se | FHIR Patient browser sample app

https://portal.azure.com/#@cloudynerd.onmicrosoft.com/resource/subscriptions/2e992723-c586-4fac-8843-3b8ece43d6da/resourcegroups/fhirdevdays-amsterdam/providers/Microsoft.Web/sites/fhir...

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fhirdevdays-amsterdam - App Service Editor (Preview)

App Service

Search (Ctrl+/)

- Locks
- Export template

App Service plan

- App Service plan
- Quotas
- Change App Service plan

Development Tools

- Clone App
- Console
- Advanced Tools
- App Service Editor (Preview)
- Performance test
- Resource explorer
- Extensions

Mobile

- Easy tables
- Easy APIs

API

- API definition
- CORS

Monitoring

- Alerts
- Metrics
- Diagnostic settings
- App Service logs
- Log stream

App Service Editor (Preview)

App Service Editor provides an in-browser editing experience for your App code. Learn more

Go

fhirdevdays-amsterdam - App Se | index.html - wwwroot - App Serv | FHIR Patient browser sample ap

https://fhirdevdays-amsterdam.scm.azurewebsites.net/dev/wwwroot/index.html

InPrivate

App Service Editor | fhirdevdays-amsterdam

Michael Hansen

EXPLORE

WORKING FILES

index.html

WWWROOT

hostingstart.html

index.html

index.html

SAVED

1

fhirdevdays-amsterdam - App Se | index.html - wwwroot - App Serv | FHIR Patient browser sample app

https://fhirdevdays-amsterdam.scm.azurewebsites.net/dev/wwwroot/index.html

App Service Editor | fhirdevdays-amsterdam

Michael Hansen

EXPLORE

WORKING FILES

index.html

WWWROOT

hostingstart.html

index.html

index.html

SAVED

```html
<!DOCTYPE html>
<html>

<head>
    <title>FHIR Patient browser sample app</title>
    <script src="https://secure.aadcdn.microsoftonline-p.com/lib/1.0.0/js/msal.js"></script>
</head>

<body>
    <div class="leftContainer">
        <p id="WelcomeMessage">Welcome to the FHIR Patient browsing sample Application</p>
        <button id="SignIn" onclick="signIn()">Sign In</button>
    </div>

    <div id="patientTable">
    </div>

    <script>
        var msalConfig = {
            auth: {
                clientId: 'af27cac8-17f3-4fed-b1fe-404a712fffaa',
                authority: "https://login.microsoftonline.com/cloudynerd.onmicrosoft.com"
            },
            cache: {
                cacheLocation: "localStorage",
                storeAuthStateInCookie: true
            }
        }

        var FHIRConfig = {
            FHIRendpoint: "https://amsterdam1.azurehealthcareapis.com"
        }
        var requestObj = {
            scopes: ["https://azurehealthcareapis.com/user_impersonation"]
        }

        function authRedirectCallBack(error, response) {
            if (error) {
                console.log(error);
            } else {
                if (response.tokenType === "access_token") {
                    callFHIRServer(FHIRConfig.FHIRendpoint + '/Patient', 'GET', null, response.accessToken, FHIRCallback);
                }
            }
        }

        var myMSALObj = new Msal.UserAgentApplication(msalConfig);
        myMSALObj.handleRedirectCallback(authRedirectCallBack);

        function signIn() {
            myMSALObj.loginPopup(requestObj).then(function (loginResponse) {
                showWelcomeMessage();
                acquireTokenPopupAndCallFHIRServer();
```

fhir-public-client - Authenticatio | index.html - wwwroot - App Ser | FHIR Patient browser sample ap | FHIR Patient browser sample ap

https://fhirdevdays-amsterdam.azurewebsites.net

InPrivate

Welcome to the FHIR Patient browsing sample Application

Sign In

fhir-public-client - Authenticatio | index.html - wwwroot - App Ser | FHIR Patient browser sample ap | FHIR Patient browser sample ap

https://fhirdevdays-amsterdam.azurewebsites.net

InPrivate

Welcome cloudynerd@outlook.com to FHIR Patient Browsing App

Sign Out

1. Kirk, James,Tiberious (9f0a133f-8fbe-4969-9700-bd5e4f324e84)

Audit logging

fhirdevdays - Logs - Microsoft A | index.html - wwwroot - App Ser | FHIR Patient browser sample app | FHIR Patient browser sample app

https://portal.azure.com/#@cloudynerd.onmicrosoft.com/resource/subscriptions/2e992723-c586-4fac-8843-3b8ece43d6da/resourceGroups/fhirdevdays-amsterdam/providers/Microsoft.OperationalIns...

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fhirdevdays - Logs

Log Analytics workspace

Search (Ctrl+/)

- Overview
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- Tags
- Diagnose and solve problems

Settings

- Locks
- Export template
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General

- Quick Start
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- Pricing tier
- Usage and estimated costs
- Properties
- Service Map

Workspace Data Sources

- Virtual machines
- Storage accounts logs
- Azure Activity log
- Scope Configurations (Previ...
- Azure Resources

Welcome to Log Analytics

Azure Monitor Log Analytics is a tool used to produce insights from Azure Monitor logs.

Get Started

Learn more about Log Analytics

Quickly retrieve, consolidate, and analyze all data collected into Azure Monitoring Logs. Save your queries for future use, pin query results to Azure Dashboards, and create log alerts.

Learn More

Query Language

Log Analytics uses a version of the Kusto Query language (KQL) that is suitable for both simple and advanced log queries using functionality such as aggregations, joins, and smart analytics.

Learn the query language

Online course

fhirdevdays - Logs - Microsoft A | index.html - wwwroot - App Ser | FHIR Patient browser sample ap | FHIR Patient browser sample ap

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fhirdevdays - Logs

Log Analytics workspace

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- Service Map

Workspace Data Sources

- Virtual machines
- Storage accounts logs
- Azure Activity log
- Scope Configurations (Previ...
- Azure Resources

New Query 1*

Help | Settings | Sample queries | Query explorer

fhirdevdays | Select Scope | Run | Time range : Last 24 hours | Save | Copy | Export | New alert rule | Pin to dashboard

Schema | Filter

Filter by name or type...

Collapse all

Active

- fhirdevdays
  - LogManagement
  - Functions

Favorite workspaces

```
MicrosoftHealthcareApisAuditLogs
| limit 10
```

Completed. Showing results from the last 24 hours.

00:00:02.659 | 9 records

Table | Chart | Columns

Display time (UTC+00:00)

Drag a column header and drop it here to group by that column

TimeGenerated [UTC]	OperationName	CorrelationId	RequestUri	FhirResourceType	StatusCode	R
11/6/2019, 11:24:12.000 PM	Microsoft.HealthcareApis/services/fhir-R4/search-type	b850b5af2956b941bb5ea39b29c3fcd4	https://amsterdam1.azurehealthcareapis.com:443/Patient	Patient	401	Fa
11/6/2019, 11:30:13.000 PM	Microsoft.HealthcareApis/services/fhir-R4/create	25ed5d33533f6e4b9a734aa0f33b9627	https://amsterdam1.azurehealthcareapis.com:443/Patient		0	St
11/6/2019, 11:30:14.000 PM	Microsoft.HealthcareApis/services/fhir-R4/create	25ed5d33533f6e4b9a734aa0f33b9627	https://amsterdam1.azurehealthcareapis.com:443/Patient	Patient	201	Su
11/6/2019, 11:30:42.000 PM	Microsoft.HealthcareApis/services/fhir-R4/search-type	e7081039c6eede438e32f6a6614044be	https://amsterdam1.azurehealthcareapis.com:443/Patient		0	St
11/6/2019, 11:30:42.000 PM	Microsoft.HealthcareApis/services/fhir-R4/search-type	e7081039c6eede438e32f6a6614044be	https://amsterdam1.azurehealthcareapis.com:443/Patient	Bundle	200	Su
11/6/2019, 11:51:47.000 PM	Microsoft.HealthcareApis/services/fhir-R4/search-type	a3ff1c0b558d164cbd47f7d405eb96a7	https://amsterdam1.azurehealthcareapis.com:443/Patient		0	St
11/6/2019, 11:51:47.000 PM	Microsoft.HealthcareApis/services/fhir-R4/search-type	a3ff1c0b558d164cbd47f7d405eb96a7	https://amsterdam1.azurehealthcareapis.com:443/Patient	Bundle	200	Su
11/7/2019, 12:05:21.000 AM	Microsoft.HealthcareApis/services/fhir-R4/search-type	fa3586870813ef4b9b7feac20d5eb69f	https://amsterdam1.azurehealthcareapis.com:443/Patient		0	St
11/7/2019, 12:05:21.000 AM	Microsoft.HealthcareApis/services/fhir-R4/search-type	fa3586870813ef4b9b7feac20d5eb69f	https://amsterdam1.azurehealthcareapis.com:443/Patient	Bundle	200	Su

Page 1 of 1 | 50 items per page | 1 - 9 of 9 items

Larger Sandbox

https://github.com/Microsoft/fhir-server-samples

fhirsampdev - Microsoft Azure | microsoft/fhir-server-samples: Sa

GitHub, Inc. [US] https://github.com/Microsoft/fhir-server-samples

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Samples for Microsoft FHIR Server for Azure

Edit

Manage topics

40 commits | 1 branch | 0 releases | 4 contributors | MIT

Branch: master | New pull request | Create new file | Upload files | Find File | Clone or download

hansenms Reverting to upstream for growth chart and pulling only production de... (... Latest commit 640d108 27 days ago

analytics	Adf option2 (#41)	a month ago
deploy	Reverting to upstream for growth chart and pulling only production de... (	27 days ago
images	Adf template (#37)	a month ago
src	JS dashboard (#36)	a month ago
test/FhirDashboard.Tests.E2E	Importer function (#21)	3 months ago
.editorconfig	Style cop corrections (#10)	5 months ago
.gitignore	Initial deployment templates	5 months ago
CustomAnalysisRules.Test.ruleset	Style cop corrections (#10)	5 months ago
CustomAnalysisRules.ruleset	Style cop corrections (#10)	5 months ago

```
git clone https://github.com/Microsoft/fhir-server-samples
cd fhir-server-samples/deploy/scripts
```

Log into your Azure subscription:

```
Login-AzAccount
```

Connect to Azure AD with:

```
Connect-AzureAd -TenantDomain <AAD TenantDomain>
```

NOTE The connection to Azure AD can be made using a different tenant domain than the one tied to your Azure subscription. If you don't have privileges to create app registrations, users, etc. in your Azure AD tenant, you can create a new one, which will just be used for demo identities, etc.

