

# DIPS FHIR R4 Observation Installation Guide

DIPS AS

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Date	Revision	Approved by	Role
2021-10-30	1.0.0	Lars-Andreas Nystad	Product owner

# 1. Prerequisites for FHIR R4 DocumentReference Module

*DIPS FHIR R4 Observation* is a web service installed in IIS. The following system requirements are needed for this service to run.

- DIPS EPJ/PAS version 7.3.0 or newer. This does not need to be installed on the same computer, but the service builds on database components from version 7.3.
- IIS, version 7.5 or newer.
- The Default Web Site must have an SSL binding with a valid SSL certificate.
- .NET Core Hosting Bundle version  $\geq 3.1.12$  must be installed, this contains runtime files for .Net Core and Asp.Net Core 3.1.12. See <https://www.microsoft.com/net/permalink/dotnetcore-current-windows-runtime-bundle-installer>
- .NET Framework 4.6.1 or newer.
- DIPS Federation Service must be installed on an accessible server if federated security is used. Required version  $\geq 1.2.0$
- Optional: If the Audit Service is to be used the installed version must be  $\geq 1.5.5$ .
- Minimum Oracle database 11gR2 Oracle Standard Edition.
- Same network and connectivity requirements as for Arena application server
- Install Chocolatey from <https://chocolatey.org/>
- Install FHIR R4 core
- Arena FHIR Server Wrapper 2.3.0 should be installed, see instructions below:



Please refer the [Compatibility Matrix](#) to find out exactly which version should be installed, based on the Arena server version.

1. Download Arena FHIR Server Wrapper package, and extract the file `arena-fhir-serverwrapper-service_n.n_buildnnnn.zip` (where n is a digit)
2. Open the target folder containing the extracted files.
3. Open the file `install_parameters.config` and insert correct parameter values according to the descriptions. We recommend that you keep a copy of this file for later use.
4. Save and close file.
5. Remove earlier versions of the product:
  - a. Use the Windows PowerShell script `Remove.ps1` if the product was installed using Chocolatey.
6. Start PowerShell console as administrator
7. Install by running the Windows PowerShell script `Setup.ps1`

## 2. Chocolatey Installation Process

DIPS FHIR R4 DocumentReference uses an installation system based on Chocolatey, which is a packet manager for Microsoft Windows. Chocolatey is used to simplify installation and updating. It's now possible to customize, script and automate the installation process. For more information about Chocolatey, see <https://chocolatey.org>

### 2.1. Prerequisites for Chocolatey/PowerShell

Prior to installing DIPS FHIR R4 with Chocolatey in PowerShell (PS), you need permissions to run the `./setup.ps1` script. If permissions are not already set, run the following command in PowerShell with admin rights:

```
PS C:\> Set-ExecutionPolicy -ExecutionPolicy Unrestricted
```

Output from the command:

"Execution Policy Change The execution policy helps protect you from scripts that you do not trust. Changing the execution policy might expose you to the security risks described in the about\_Execution\_Policies help topic at <http://go.microsoft.com/fwlink/?LinkID=135170>. Do you want to change the execution policy? [Y] Yes [N] No [S] Suspend [?] Help (default is "Y"):"

Insert Y to set the execution policy.

### 2.2. Chocolatey logging and monitoring

The Chocolatey log contains extensive information from the installation process. The Chocolatey logs are located in `C:\ProgramData\Chocolatey\logs`. The latest log is called "Chocolatey.log", and older logs are appended with a digit, e.g. "Chocolatey.log.1" and "Chocolatey.log.2".

### 2.3. Chocolatey Delivery

These are the files

- `fhir-r4-service_n.n.n_buildnnnn.zip`
- `fhir-r4-database_n.n.n_buildnnnn.zip`

Extract the file `fhir-r4-service_n.n.n_buildnnnn.zip` (where n is a digit). In the folder `Packages` you will find all resources delivered. If you want to exclude some of them, open the `Packages.config` file and remove the line containing the resource you want to exclude.

The file `fhir-r4-database_n.n.n_buildnnnn.zip` contains required database upgrades.

## 3. Information needed before installation

The file `install_parameters.config` contains information needed to run installation, and must be changed. We recommend that you copy this for later installations. Based on the [DIPS](#)

[Configuration Server Parameters](#), either the DIPS Configuration Server or file `appsettings.json` in the installation folder of DIPS FHIR R4 will contain these parameters after installing, and they may be changed there.