Then deploy the scenario with the Open Source FHIR Server for Azure:

```
.\Create-FhirServerSamplesEnvironment.ps1 -EnvironmentName <ENVIRONMENTNAME> -UsePaaS $false
```

or the managed Azure API for FHIR:

```
.\Create-FhirServerSamplesEnvironment.ps1 -EnvironmentName <ENVIRONMENTNAME> -UsePaaS $true
```

and to include the ADF pipeline:

```
.\Create-FhirServerSamplesEnvironment.ps1 -EnvironmentName <ENVIRONMENTNAME> -UsePaaS $true -DeployAdf $true
```

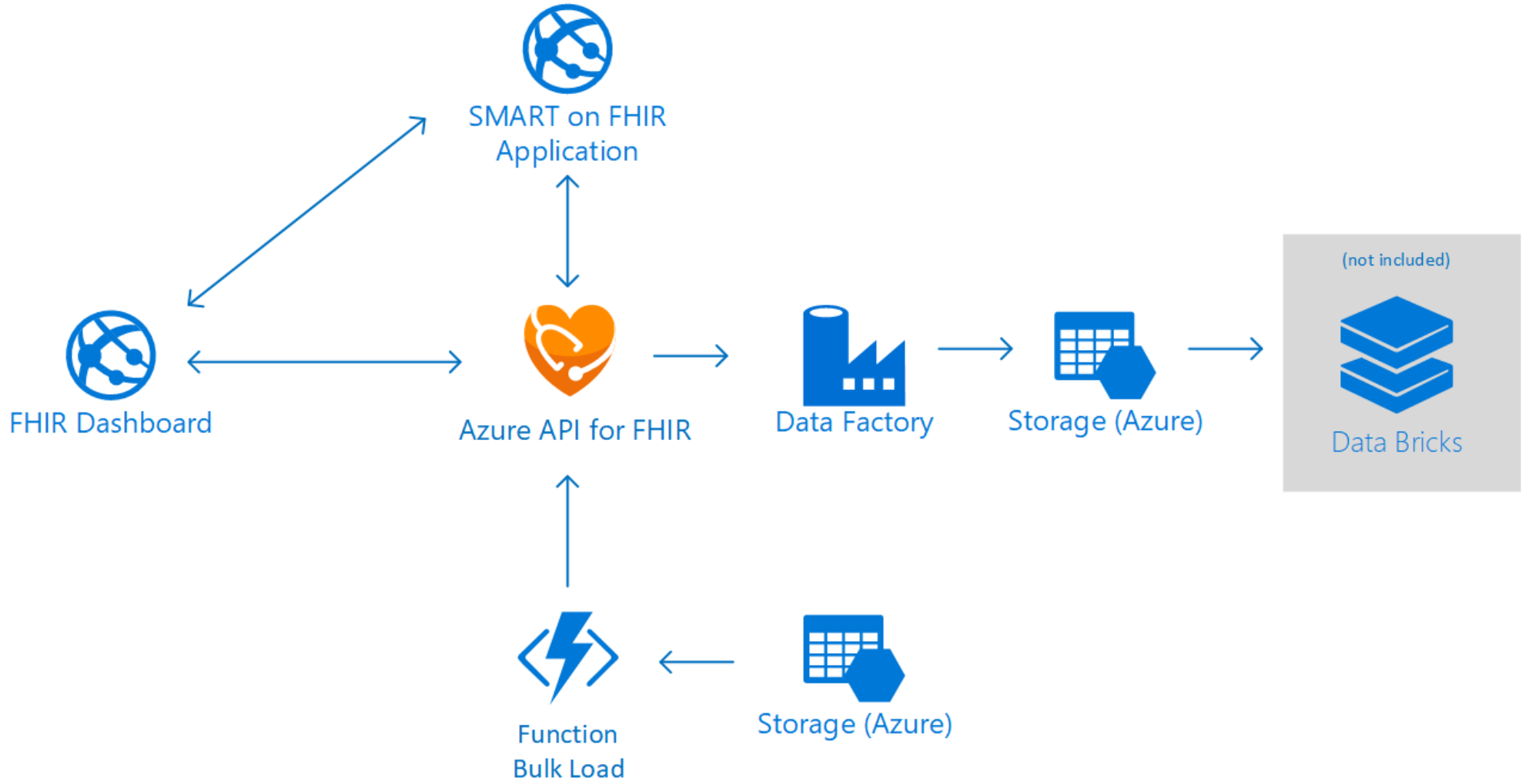
To delete the senario:

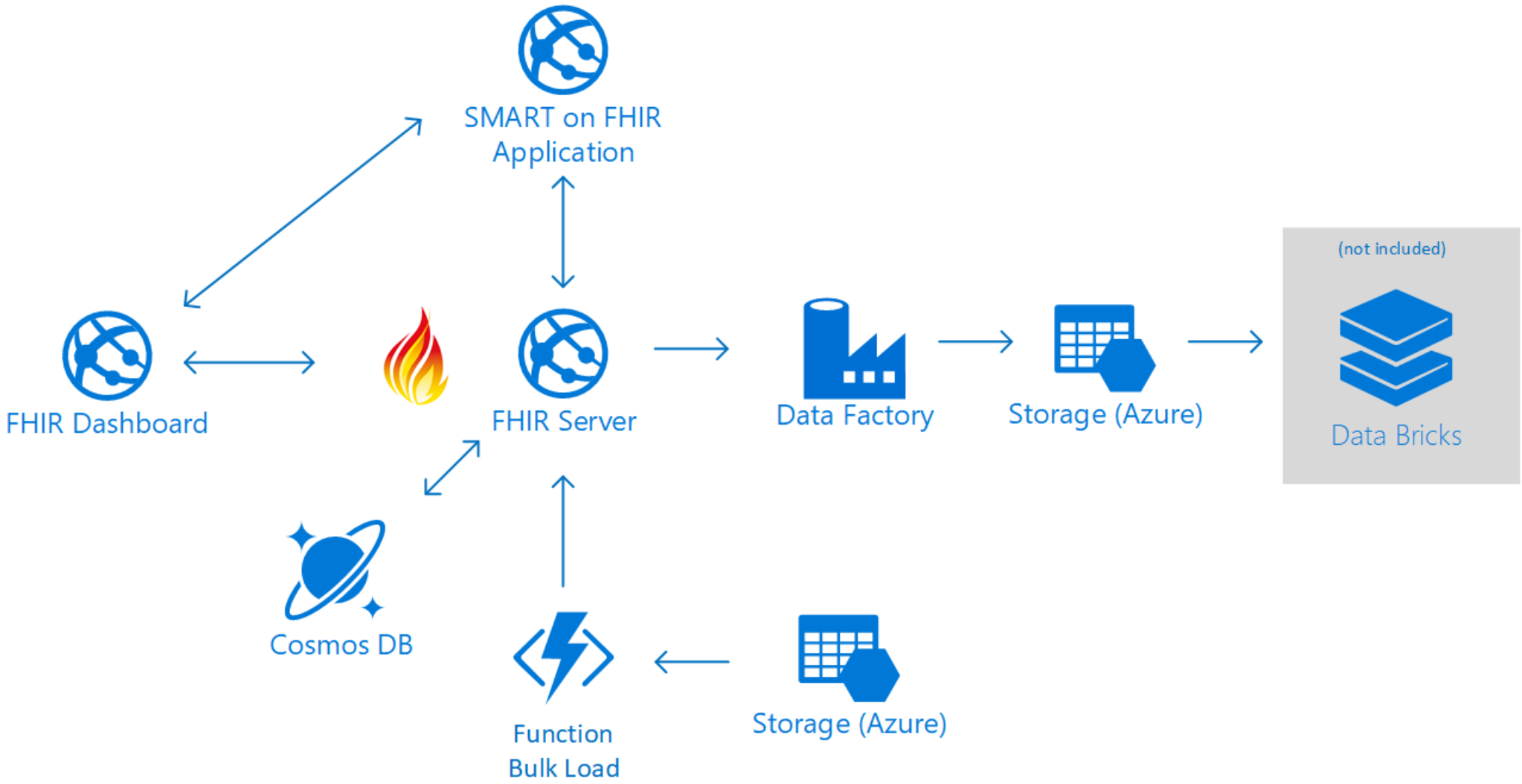
```
.\Delete-FhirServerSamplesEnvironment.ps1 -EnvironmentName <ENVIRONMENTNAME>
```

Contributing

This project welcomes contributions and suggestions. Most contributions require you to agree to a Contributor License Agreement (CLA) declaring that you have the right to, and actually do, grant us the rights to use your contribution. For details, visit https://cla.microsoft.com.

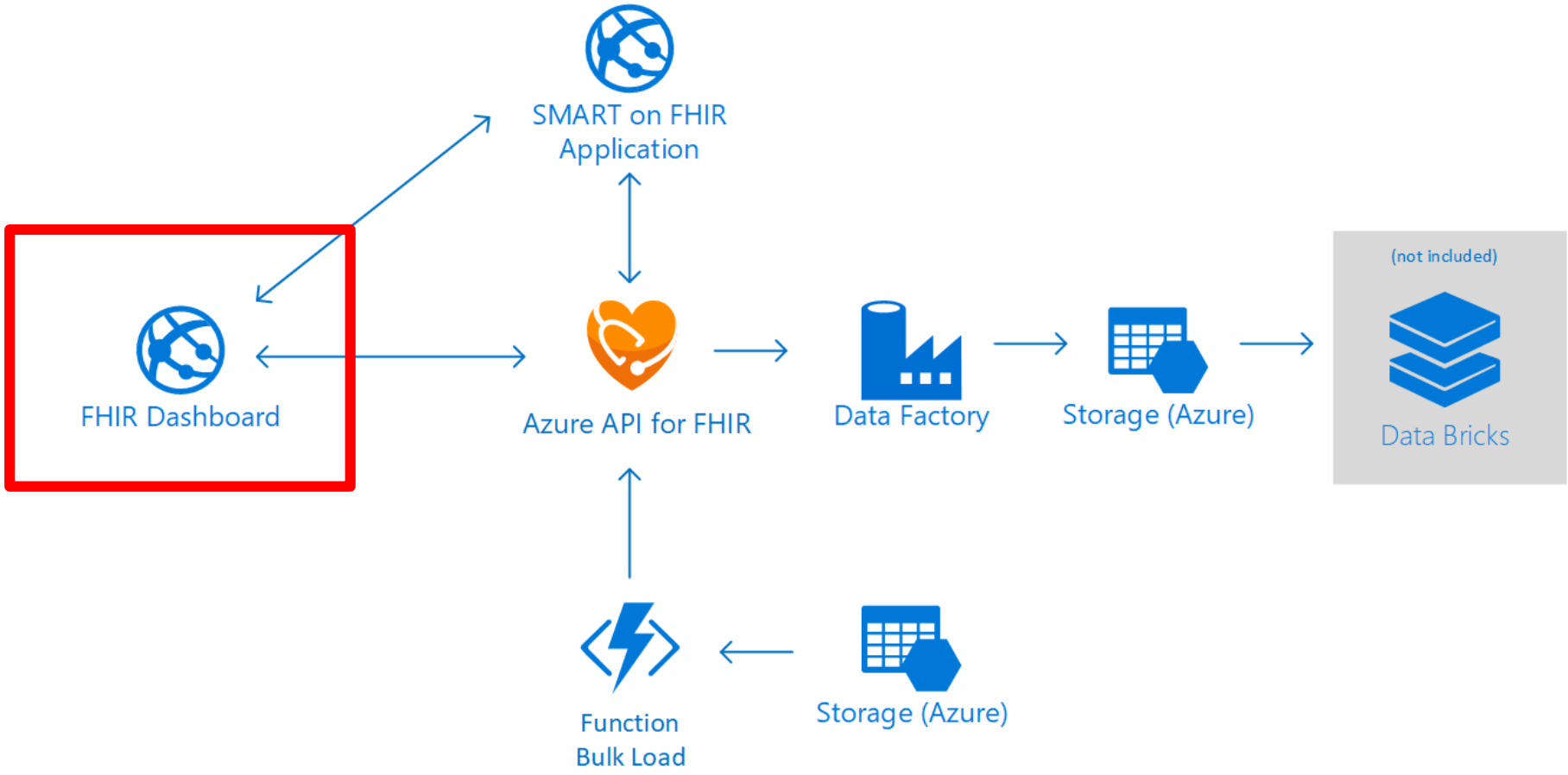
When you submit a pull request, a CLA bot will automatically determine whether you need to provide a CLA and decorate