### 3.1. Common Parameters

Parameter	Default value	Description	Read Only
InstallLocation	D:\DIPS	The installation location. Example: "D:\DIPS".	No
LogPath	D:\DIPS-Log	Full path to folder where logfiles should be placed, e.g. 'D:\DIPS-Log'.	No
ServiceBrokerCareServiceUrl		URI for ServiceBrokerCare WCF service. https://[servername]/ServiceBrokerCareWcfServer/	No
EncounterServiceUrl		FHIR Encounter Service URL, Example: https://[servername]/FhirEncounterServer/	No
DocumentServiceUrl		URI for DIPS WCF service. https://[servername]/DIPS/DIPS-WCFService/	No
HealthCarePartyServiceUrl		URL for Health Care Party WCF service. https://[servername]/HealthCarePartyWcfServer/	No

### 3.2. DIPS Configuration Server Parameters

Parameter	Default value	Description	Read Only
SetConfig		Set to 'true' to run Configuration. If 'false' binaries are installed, not config or setup.	No
OverrideConfig		If 'true', install will overwrite existing values in the appsettings.json in the install directory. If 'false', only new values will be added.	No
UseCentralizedConfig		Set to 'true' if services should use centralized configuration.	No
SetCentralizedConfig		Set to 'true' to update centralized configuration values. Centralized configuration values are never overwritten, even if 'OverrideConfig' is 'true'."	No
ConfigServiceSSLCertificateSubject		Subject of Certificate to be used when connecting to DIPS Configuration Server	No

Parameter	Default value	Description	Read Only
ConfigServiceRootUrl		Endpoint for DIPS Configuration Server root URL for the server environment.	No
ConfigServiceEnvironmentPath		Environment path for DIPS Configuration server environment	No

### 3.3. IIS Parameters

Parameter	Default value	Description	Read Only
HostHeader		Host header for DIPS FHIR R4. Example: 'computername.userdnsdomain'	No
UseHttps		Set to 'true' to run Configuration. If 'false' binaries are installed, not config or setup.	No
Port		Defaults to 80 (HTTP) or 443 (HTTPS) depending on UseHttps.	No
SSLSubject		Subject of the certificate to use to secure the DIPS FHIR R4 with HTTPS. Example: 'hospital.local'.	No
CreateIISApplication		Switch for creating the IIS application	No

### 3.4. Audit Event/Authorization Parameters

Parameter	Description
AuditServiceUrl	Absolute URI of the audit service application. If left blank, audit logging will not be performed
UseAuthorizationService	Specifies if DIPS Authorization Service is used for access control. Valid values: true/false. Default: false
AuthorizationServiceUrl	URL to DIPS Authorization Service, e.g. https://[host]/dipsauthorization-service/

### 3.5. Federation Service Parameters

Parameter	Description
UseFederatedSecurity	Set to true to use ticket exchange with DIPS Federation Service
FederationServiceUrl	DIPS Federation Service endpoint. Eg: https://[servername]/dips.oauth/identity

### 3.6. Database Parameters

Parameter	Description	Read Only
DatabaseDataSource	Data source for the DIPS database, to be used in the database connection string. Should contain the full connect descriptor. Example: (DESCRIPTION=(ADDRESS_LIST=(ADDRESS=(PROTOCOL=TCP)(HOST=[db_server])(PORT=[port])))(CONNECT_DATA=(SERVER=DEDICATED)(SERVICE_NAME=[service_name])))	No
DatabaseFhirPassword	Database password for 'FHIR_APP' user.	No

## 4. Resource specific install parameters



Parameters that are mentioned as "Read Only = Yes" should not be changed. Those were initially added in case customization was needed, but as of now there is no need to change these default values.

Table 1. DIPS FHIR R4 DocumentReference install parameters

Parameter	Default value	Description	Read Only
DocumentReferenceCount	100	Default records per page	No
DocumentReferenceIsDescending	true	Default sort order	No
DocumentReferenceSortField	EventTime	Default sort field name. Available fields: EventTime, IsSigned, CreatedBy, LastModifiedBy, ReferralId. See API Documentation for details.	No
DocumentReferencePage	1	Default page number	No
FHIRBinaryServiceUrl		URL for FHIR Binary service. https://[servername]/DIPS-WebAPI/HL7/FHIR-R4/Binary	No



In all of the example URLs given below, the HTTP protocol used is `https`. This is defined by the installation parameter 'UseHttps' in `appsettings.json`.

## 5. Installation of DIPS FHIR R4

### 5.1. Upgrade Database

1. Extract the file `fhir-r4-database_n.n.n_buildnnnn.zip` (where `n` is a digit).
2. Upgrade by running the Windows PowerShell script `upgrade_database.ps1`.



### 5.1.1. Password on database users

The upgrade creates database users which are used for data access in the default configuration. Before using the service these users must be unlocked and given a password.