SMART on FHIR
Application
FHIR Dashboard
Azure API for FHIR
Data Factory
Storage (Azure)
(not included)
Data Bricks
Function
Bulk Load
Storage (Azure)


SMART on FHIR
Application
FHIR Dashboard
FHIR Server
Data Factory
Storage (Azure)
(not included)
Data Bricks
Cosmos DB
Function
Bulk Load
Storage (Azure)

FHIR Dashboard

FHIR DASHBOARD



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Resource group

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Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Deployments : 7 Succeeded

Filter by name... | All types | All locations | No grouping

14 items | Show hidden types

NAME	TYPE	LOCATION
AppInsights-fhirsampdevdash	Application Insights	East US
fhirsampdev	Azure API for FHIR	West US 2
fhirsampdev-asp	App Service plan	West US 2
fhirsampdevdash	App Service	West US 2
fhirsampdevgrowth	App Service	West US 2
fhirsampdevimp	Application Insights	East US
fhirsampdevimp	App Service plan	West US 2
fhirsampdevimp	App Service	West US 2
fhirsampdevimpsa	Storage account	West US 2
fhirsampdevjs	App Service	West US 2
fhirsampdevmeds	App Service	West US 2
fhirsampdev-ts	Key vault	West US 2
fhirsampdevxzihtb76	Data factory (V2)	West US 2
fhirsampdevxzihtb76sa	Storage account	West US 2

Home Page - FhirDashboard

https://fhirsampdevdash.azurewebsites.net

FhirDashboard Home AboutMe Patients Privacy

Hello fhirsampdev-admin@fhirserversamples.onmicrosoft.com! Sign out

Welcome

Learn about building Web apps with ASP.NET Core.

Patient - FhirDashboard

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Patient

NEXT

Family Name	Given Name	Age	
Quiñónez764	Antonio44	29	[Details] [FHIR]
Runolfsson901	Ernestina649	17	[Details] [FHIR]
Emard19	Antonia30	57	[Details] [FHIR]
Krajcik437	Granville802	1	[Details] [FHIR]
Griego535	Caridad510	39	[Details] [FHIR]
Gutkowski940	Darwin703	41	[Details] [FHIR]
Heaney114	Mauro926	45	[Details] [FHIR]
Heathcote539	Lester513	2	[Details] [FHIR]
Mohr916	Gregorio366	87	[Details] [FHIR]
Hegmann834	Rodrigo242	87	[Details] [FHIR]

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Storage accounts
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Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Deployments : 7 Succeeded

Filter by name... | All types | All locations | No grouping

14 items | Show hidden types

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fhirsampdevimp	App Service plan	West US 2
fhirsampdevimp	App Service	West US 2
fhirsampdevimpsa	Storage account	West US 2
fhirsampdevjs	App Service	West US 2
fhirsampdevmeds	App Service	West US 2
fhirsampdev-ts	Key vault	West US 2
fhirsampdevxzihtb76	Data factory (V2)	West US 2
fhirsampdevxzihtb76sa	Storage account	West US 2

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net

About me Patients

	Family Name	Given Name	Age
1	Quiñónez764	Antonio44	29
2	Runolfsson901	Ernestina649	17
3	Emard19	Antonia30	57
4	Krajcik437	Granville802	1
5	Griego535	Caridad510	39
6	Gutkowski940	Darwin703	41
7	Heaney114	Mauro926	45
8	Heathcote539	Lester513	2
9	Mohr916	Gregorio366	87
10	Hegmann834	Rodrigo242	87

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

Information about the signed in user

UPN: fhirsampdev-admin@fhirserversamples.onmicrosoft.com

FHIR Server URL: https://fhirsampdev.azurehealthcareapis.com

Access Token:

eyJ0eXAiOiJKV1QiLCJhbGciOiJSUzI1NiIsIng1dCI6IkhCeGw5bUFlNmd4YXZDa2NvT1UyVEhzRE5hMCIsImt
pZCI6IkhCeGw5bUFlNmd4YXZDa2NvT1UyVEhzRE5hMCJ9.eyJhdWQiOiJodHRwczovL2ZoaXJzYW1wZGV
2LmF6dXJlaGVhbHRoY2FyZWFwaXMuY29tIiwiaXNzIjoiaHR0cHM6Ly9zdHMud2luZG93cy5uZXQvYWJmZ
GU3YjItZGYwZi00N2U2LWFhYmYtMjQ2MmIwNzUwOGRjLyIsImlhdCI6MTU1OTI3NTQyNiwibmJmIjoxNT
U5Mjc1NDI2LCJleHAiOjE1NTkyNzkzMjYsImFjciI6IjEiLCJhaW8iOiI0MlpnWUZnZkt6RFpYOTh4YnY4K3VVSU
xvUTFzc1J0RHczcUNRaTJZbndhZGJOOWJLUTBBIiwiYW1yIjpbInB3ZCJdLCJhcHBpZCI6ImQ2MTIwMDU0LT
c5Y2YtNGQ5ZS04ZDcxLTY3NjViNWI5MTgxYiIsImFwcGlkYWNyIjoiMSIsImlwYWRkciI6IjcxLjE5Ny4xOTIuNy
IsIm5hbWUiOiJmaGlyc2FtcGRldi1hZG1pbiIsIm9pZCI6IjZkZTFlZmFkLTNiOTgtNDVlYi05ZiQwLTM0M2UxZ

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net

About me Patients

	Family Name	Given Name	Age
1	Quiñónez764	Antonio44	29
2	Runolfsson901	Ernestina649	17
3	Emard19	Antonia30	57
4	Krajcik437	Granville802	1
5	Griego535	Caridad510	39
6	Gutkowski940	Darwin703	41
7	Heaney114	Mauro926	45
8	Heathcote539	Lester513	2
9	Mohr916	Gregorio366	87
10	Hegmann834	Rodrigo242	87

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

	Fa
1	Qu
2	Ru
3	Em
4	Kra
5	Gri
6	Gu
7	He
8	He
9	Mo
10	He

/Patient/a34858e3-c86d-4866-b731-e23c0a14c89b


```
{
  "resourceType": "Patient",
  "id": "a34858e3-c86d-4866-b731-e23c0a14c89b",
  "meta": {
    "versionId": "8",
    "lastUpdated": "2019-04-07T03:15:34.4579377+00:00"
  },
  "text": {
    "status": "generated",
    "div": "
Generated by Synthea.Version identifier: v2.2.0-56-g113d8a2d\n .   Person seed: 269190012548182190
"
  },
  "extension": [
    {
      "extension": [
        {
          "url": "ombCategory",
          "valueCoding": {
            "system": "urn:oid:2.16.840.1.113883.6.238",
            "code": "2106-3",
            "display": "White"
          }
        },
        {
          "url": "text",
          "valueString": "White"
        }
      ],
      "url": "http://hl7.org/fhir/us/core/StructureDefinition/us-core-race"
    },
    {
      "extension": [
        {
          "url": "ombCategory",
          "valueCoding": {
            "system": "urn:oid:2.16.840.1.113883.6.238",
```

FHIR Dashboard (JS Edition)

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About me Patients

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2	Runolfsson901	Ernestina649	17
3	Emard19	Antonia30	57
4	Krajcik437	Granville802	1
5	Griego535	Caridad510	39
6	Gutkowski940	Darwin703	41
7	Heaney114	Mauro926	45
8	Heathcote539	Lester513	2
9	Mohr916	Gregorio366	87
10	Hegmann834	Rodrigo242	87

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

Heathcote539, Lester513

DOB: 2016-08-17
Gender: male

SMART on FHIR Apps

Growth Chart Medications

Conditions 5

Onset	Description	Status	
2016-08-25T03:46:47+00:00	Atopic dermatitis	active	
2017-06-14T03:46:47+00:00	Acute allergic reaction	resolved	
2017-09-12T03:46:47+00:00	Sprain of ankle	resolved	
2017-11-11T03:46:47+00:00	Otitis media	resolved	
2018-03-26T03:46:47+00:00	Otitis media	resolved	

Encounters 16

Observations 71

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

Heathcote

DOB: 2016-08-17
Gender: male

SMART on FHIR A

Growth Chart

Conditions 5

Onset

2016-08-25T03

2017-06-14T03

2017-09-12T03

2017-11-11T03

2018-03-26T03

Encounters 16

Observations 71

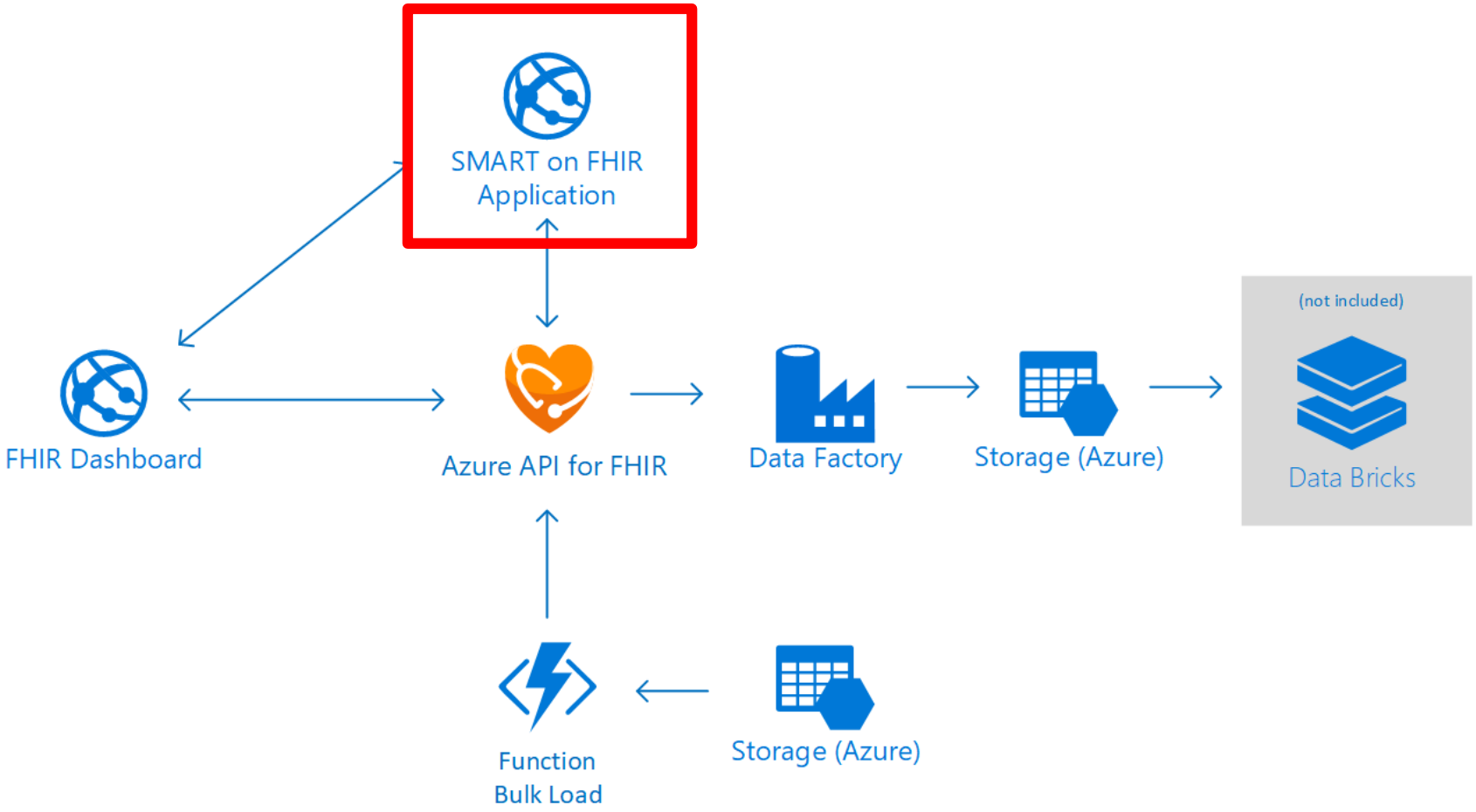
/Condition/e350bd0b-fb83-4990-83cb-b0595dd55bd6


```
{
  "resourceType": "Condition",
  "id": "e350bd0b-fb83-4990-83cb-b0595dd55bd6",
  "meta": {
    "versionId": "9",
    "lastUpdated": "2019-04-07T03:15:32.4019127+00:00"
  },
  "clinicalStatus": "active",
  "verificationStatus": "confirmed",
  "code": {
    "coding": [
      {
        "system": "http://snomed.info/sct",
        "code": "24079001",
        "display": "Atopic dermatitis"
      }
    ],
    "text": "Atopic dermatitis"
  },
  "subject": {
    "reference": "Patient/a34858e3-c86d-4866-b731-e23c0a14c89b"
  },
  "context": {
    "reference": "Encounter/e0f85812-7c71-491f-afaa-cd6e27d85387"
  },
  "onsetDateTime": "2016-08-25T03:46:47+00:00",
  "assertedDate": "2016-08-25T03:46:47+00:00"
}
```


Close

SMART on FHIR Apps

SMART ON FHIR APPS



fhirsampdev - Microsoft Azure

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Metrics

Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Deployments : 7 Succeeded

Filter by name... | All types | All locations | No grouping

14 items | Show hidden types

NAME	TYPE	LOCATION
AppInsights-fhirsampdevdash	Application Insights	East US
fhirsampdev	Azure API for FHIR	West US 2
fhirsampdev-asp	App Service plan	West US 2
fhirsampdevdash	App Service	West US 2
fhirsampdevgrowth	App Service	West US 2
fhirsampdevimp	Application Insights	East US
fhirsampdevimp	App Service plan	West US 2
fhirsampdevimp	App Service	West US 2
fhirsampdevimpsa	Storage account	West US 2
fhirsampdevjs	App Service	West US 2
fhirsampdevmeds	App Service	West US 2
fhirsampdev-ts	Key vault	West US 2
fhirsampdevxzihtb76	Data factory (V2)	West US 2
fhirsampdevxzihtb76sa	Storage account	West US 2

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

Heathcote539, Lester513

DOB: 2016-08-17
Gender: male

SMART on FHIR Apps

Growth Chart Medications

Conditions 5

Onset	Description	Status
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2017-09-12T03:46:47+00:00	Sprain of ankle	resolved
2017-11-11T03:46:47+00:00	Otitis media	resolved
2018-03-26T03:46:47+00:00	Otitis media	resolved

Encounters 16

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FHIR Dashboard (JS Edition) | Growth Charts Application

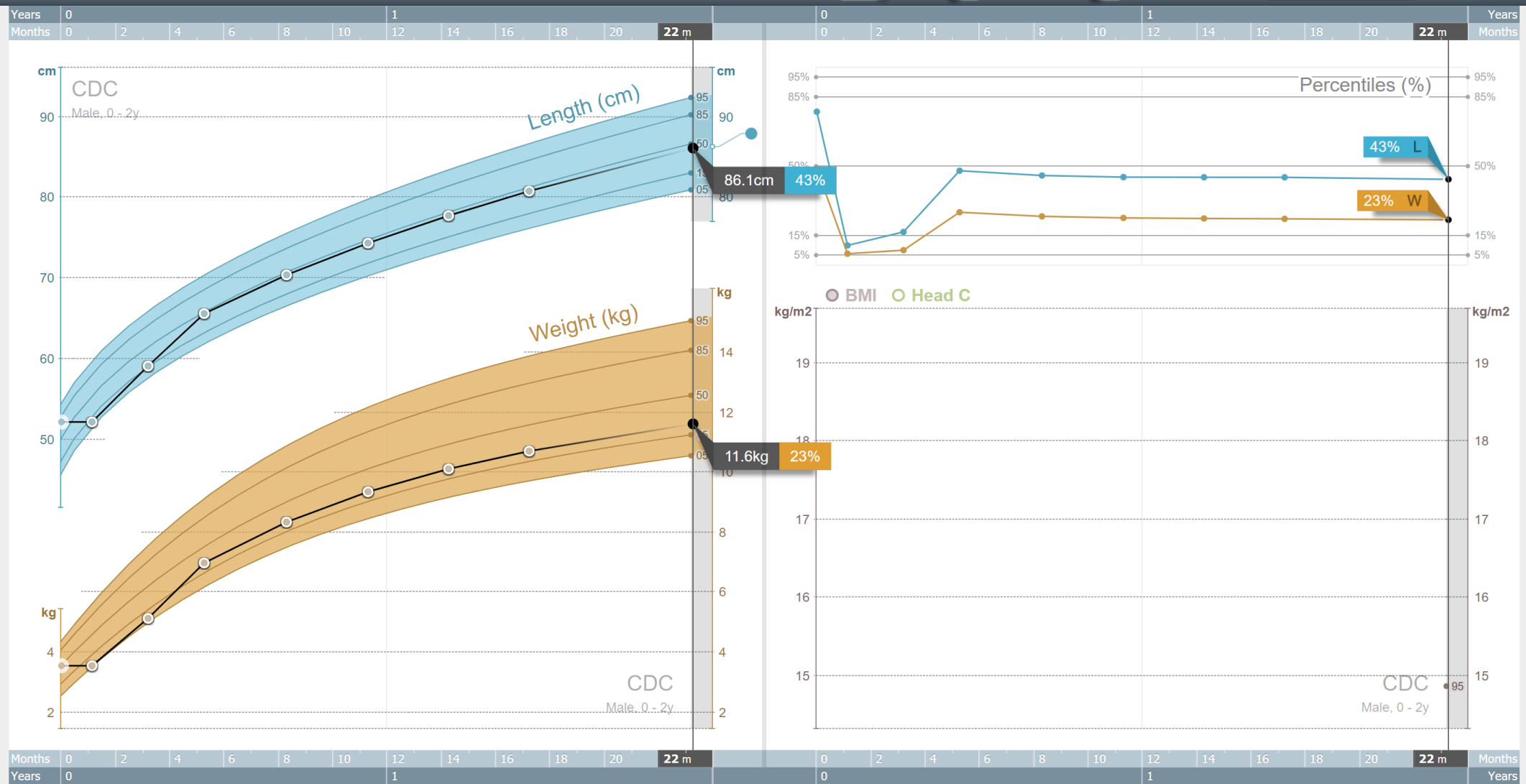
https://fhirsampdevgrowth.azurewebsites.net

Lester513 Heathcote539 | sex **male** | dob **17Aug2016** | age **2y 9m** | corrected age **2y 9m**

CDC | App Version: 0.1.3-beta | GRAPHS | TABLE | PARENT

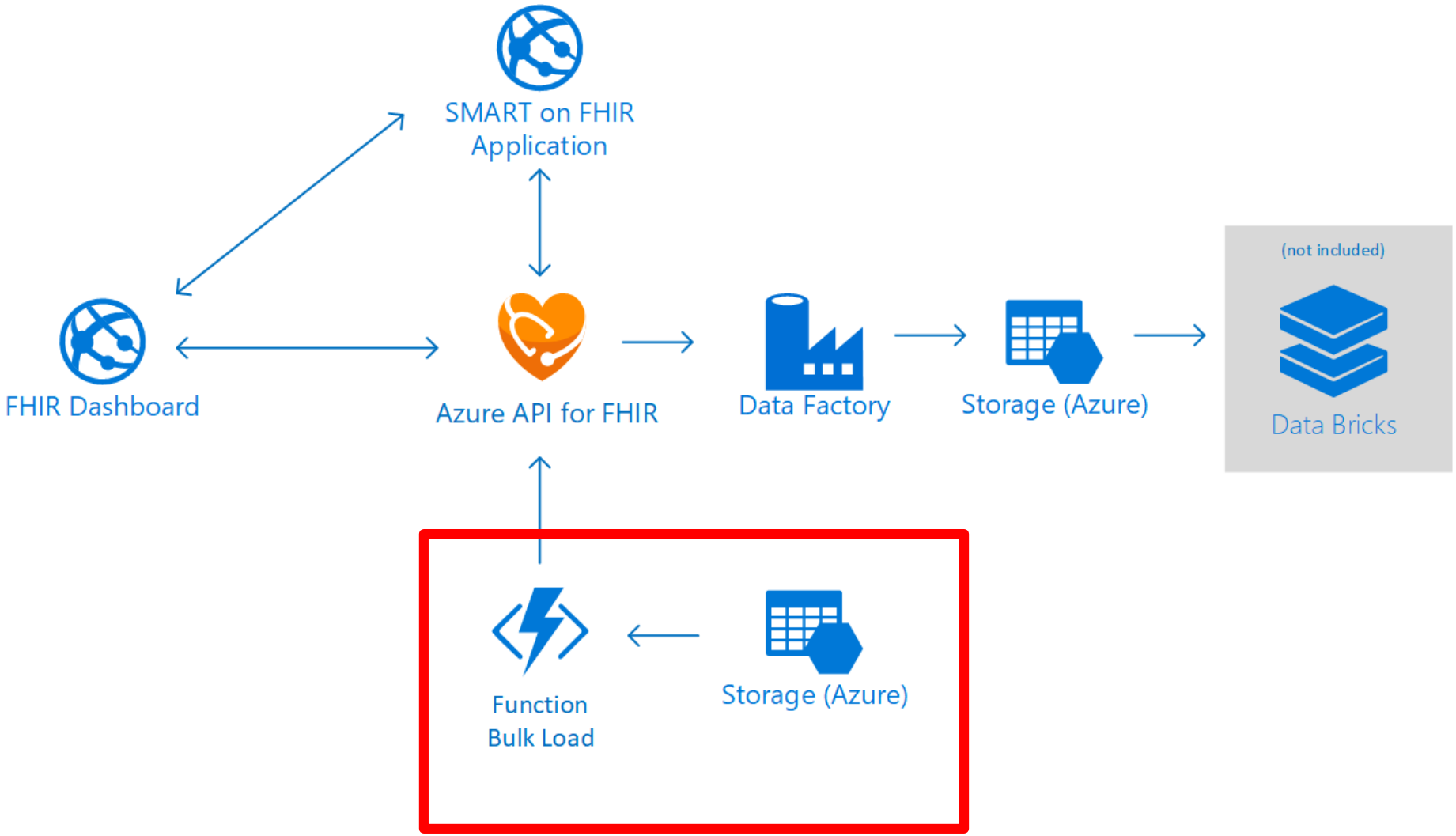
0 – 13 Weeks | 0 – 6 Months | 0 – 2 Years | 0 – 20 Years | Fit to Age | Zoom Out