Table 2. Database users

User	Description
FHIR_APP	Database user for the Service Broker

```
alter user FHIR_APP identified by <password>;
```

## 5.2. Install DIPS FHIR R4 Observation Services

1. Extract the file `fhir-r4-service_n.n.n_buildnnnn.zip` (where `n` is a digit)
2. Open the target folder.
3. Open the file `install_parameters.config` and insert correct parameter values. We recommend that you keep a copy of this file for later use.
4. Save and close file.
5. Remove earlier versions of the product.
  - a. Use the Windows PowerShell script `Remove.ps1` if the product was installed using Chocolatey.
6. Install by running the Windows PowerShell script `Setup.ps1`.

## 5.3. TnsNames.ora and Oracle Managed Driver

Four services installed by DIPS FHIR R4 Observation use Oracle Managed Driver, which needs special considerations to support `tnsnames.ora`.

Depending on how ODP.NET and the managed driver are installed, `machine.config` may already have been updated to support `tnsnames.ora`. Otherwise you need to add configuration to the following files in order to use `tnsnames` in the `Database.DataSource` parameter.

1. `[DIPS-dir]\FHIR-R4\appsettings.json`

```

<configSections>
  <!-- This part may not be needed if it is in machine.config -->
  <section name="oracle.manageddataaccess.client" type=
"OracleInternal.Common.ODPMSectionHandler, Oracle.ManagedDataAccess" />
</configSections>

<oracle.manageddataaccess.client>
  <version number="*">
    <settings>
      <!-- Set 'value' to the directory containing tnsnames.ora -->
      <setting name="TNS_ADMIN" value="C:\oracle\product\12.1.0\client_1\network\admin"/>
    </settings>
  </version>
</oracle.manageddataaccess.client>

```

## 5.4. Verify Installation

To verify installation in IIS do the following:

1. Open IIS manager
2. Check that the application pool `fhir-r4-service` exists. This application pool should have status *Started* and contain 1 application.
3. Open Default Web Site
4. Check that the application “DIPS-WebAPI/HL7/fhir-r4” exists

## 6. Monitoring the service

### 6.1. IIS Request Log

The IIS request log contains all recorded service calls to this server and the HTTP status codes that were returned.

### 6.2. Application Logs

DIPS FHIR R4 Observation will by default log errors and warnings to “C:\DIPS-Log\”

#### 6.2.1. Changing application log location

If you want the application logs to be written to a different location than the default “C:\DIPS-Log\” you may change this by editing `log4net.config`.

1. Go to the Installation folder.

2. Edit `log4net.config`
3. Find “log4net/appender/file”. Change the value attribute to the folder and filename you want for your log. There are multiple appenders in the configuration.

### 6.2.2. Correlation between log entries and requests

During request processing, DIPS FHIR R4 Observation will attach an HTTP header "X-DIPS-Callcontext" to the response. The value of this header is an opaque string which provides a unique context for the request. It is created when processing of the request starts in the application, and it follows the entire request.

Below is a partial HTTP response, which shows the HTTP header in action:

```
HTTP/1.1 200 OK
Content-Type: application/xml+fhir; charset=utf-8
Content-Location: https://server/DIPS-WebAPI/HL7/FHIR-R4/Patient/cdp12345
Server: Microsoft-IIS/10.0
X-DIPS-CallContext: Lp/rr/ZC4kSsiKcS6GkJaQ

<Patient xmlns="http://hl7.org/fhir">
  <status value="generated"/>
  <id>cdp12345</id>
  .
  .
</Procedure>
```

By default, application logs generated by DIPS FHIR R4 Observation will also contain this context identifier:

```
DEBUG (null);Lp/rr/ZC4kSsiKcS6GkJaQ DIPS.FHIR.R4.Patient.Server.PatientService -
GetPatientByOfficialNumber: Results: 1, Number of unauthorized: 0
```

If an error situation occurs, the calling system can extract the "X-DIPS-CallContext" header value. By using this value, application logs can be filtered to show only logs that contain this context ID for quicker error investigation.

## 7. Error Handling

Sometimes user rights on server causes problems after installations. This chapter contains some help solving common issues.

### 7.1. Application pool will not start

An application pool which fails to start will often generate an error message. This error message will be

visible in the event viewer of the server computer.

1. Open the Event Viewer.
2. Open «Windows Logs» and click «Applications».
3. To narrow the results, you can right-click and select «Filter Current Logs». Add the following filters:
  1. Event level: Error
  2. Event Sources: IIS-W3SVC-WP
4. All errors connected to startup problems of an Application Pool are listed here.