Last recording **25Jul2018 1y 11m** | NICU OFF | % Z | kg/cm lb/ft | Language: English | Add Data



Importing Synthea Data

SYNTHEA DATA IMPORT



FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

	Family Name	Given Name	Age
41	Raynor401	Lacy523	4
42	Greenholt190	Dong972	70
43	Wiegand701	Osvaldo336	0

fhirsampdev - Microsoft Azure

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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fhirsampdev
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Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Deployments : 7 Succeeded

Filter by name... | All types | All locations | No grouping

14 items | Show hidden types

NAME	TYPE	LOCATION
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fhirsampdevimp	Application Insights	East US
fhirsampdevimp	App Service plan	West US 2
fhirsampdevimp	App Service	West US 2
fhirsampdevimpsa	Storage account	West US 2
fhirsampdevjs	App Service	West US 2
fhirsampdevmeds	App Service	West US 2
fhirsampdev-ts	Key vault	West US 2
fhirsampdevxzihtb76	Data factory (V2)	West US 2
fhirsampdevxzihtb76sa	Storage account	West US 2

fhirsampdevimpsa - Microsoft A | Your Azure Function App is up a

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Home > Resource groups > fhirsampdev > fhirsampdevimpsa

fhirsampdevimpsa

Storage account

Open in Explorer | Move | Delete | Refresh

Resource group (change) : fhirsampdev
Status : Primary: Available
Location : West US 2
Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Performance : Standard
Replication : Locally-redundant storage (LRS)
Account kind : Storage (general purpose v1)

Services

Blobs
REST-based object storage for unstructured data
Learn more

Files
File shares that use the standard SMB 3.0 protocol
Learn more

Tables
Tabular data storage
Learn more

Queues
Effectively scale apps according to traffic
Learn more

Monitoring

Show data for last: 1 hour | 6 hours | 12 hours | 1 day | 7 days

Show data for: Account

Total egress

43.95KiB
39.06KiB

Total ingress

117.19KiB

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CORS
Configuration
Encryption
Shared access signature
Firewalls and virtual networks
Advanced security
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Blob service
Blobs
Custom domain

fhirsampdevimpsa - Blobs - Micr | Your Azure Function App is up a

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Home > Resource groups > fhirsampdev > fhirsampdevimpsa - Blobs

fhirsampdevimpsa - Blobs

Storage account

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- Geo-replication
- CORS
- Configuration
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- Shared access signature
- Firewalls and virtual networks
- Advanced security
- Properties
- Locks
- Export template

Blob service

- Blobs
- Custom domain

Container | Refresh | Delete | Change access level

Storage account: fhirsampdevimpsa

Search containers by prefix

NAME	LAST MODIFIED	PUBLIC ACCESS L...	LEASE STATE
azure-webjobs-hosts	4/6/2019, 6:47:48 PM	Private	Available
fhirimport	5/3/2019, 12:51:18 PM	Private	Available
fhirrejected	5/3/2019, 12:51:18 PM	Private	Available

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fhirimport - Microsoft Azure | Your Azure Function App is up a

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

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Home > Resource groups > fhirsampdev > fhirsampdevimpsa - Blobs > fhirimport

fhirimport

Container

Search (Ctrl+/)

- Overview
- Access Control (IAM)

Settings

- Access policy
- Properties
- Metadata
- Editor (preview)

Upload | Refresh | Change access level | Delete | Acquire lease | Break lease | View snapshots | Create snapshot

Authentication method: Access key (Switch to Azure AD User Account)
Location: fhirimport

Search blobs by prefix (case-sensitive) | Show deleted blobs

NAME	MODIFIED	ACCESS TIER	BLOB TYPE	SIZE	LEASE STATE
No blobs found.					

- Create a resource
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Upload blob - Microsoft Azure | Your Azure Function App is up a

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

Preview | Microsoft Azure | Report a bug | Search resources, services, and docs | mihansen@microsoft.... MICROSOFT

- Create a resource
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Home > Resource groups > fhirsampdev > fhirsampdevimpsa - Blobs > fhirimport

fhirimport

Container

Search (Ctrl+/)

- Overview
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- Access policy
- Properties
- Metadata
- Editor (preview)

Upload | Refresh | Change access level | Delete | Acquire lease | Break l

Authentication method: Access key (Switch to Azure AD User Account)
Location: fhirimport

Search blobs by prefix (case-sensitive)

NAME	MODIFIED	ACCI
No blobs found.		

Upload blob

fhirimport/

Files

"Vivien121_Borer986_5a23db0c-c452-425b-8ef0-001a37...

Overwrite if files already exist

Advanced

Upload

fhirimport - Microsoft Azure | Your Azure Function App is up a

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

Preview | Microsoft Azure | Report a bug | Search resources, services, and docs | mihansen@microsoft.... MICROSOFT

Home > Resource groups > fhirsampdev > fhirsampdevimpsa - Blobs > fhirimport

fhirimport

Container

Search (Ctrl+/)

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- Access policy
- Properties
- Metadata
- Editor (preview)

Upload | Refresh | Change access level | Delete | Acquire lease | Break lease | View snapshots | Create snapshot

Authentication method: Access key (Switch to Azure AD User Account)
Location: fhirimport

Search blobs by prefix (case-sensitive) | Show deleted blobs

NAME	MODIFIED	ACCESS TIER	BLOB TYPE	SIZE	LEASE STATE
Vivien121_Borer986_5a23db0c-c452-425b-8ef0-...	5/30/2019, 5:33:26 PM		Block blob	2.45 MiB	Available

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fhirimport - Microsoft Azure | Your Azure Function App is up a

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

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fhirimport

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No blobs found.					

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- Log Analytics workspaces

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

	Family Name	Given Name	Age
41	Raynor401	Lacy523	4
42	Greenholt190	Dong972	70
43	Wiegand701	Osvaldo336	0
44	Borer986	Vivien121	35

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

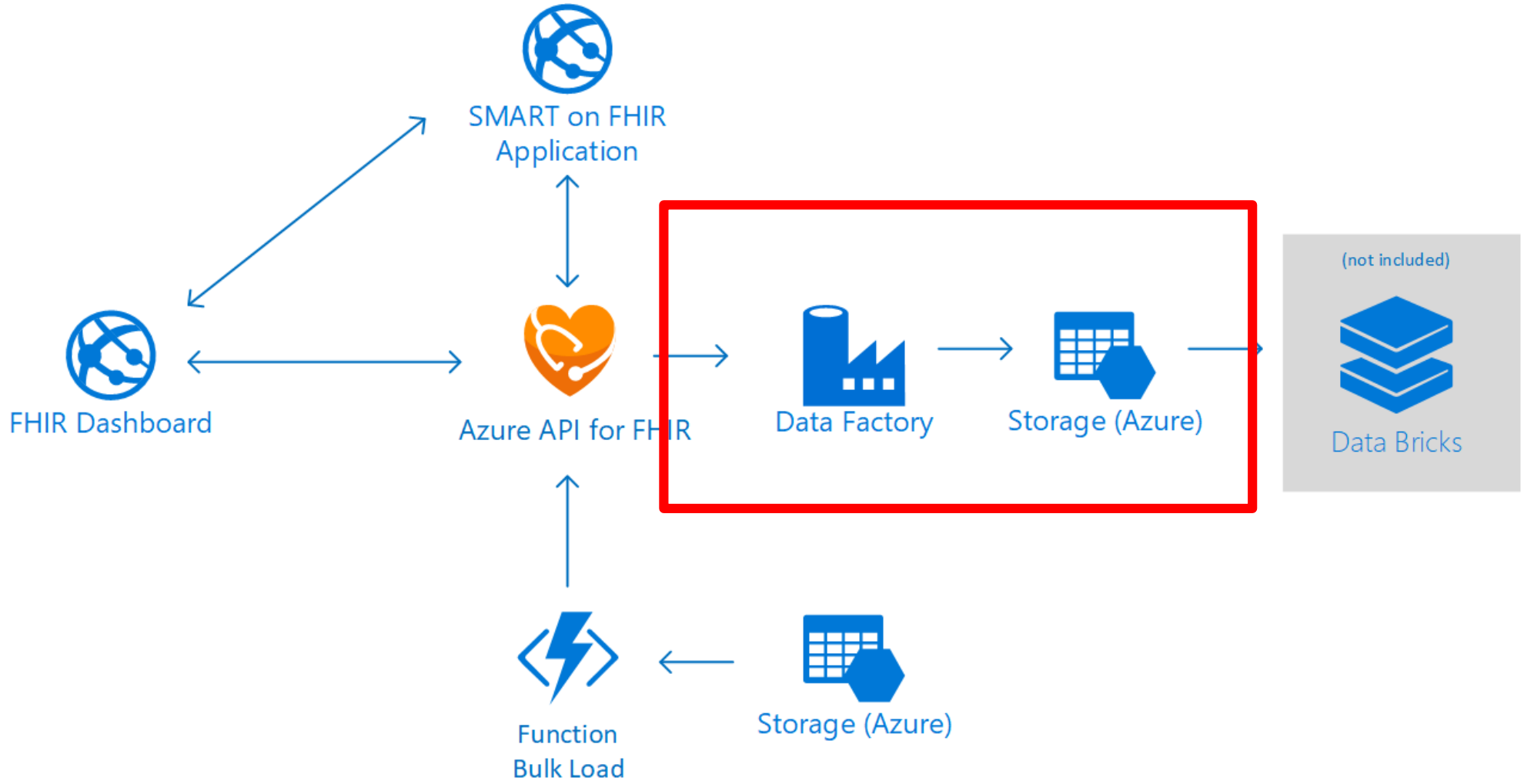
About me Patients

	Fa
41	Ra
42	Gr
43	Wi
44	Bo

/Patient/15aac6e1-3e1f-4bda-abc3-dc6d14ed58a5


```
{
  "resourceType": "Patient",
  "id": "15aac6e1-3e1f-4bda-abc3-dc6d14ed58a5",
  "meta": {
    "versionId": "1",
    "lastUpdated": "2019-05-31T00:33:36.3422591+00:00"
  },
  "text": {
    "status": "generated",
    "div": "
Generated by Synthea.Version identifier: v2.2.0-56-g113d8a2d\n .   Person seed: -5698744194936560646
"
  },
  "extension": [
    {
      "extension": [
        {
          "url": "ombCategory",
          "valueCoding": {
            "system": "urn:oid:2.16.840.1.113883.6.238",
            "code": "2106-3",
            "display": "White"
          }
        },
        {
          "url": "text",
          "valueString": "White"
        }
      ],
      "url": "http://hl7.org/fhir/us/core/StructureDefinition/us-core-race"
    },
    {
      "extension": [
        {
          "url": "ombCategory",
          "valueCoding": {
            "system": "urn:oid:2.16.840.1.113883.6.238",
```

Exporting Data


SMART on FHIR
Application
FHIR Dashboard
Azure API for FHIR
Data Factory
Storage (Azure)
(not included)
Data Bricks
Function
Bulk Load
Storage (Azure)

fhirsampdev - Microsoft Azure

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

Preview | Microsoft Azure | Report a bug | Search resources, services, and docs | mihansen@microsoft.... MICROSOFT

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fhirsampdev
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Metrics

Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Deployments : 7 Succeeded

Filter by name... | All types | All locations | No grouping

14 items | Show hidden types

NAME	TYPE	LOCATION
AppInsights-fhirsampdevdash	Application Insights	East US
fhirsampdev	Azure API for FHIR	West US 2
fhirsampdev-asp	App Service plan	West US 2
fhirsampdevdash	App Service	West US 2
fhirsampdevgrowth	App Service	West US 2
fhirsampdevimp	Application Insights	East US
fhirsampdevimp	App Service plan	West US 2
fhirsampdevimp	App Service	West US 2
fhirsampdevimpsa	Storage account	West US 2
fhirsampdevjs	App Service	West US 2
fhirsampdevmeds	App Service	West US 2
fhirsampdev-ts	Key vault	West US 2
fhirsampdevxzihtb76	Data factory (V2)	West US 2
fhirsampdevxzihtb76sa	Storage account	West US 2

fhirsampdevxzihtb76 - Microsoft | Your Azure Function App is up a

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Home > Resource groups > fhirsampdev > fhirsampdevxzihtb76

fhirsampdevxzihtb76

Data factory (V2)

Delete

Resource group (change) : fhirsampdev
Status : Succeeded
Location : West US 2
Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014

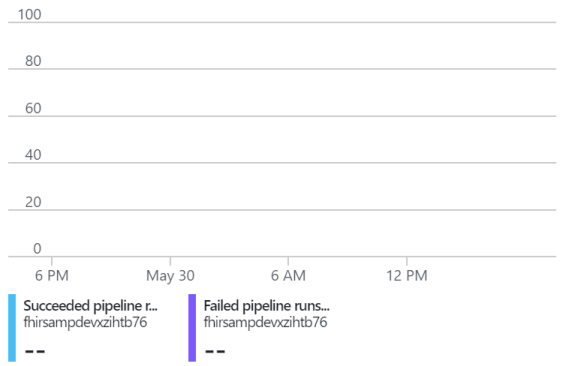
Type : Data factory (V2)
Getting started : Quick start

Documentation

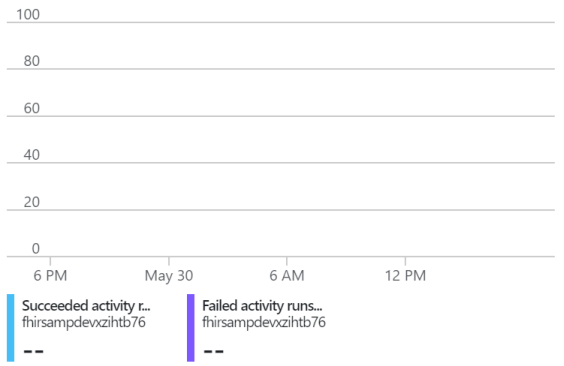
Author & Monitor

Monitoring

PipelineRuns



ActivityRuns



TriggerRuns

Integration Runtime CPU

Search (Ctrl+/)

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- Tags
- Diagnose and solve problems

Settings

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General

- Properties

Getting Started

- Quick start

Monitoring

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- Metrics
- Diagnostic settings

Support + troubleshooting

- Resource health
- New support request

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- Help + support
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- App Service Environmen...
- Log Analytics workspaces

fhirsampdevxzihtb76 - Microsoft | Azure Data Factory

https://ms-adf.azure.com/home?factory=%2Fsubscriptions%2Fa1766500-6fd5-4f5c-8515-607798271014%2FresourceGroups%2Ffhirsampdev%2Fpro...

Microsoft Azure | Data Factory ▸ fhirsampdevxzihtb76 | mihansen@microsoft.com

Azure Data Factory

Let's get started

Create pipeline

Create pipeline from template

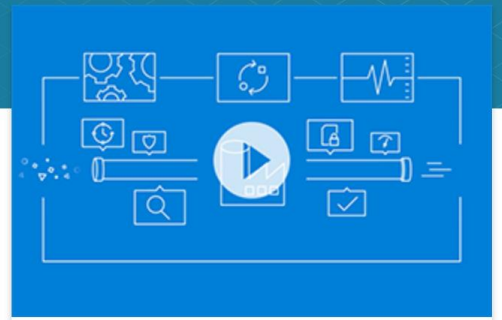
Copy Data

Configure SSIS Integration

Set up Code Repository

Videos

View All Videos



Overview of Azure Data Factory

Code-free modern data warehouse using Azure SQL DW

Rerun activities inside your Azure Data Factory pipelines

fhirsampdevxzihtb76 - Microsoft | Azure Data Factory

https://ms-adf.azure.com/authoring/pipeline/ExportPatient?factory=%2Fsubscriptions%2Fa1766500-6fd5-4f5c-8515-607798271014%2FresourceGro...

osoft Azure | Data Factory ▸ fhirsampdevxzihtb76 | Search resources | mihansen@microsoft.com

Data Factory | Publish All | Validate All | Refresh | Discard All | Data Flow Debug | ARM Template

Factory Resources

Filter resources by name

- Pipelines 5
  - ExportEncounter
  - ExportMedicationRequest
  - ExportObservation
  - ExportPatient
  - ExportPractitioner
- Datasets 15
- Data Flows (Preview) 0

Connections

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ExportPatient

Activities

Search Activities

- Move & Transform
- Batch Service
- Databricks
- Data Lake Analytics
- General
- HDInsight
- Iteration & Conditionals
- Machine Learning

Save as template | Validate | Debug | Add trigger | Code

Copy Data: Copy To Staging → Copy Data: Copy to ndjson

General | Parameters | Variables | Output

Name * ExportPatient

Description

Concurrency

Annotations + New

fhirsampdevxzihtb76 - Microsoft | Azure Data Factory

https://ms-adf.azure.com/authoring/pipeline/ExportPatient?factory=%2Fsubscriptions%2Fa1766500-6fd5-4f5c-8515-607798271014%2FresourceGro...

osoft Azure | Data Factory ▸ fhirsampdevxzihtb76 | Search resources | mihansen@microsoft.com

Data Factory | Publish All | Validate All | Refresh | Discard All | Data Flow Debug | ARM Template

Factory Resources

Filter resources by name

- Pipelines 5
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  - ExportObservation
  - ExportPatient
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- Datasets 15
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Connections

Triggers

ExportPatient

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Search Activities

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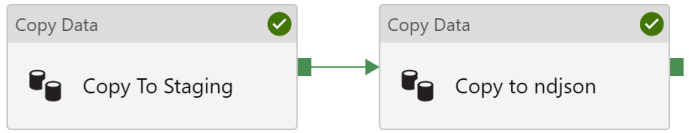
- Batch Service
- Databricks
- Data Lake Analytics
- General
- HDInsight
- Iteration & Conditionals
- Machine Learning

Save as template | Validate | Debug | Add trigger | Code



General | Parameters | Variables | Output

Pipeline Run ID: **a1aab5f5-6f15-4c64-b4a4-143ec92f7ea1**

NAME	TYPE	RUN START	DURATION	STATUS	ACTIONS	RUNID
Copy to ndjson	Copy	05/30/2019 5:45 PM	00:00:05	Succeeded		8783e674-77e5-4017-8efb-ba8fbe120953
Copy To Stagi...	Copy	05/30/2019 5:44 PM	00:00:07	Succeeded		097d89e0-36b8-4b51-bc95-50c8530a9d97

fhirsampdev - Microsoft Azure

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Home > Resource groups > fhirsampdev

fhirsampdev
Resource group

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Monitoring
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Alerts
Metrics

Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : Resolute Open Source
Subscription ID : a1766500-6fd5-4f5c-8515-607798271014
Tags (change) : Click here to add tags

Deployments : 7 Succeeded

Filter by name... | All types | All locations | No grouping

14 items | Show hidden types

NAME	TYPE	LOCATION
AppInsights-fhirsampdevdash	Application Insights	East US
fhirsampdev	Azure API for FHIR	West US 2
fhirsampdev-asp	App Service plan	West US 2
fhirsampdevdash	App Service	West US 2
fhirsampdevgrowth	App Service	West US 2
fhirsampdevimp	Application Insights	East US
fhirsampdevimp	App Service plan	West US 2
fhirsampdevimp	App Service	West US 2
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fhirsampdevmeds	App Service	West US 2
fhirsampdev-ts	Key vault	West US 2
fhirsampdevxzihtb76	Data factory (V2)	West US 2
fhirsampdevxzihtb76sa	Storage account	West US 2

fhirsampdevxzihtb76sa - Microsc | Azure Data Factory

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Home > Resource groups > fhirsampdev > fhirsampdevxzihtb76sa

fhirsampdevxzihtb76sa

Storage account

Search (Ctrl+/)

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- Firewalls and virtual networks
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Blob service

- Blobs
- Custom domain

Open in Explorer | Move | Delete | Refresh

Resource group (change)	: fhirsampdev	Performance	: Standard
Status	: Primary: Available	Replication	: Locally-redundant storage (LRS)
Location	: West US 2	Account kind	: Storage (general purpose v1)
Subscription (change)	: Resolute Open Source		
Subscription ID	: a1766500-6fd5-4f5c-8515-607798271014		
Tags (change)	: Click here to add tags		

Services

Blobs
REST-based object storage for unstructured data
Learn more

Files
File shares that use the standard SMB 3.0 protocol
Learn more

Tables
Tabular data storage
Learn more

Queues
Effectively scale apps according to traffic
Learn more

Monitoring

Show data for last: 1 hour | 6 hours | 12 hours | 1 day | 7 days

Show data for: Account

Total egress

6.84KiB
5.86KiB

Total ingress

34.18KiB
29.3KiB

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fhirsampdevxzihtb76sa - Blobs - | Azure Data Factory

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/a1766500-6fd5-4f5c-8515-607798271014/resourceGroups/fhirsa...