## 7.2. No Application Logs

If the application does not create a log file at C:\DIPS-Log\ or chosen folder for logging application specific information, it can be a problem with access to the folder. Check if the folder C:\DIPS-Log\ (or chosen) exists. Create the folder if not. Give access as shown below. To add access to folder do following:

1. Find the log folder.
2. Right click on the folder and choose “Properties”.
3. Choose “Security”
4. Choose Edit
5. In the dialog that appears choose “Add...”
6. In the dialog that appears do the following:
  1. Choose “Locations...” and choose the local computer.
  2. In “Object names to select”, enter the following text: “IIS AppPool\DIPS-FHIRDSTU2Pool”.  
This is the identity of the user that is running DIPS FHIR R4 Observation service in IIS.
7. Press OK

The application specific logs should now be written to the folder.

## 8. Service Availability Checklist

Verification Step	Expected Result	Description / Action If Failing
<b>FHIR Common Services</b>		

Verification Step	Expected Result	Description / Action If Failing
<a href="https://&lt;ServerName&gt;/DIPS-WebAPI/HL7/fhir-r4">https://&lt;ServerName&gt;/DIPS-WebAPI/HL7/fhir-r4</a>	HTTP 200 and will be directed to metadata	This is FHIR endpoint common to all FHIR services. If failing, none of the FHIR services can work. Refer to module FHIR-CORE-R4 for more information on verifying if that is installed properly.
<a href="https://&lt;ServerName&gt;/DIPS-WebAPI/HL7/fhir-r4/&lt;fhirResource&gt;">https://&lt;ServerName&gt;/DIPS-WebAPI/HL7/fhir-r4/&lt;fhirResource&gt;</a> : without header	HTTP 401 with this content body (as we have not sent Auth-Ticket HTTP header)<Error><Message>Authorization has been denied for this request.</Message></Error>	Common for all FHIR resources
<b>FHIR R4 Binary Service</b>		
Locate DLL files present in: <InstallLocation>\FHIR-R4\bin and verify if correct version is installed	DIPS.FHIR.R4.Binary.Server.dll : 1.1.0.xxxx	If the versions are different, make sure that the correct delivery package was downloaded
<b>Arena FHIR ServerWrapper Service</b>		
<a href="https://&lt;ServerName&gt;/DIPS/DIPS-WcfService/DIPS-ArenaServerWrapper-HealthRecordDocuments-IFHIRDocumentService.svc">https://&lt;ServerName&gt;/DIPS/DIPS-WcfService/DIPS-ArenaServerWrapper-HealthRecordDocuments-IFHIRDocumentService.svc</a>	HTTP 200. WSDL listing of endpoint should be returned	WCF endpoint for reading a Document
<a href="https://&lt;ServerName&gt;/DIPS/DIPS-WcfService/DIPS-ArenaServerWrapper-HealthRecord-Services-IFHIRDocumentCommandService.svc">https://&lt;ServerName&gt;/DIPS/DIPS-WcfService/DIPS-ArenaServerWrapper-HealthRecord-Services-IFHIRDocumentCommandService.svc</a>	HTTP 200. WSDL listing of endpoint should be returned	WCF endpoint for Document Create
If only first endpoint is working and second is not	This means module is not the latest	Verify the installed module is version 2.3.0.xxxxx
<b>FHIR Binary Service</b>		
<a href="https://&lt;ServerName&gt;/DIPS/DIPS-WcfService/DIPS-DocumentPublish-Api-IDocumentPublishApi.svc">https://&lt;ServerName&gt;/DIPS/DIPS-WcfService/DIPS-DocumentPublish-Api-IDocumentPublishApi.svc</a>	HTTP 200. WSDL listing of endpoint should be returned	WCF endpoint for Binary Read
<b>Common for FHIR Document and FHIR Binary</b>		

Verification Step	Expected Result	Description / Action If Failing
Locate DLL files present in: <InstallLocation>\FHIRR4\bin and verify if correct version is installed	DIPS.ArenaServerWrapper.dll : 2.3.0.xxxx DIPS.FHIR.R4.DocumentReference.Server.dll : 1.1.0.xxxx DIPS.FHIR.R4.Binary.Server.dll : 1.1.0.xxxx	If the versions are different, make sure that the correct delivery package was downloaded

## 9. Compatibility Matrix

This chart describes the compatibility of each module with the rest of modules.

### 9.1. FHIR R4 Document

FHIR-CORE-R4	FHIR-R4-Document	Arena-FHIR-ServerWrapper	FHIR Module	FHIR Module Version	Arena Server		
					19.1	20.1	21.1
1.2.0	1.1.0	2.3.0	FHIR Document	1.1.0.*	✓	✓	✓
			FHIR Binary	1.1.0.*	✓	✓	✓
			FHIR ArenaServerWrapper	2.3.0.*	✓	✓	✓

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DIPS AS  
Postboks 1435  
8037 Bodø  
Norway  
<https://www.dips.no>  
+47 75 59 20 00