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Home > Resource groups > fhirsampdev > fhirsampdevxzihtb76sa - Blobs

fhirsampdevxzihtb76sa - Blobs

Storage account

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- Export template

Blob service

- Blobs
- Custom domain

Container | Refresh | Delete | Change access level

Storage account: fhirsampdevxzihtb76sa

Search containers by prefix

NAME	LAST MODIFIED	PUBLIC ACCESS L...	LEASE STATE
dataexport	4/27/2019, 4:06:43 PM	Private	Available
datastaging	4/27/2019, 4:06:34 PM	Private	Available

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dataexport - Microsoft Azure | Azure Data Factory

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

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Home > Resource groups > fhirsampdev > fhirsampdevxzihtb76sa - Blobs > dataexport

dataexport

Container

Search (Ctrl+/)

- Overview
- Access Control (IAM)

Settings

- Access policy
- Properties
- Metadata
- Editor (preview)

Upload | Refresh | Change access level | Delete | Acquire lease | Break lease | View snapshots | Create snapshot

Authentication method: Access key (Switch to Azure AD User Account)
Location: dataexport

Search blobs by prefix (case-sensitive) | Show deleted blobs

NAME	MODIFIED	ACCESS TIER	BLOB TYPE	SIZE	LEASE STATE
Encounter.json	4/27/2019, 4:06:44 PM		Block blob	454.77 KiB	Available
Observation.json	4/27/2019, 4:07:37 PM		Block blob	2.53 MiB	Available
Patient.json	5/30/2019, 5:45:09 PM		Block blob	137.34 KiB	Available

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Patient.json - Microsoft Azure | Azure Data Factory

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

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Home > Resource groups > fhirsampdev > fhirsampdevxzihtb76sa - Blobs > dataexport > Patient.json

dataexport
Container

Search (Ctrl+/)

- Overview
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Settings

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- Properties
- Metadata
- Editor (preview)

Upload | Refresh | More

Authentication method: Access key (Switch to Azure AD User Account)
Location: dataexport

Search blobs by prefix (case-sensiti... | Show deleted blobs

NAME
Encounter.json
Observation.json
Patient.json

Patient.json
Blob

Save | Discard | Refresh | Download | Acquire lease | Break lease | Delete

Overview | Snapshots | Edit blob | Generate SAS

Properties

URL	https://fhirsampdevxzihtb76sa.blob.core.windows....
LAST MODIFIED	5/30/2019, 5:45:09 PM
CREATION TIME	4/27/2019, 4:07:09 PM
TYPE	Block blob
SIZE	137.34 KiB
SERVER ENCRYPTED	true
ETAG	0x8D6E5613B74AD82
CONTENT-MD5	-
LEASE STATUS	Unlocked
LEASE STATE	Available
LEASE DURATION	-
COPY STATUS	-
COPY COMPLETION TIME	-

Undelete all snapshots

Access Tier

Optimize storage costs by placing your data in the appropriate access tier. Archive is not supported in your region at this time. Learn more

N/A

Setting object level access tier is only supported for Standard LRS, GRS, and RA-GRS Blob Storage and General Purpose V2 Accounts.

Metadata

KEY	VALUE

Patient.json - Microsoft Azure | Azure Data Factory

https://ms.portal.azure.com/#blade/Microsoft_Azure_Storage/ContainerMenuBlade/overview/storageAccountId/%2Fsubscriptions%2Fa1766500-6fd5...

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Home > Resource groups > fhirsampdev > fhirsampdevxzihtb76sa - Blobs > dataexport > Patient.json

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dataexport
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- Editor (preview)

Upload | Refresh | More

Authentication method: Access key (Switch to Azure AD User Account)
Location: dataexport

Search blobs by prefix (case-sensiti... | Show deleted blobs

NAME
Encounter.json
Observation.json
Patient.json

Patient.json
Blob

Save | Discard | Refresh | Download | Delete

Overview | Snapshots | Edit blob | Generate SAS


```
{"resourceType":"Patient","id":"806fdaf8-728a-443a-aa90-51f39bb4c56a","meta'
{"resourceType":"Patient","id":"a4828ce1-f5f1-4ab3-9636-3d4cae3ed952","meta'
{"resourceType":"Patient","id":"b9f20a15-b3eb-49f5-bf60-fde29e82ee96","meta'
{"resourceType":"Patient","id":"7daf68c0-cbb6-48f9-a7cc-30f8c3e52836","meta'
{"resourceType":"Patient","id":"6873c1c6-522d-4b2a-bcc7-5a10fb6a5f43","meta'
{"resourceType":"Patient","id":"a6e14901-9fd2-4836-9332-7d1d5d74bd9e","meta'
{"resourceType":"Patient","id":"1f227cb4-f143-468b-a149-87ea8056c650","meta'
{"resourceType":"Patient","id":"18baafe4-096f-463d-a9b4-d55dff78734c","meta'
{"resourceType":"Patient","id":"250f7eb5-df0c-4ac5-94ef-e49af2c8962a","meta'
{"resourceType":"Patient","id":"80b99155-53fe-453f-a274-7440e368f8bb","meta'
{"resourceType":"Patient","id":"28e115b5-66ed-4ba9-812d-19a1426e8073","meta'
{"resourceType":"Patient","id":"8718399b-7a35-47b0-a18e-15db13dd5be9","meta'
{"resourceType":"Patient","id":"d82e0e5c-f144-4968-a0d2-ad702436e450","meta'
{"resourceType":"Patient","id":"8aee0b6e-21fb-4f6c-aae9-2d83e532e17d","meta'
{"resourceType":"Patient","id":"024f3856-8e78-4d3b-9c61-b63f2a55484f","meta'
{"resourceType":"Patient","id":"d01e01e5-2674-45c6-b69c-ecf626c974a7","meta'
{"resourceType":"Patient","id":"f2db6bd2-d1a6-46e7-955f-8dd6e22d2c2f","meta'
{"resourceType":"Patient","id":"41b23605-b4a8-4526-bec5-ece177b95d12","meta'
{"resourceType":"Patient","id":"5e36c90f-dfaf-403d-a82a-09ce3d8fe876","meta'
{"resourceType":"Patient","id":"eadc99b9-076e-4fed-9413-3cde48258908","meta'
{"resourceType":"Patient","id":"b29868ba-4f7f-464b-bb19-066a5856b616","meta'
{"resourceType":"Patient","id":"9645782e-a54e-49eb-8c7d-336248b12cbd","meta'
{"resourceType":"Patient","id":"cd069c44-aec9-48fd-94ac-783ed8166e9a","meta'
{"resourceType":"Patient","id":"318ae542-191c-46a8-912f-f04e3f6a704a","meta'
{"resourceType":"Patient","id":"ae2a38f0-ab87-4e99-976c-562966fc02ca","meta'
{"resourceType":"Patient","id":"15aac6e1-3e1f-4bda-abc3-dc6d14ed58a5","meta'
```

FHIR Dashboard (JS Edition)

https://fhirsampdevjs.azurewebsites.net/#

About me Patients

	Fa
41	Ra
42	Gr
43	Wi
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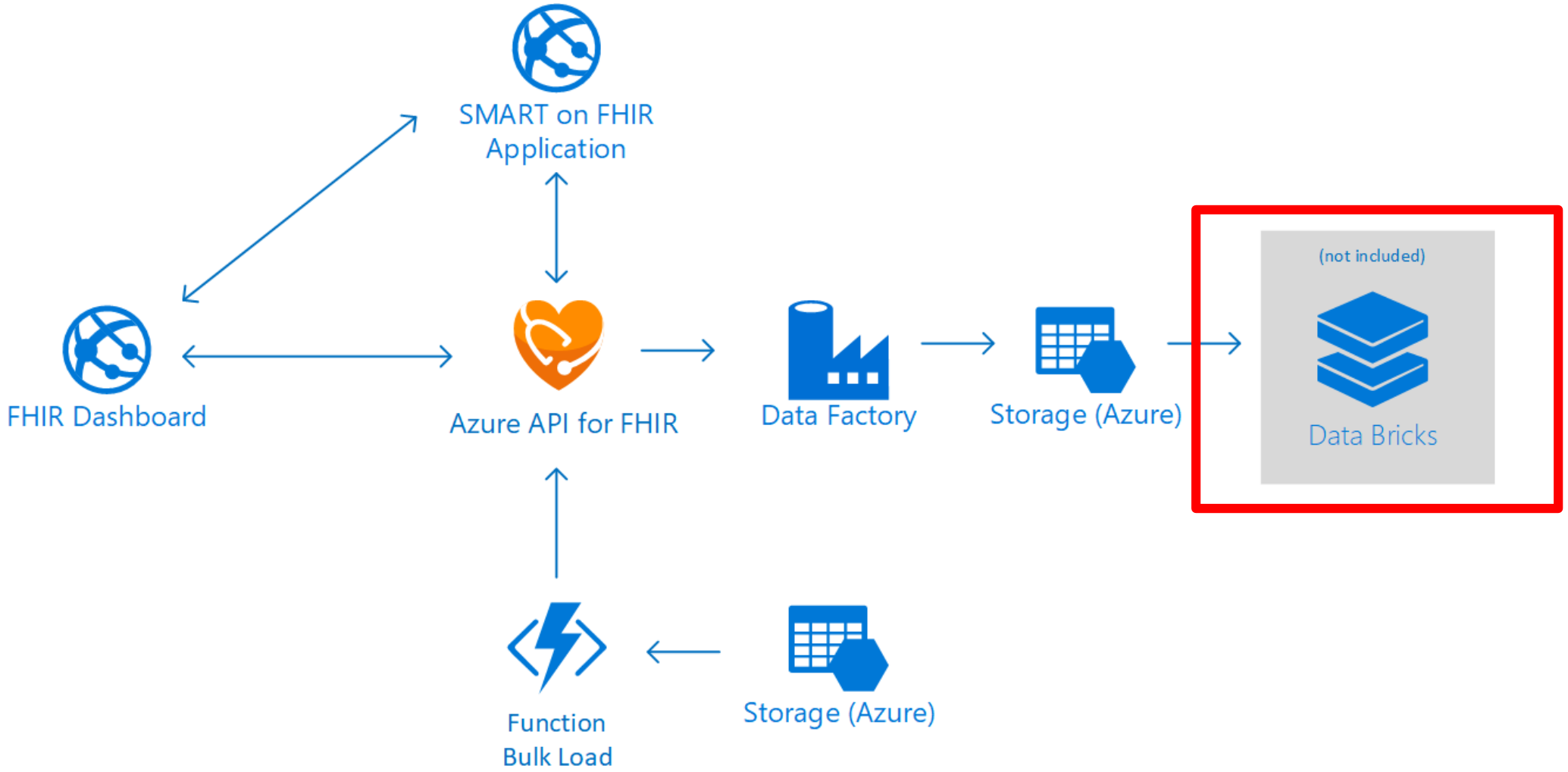
/Patient/15aac6e1-3e1f-4bda-abc3-dc6d14ed58a5


```
{
  "resourceType": "Patient",
  "id": "15aac6e1-3e1f-4bda-abc3-dc6d14ed58a5",
  "meta": {
    "versionId": "1",
    "lastUpdated": "2019-05-31T00:33:36.3422591+00:00"
  },
  "text": {
    "status": "generated",
    "div": "
Generated by Synthea.Version identifier: v2.2.0-56-g113d8a2d\n .   Person seed: -5698744194936560646
"
  },
  "extension": [
    {
      "extension": [
        {
          "url": "ombCategory",
          "valueCoding": {
            "system": "urn:oid:2.16.840.1.113883.6.238",
            "code": "2106-3",
            "display": "White"
          }
        },
        {
          "url": "text",
          "valueString": "White"
        }
      ],
      "url": "http://hl7.org/fhir/us/core/StructureDefinition/us-core-race"
    },
    {
      "extension": [
        {
          "url": "ombCategory",
          "valueCoding": {
            "system": "urn:oid:2.16.840.1.113883.6.238",
```

Analytics Databricks


SMART on FHIR
Application
FHIR Dashboard
Azure API for FHIR
Data Factory
Storage (Azure)
(not included)
Data Bricks
Function
Bulk Load
Storage (Azure)

mihansen-databricks1 - Microsof | Your Azure Function App is up a

https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/8d0d324c-b1a1-4c71-8b9b-12320b418911/resourceGroups/miha...

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Home > Resource groups > mihansen-databricks1

mihansen-databricks1

Resource group

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- Cost analysis
- Cost alerts
- Budgets
- Advisor recommendations

Monitoring

- Insights (preview)
- Alerts
- Metrics

Add | Edit columns | Delete resource group | Refresh | Move | Export to CSV | Assign tags | Delete | Export template

Subscription (change) : mihansen internal subscription

Subscription ID : 8d0d324c-b1a1-4c71-8b9b-12320b418911

Tags (change) : Click here to add tags

Deployments : 1 Succeeded

Filter by name... | All types | All locations | No grouping

1 items | Show hidden types

NAME	TYPE	LOCATION
mihansen1	Azure Databricks Service	West US 2

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https://ms.portal.azure.com/#@microsoft.onmicrosoft.com/resource/subscriptions/8d0d324c-b1a1-4c71-8b9b-12320b418911/resourceGroups/miha...

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Home > Resource groups > mihansen-databricks1 > mihansen1

mihansen1

Azure Databricks Service

Search (Ctrl+/)

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- Locks
- Export template

Support + troubleshooting

- New support request

Delete

Resource group (change) : mihansen-databricks1

Subscription (change) : mihansen internal subscription

Subscription ID : 8d0d324c-b1a1-4c71-8b9b-12320b418911

Managed Resource Group : databricks-rg-mihansen1-4grwwatpsixe2

URL : https://westus2.azuredatabricks.net

Pricing Tier : standard

Launch Workspace

Documentation | Getting Started | Import Data from File | Import Data from Azure Storage

Notebook | Admin Guide

- Create a resource
- Home
- Dashboard
- All services

FAVORITES

- All resources
- Resource groups
- App Services
- SQL databases
- Azure Cosmos DB
- Virtual machines
- Load balancers
- Storage accounts
- Virtual networks
- Azure Active Directory
- Monitor
- Advisor
- Security Center
- Cost Management + Bill...
- Help + support
- Subscriptions
- Resource Explorer
- Azure AD B2C
- Key vaults
- App Service Environmen...
- Log Analytics workspaces

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Azure Databricks

Explore the Quickstart Tutorial

Spin up a cluster, run queries on preloaded data, and display results in 5 minutes.

Drop files or click to browse

Import & Explore Data

Quickly import data, preview its schema, create a table, and query it in a notebook.

Create a Blank Notebook

Create a notebook to start querying, visualizing, and modeling your data.

Common Tasks

- New Notebook
- Upload Data
- Create Table
- New Cluster
- New Job
- New MLflow Experiment New
- Import Library
- Read Documentation

Recents

- fhirnotebook

Documentation

- Databricks Guide
- Python, R, Scala, SQL
- Importing Data

mihansen1 - Microsoft Azure | fhirnotebook - Databricks | Azure Data Factory | fhir-server-samples/analytics at

GitHub, Inc. [US] https://github.com/microsoft/fhir-server-samples/tree/master/analytics

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microsoft / fhir-server-samples

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Branch: master | fhir-server-samples / analytics / | Create new file | Upload files | Find file | History

hansenms Adf option2 (#41) ... Latest commit 257d5ea on Apr 29

..

README.md	Adf option2 (#41)	a month ago
fhirnotebook.ipynb	Adf option2 (#41)	a month ago

README.md

Analytics with ADF and Databricks

The templates folder includes a template for Azure Data Factory. This template will deploy an Azure Data Factory instances, which can be used to export specific resource types to ndjson files. Specifically, the template has an array parameter called `resourceTypes`, which can be set to the resource types for which export pipelines should be deployed.

Once deployed these export pipelines can be triggered manually to export a given resource type to blob storage. The ndjson files are easily consumed, e.g. in Databricks (Apache-Spark).

Using Databricks

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https://westus2.azuredatabricks.net/?o=4290740572521372#notebook/2344533555422082/command/2344533555422088

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fhirnotebook (Python)

Attached: mihansencluster | File | View: Code | Permissions | Run All | Clear | Schedule | Comments | Runs | Revision history

Cmd 1

Analyzing FHIR data in Databricks

Cmd 2

```
# Some initial setting:
storageAccountName = "fhirsampdevxzihtb76sa"
storageAccountKey = "+[redacted]87s3d6ChcD9Iq8kjXttqj7SSQRrFsBwPZFZgECnqZvA=="
```

Command took 0.13 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:39:44 PM on mihansencluster

Cmd 3

```
dbutils.fs.mount(
  source = "wasbs://dataexport@" + storageAccountName + ".blob.core.windows.net",
  mount_point = '/mnt/dataexport',
  extra_configs = {"fs.azure.account.key." + storageAccountName + ".blob.core.windows.net":storageAccountKey})
```

(1) Spark Jobs

Out[2]: True

Command took 24.06 seconds -- by mihansen@microsoft.com at 5/28/2019, 4:10:33 PM on mihansencluster

Cmd 4

```
%sql CREATE TEMPORARY TABLE observationTable USING json OPTIONS (path "/mnt/dataexport/Observation.json")
```

(1) Spark Jobs

OK

Command took 5.19 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:50:11 PM on mihansencluster

Cmd 5

```
%sql CREATE TEMPORARY TABLE patientTable USING json OPTIONS (path "/mnt/dataexport/Patient.json")
```

(1) Spark Jobs

OK

Command took 0.50 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:50:23 PM on mihansencluster

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fhirnotebook (Python)

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Cmd 5

```
%sql CREATE TEMPORARY TABLE patientTable USING json OPTIONS (path "/mnt/dataexport/Patient.json")
```

(1) Spark Jobs

OK

Command took 0.50 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:50:23 PM on mihansencluster

Cmd 6

```
%sql
CREATE OR REPLACE TEMPORARY VIEW temp_heights AS
  SELECT * FROM (
    SELECT
      SUBSTRING_INDEX(subject.reference,'/',-1) AS patient,
      valueQuantity.value as heightValue,
      valueQuantity.unit as heightUnit,
      ROW_NUMBER() OVER (PARTITION BY subject.reference ORDER BY issued DESC) AS rn
   FROM observationTable WHERE code.coding[0].code = "8302-2") tm
  WHERE tm.rn = 1
```

OK

Command took 0.24 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:50:49 PM on mihansencluster

Cmd 7

```
%sql
CREATE OR REPLACE TEMPORARY VIEW temp_weights AS
  SELECT * FROM (
    SELECT
      SUBSTRING_INDEX(subject.reference,'/',-1) AS patient,
      valueQuantity.value as weightValue,
      valueQuantity.unit as weightUnit,
      ROW_NUMBER() OVER (PARTITION BY subject.reference ORDER BY issued DESC) AS rn
   FROM observationTable WHERE code.coding[0].code = "29463-7") tm
  WHERE tm.rn = 1
```

OK

Command took 0.07 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:50:51 PM on mihansencluster

Cmd 8

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fhirnotebook (Python)

Attached: mihansencluster | File | View: Code | Permissions | Run All | Clear | Schedule | Comments | Runs | Revision history

```sql
%sql
CREATE OR REPLACE TEMPORARY VIEW temp_latitude AS
  SELECT id, coord.valueDecimal AS latitude FROM
    (SELECT id, explode(address[0].extension[0].extension) as coord FROM patientTable)
  WHERE coord.url = 'latitude';

CREATE OR REPLACE TEMPORARY VIEW temp_longitude AS
  SELECT id, coord.valueDecimal AS longitude FROM
    (SELECT id, explode(address[0].extension[0].extension) as coord FROM patientTable)
  WHERE coord.url = 'longitude'
```

OK

Command took 0.10 seconds -- by mihansen@microsoft.com at 5/30/2019, 5:51:24 PM on mihansencluster

Cmd 9

```sql
%sql
SELECT
  patientTable.id,
  patientTable.name[0].family AS lastName,
  temp_longitude.longitude AS longitude,
  temp_latitude.latitude AS latitude,
  temp_weights.weightValue, temp_heights.heightValue
FROM patientTable
  INNER JOIN temp_weights ON temp_weights.patient = patientTable.id
  INNER JOIN temp_heights ON temp_heights.patient = patientTable.id
  INNER JOIN temp_latitude ON temp_latitude.id = patientTable.id
  INNER JOIN temp_longitude ON temp_longitude.id = patientTable.id
LIMIT 10
```

(4) Spark Jobs

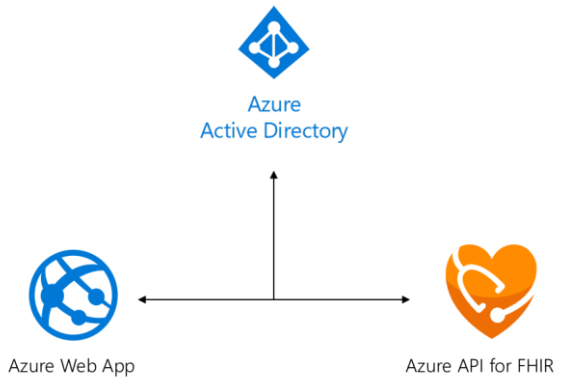
id	lastName	longitude	latitude	weightValue	heightValue
0f7c47c3-5590-4b31-9bb7-5c63ce7ac2a7	Mohr916	-70.599243	41.594939	92.13042895893534	192.85297269012312
8aee0b6e-21fb-4f6c-aae9-2d83e532e17d	Lakin515	-71.45625600000002	42.425955	80.15757577973014	190.54977969241796
5c5e4974-7d28-4d98-84d4-18eb3eb4f788	Krajcik437	-71.24226800000002	42.388921	13.3112797373299	81.28613786091779
d01e01e5-2674-45c6-b69c-ecf626c974a7	Rowe323	-70.969734	42.534202	16.595222814972455	96.0173701365811
f37fa7c5-aedf-4e86-a325-9d36a6975367	Hahn503	-71.142002	42.323853	84.36838963519705	180.61652820180467

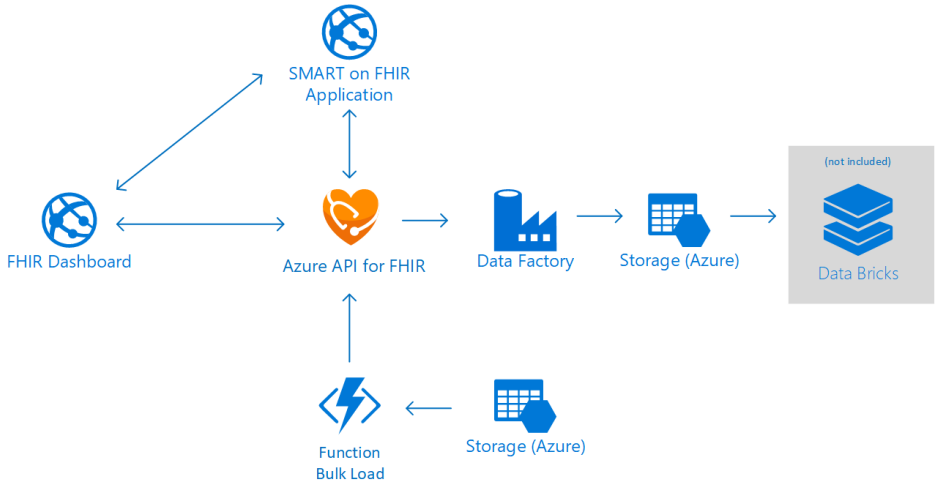
SUMMARY

You are likely to need a FHIR sandbox to test your FHIR App

Good sandboxes are easy to deploy, maintain, and dispose of

We looked at a couple of options for sandboxes based on managed cloud services





https://aka.ms/michael-devdays

https://github.com/hansenms/FHIRDevDays-Amsterdam2019

https://github.com/Microsoft/fhir-server-samples

https://azure.microsoft.com/free/

mihansen@microsoft.com