

# **OPENIMIS FHIR INTEGRATION DOCUMENT**

Ver 1.2

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## Table of Contents

<b>Document Control.....</b>	<b>1</b>
<b>1. Introduction .....</b>	<b>2</b>
1.1. Purpose.....	2
1.2. Intended Audience and Reading Suggestions .....	2
<b>2. FHIR and OpenIMIS.....</b>	<b>2</b>
<b>3. OpenIMIS FHIR API Specification .....</b>	<b>4</b>
<b>3.1. API Authentication.....</b>	<b>7</b>
3.2. Eligibility FHIR Resource and API.....	8
3.3. Patient FHIR Resource and API.....	11
3.3.1. GET PATIENT USING PATIENT UUID.....	11
3.3.2. GET PATIENT USING PATIENT ID.....	14
3.4. Claim FHIR Resource and API.....	21
3.4.1. GET ALL CLAIMS .....	21
3.4.2. GET CLAIM BY Claim UUID.....	26
3.4.3. GET CLAIM BY Claim ID.....	31
3.4.5. SUBMIT CLAIM.....	35

## Document Control

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## **1. Introduction**

### **1.1. Purpose**

The purpose of the document is to describe necessary information for integrating software applications to OpenIMIS Software to initiate insurance claims.

### **1.2 Intended Audience and Reading Suggestions**

The intended audience for this document comprises mainly software developers, software development managers or any other person with technical expertise in software development who is a technical partner or employee or has the approval for reading this document. And this process details are intended for the operations/ business managers of the companies having health care application.

## **2. FHIR and OpenIMIS**

### **What is FHIR (Fast Healthcare Interoperability Resource)?**

It is an interoperability standard for electronic exchange of healthcare information developed by health level Seven International (HL7). FHIR was created with the complexity of healthcare data in mind, and takes a modern, internet-based approach to connecting different discrete elements.

### **How FHIR Works?**

It is built upon the concept of “resources” – any content that is exchangeable – which are used as building blocks that can be incorporated in existing systems. Resources must have:

- A common definition and method of representation, A common set of metadata, A human readable part

Resources can be in XML, JSON, HTTP, Atom, OAuth structure. Aim is to create a framework that can be used to extend and adapt resources and can be interpreted by any system, no matter how it was developed. It can be used in a variety of applications, including mobile apps, cloud communications, EHRs, and more.

## **Why FHIR ?**

Goal is to standardize the exchange of healthcare information, enabling healthcare providers and administrators to easily share patient information even when they're using different software systems. It eliminates the need to exchange individual documents or data back and forth between systems, while ensuring that disparate applications can point to the right information, and the same version of that information, simultaneously, which in turn offers the potential for several benefits, such as:

- Easy implementation
- Improves the speed of healthcare delivery by making data readily accessible
- Standardizes and structures data for automated clinical support and other machine-based processing
- Eliminates the time-consuming document-based exchange of information, feeding information directly into workflow.

## **FHIR in OpenIMIS**

FHIR compatible resources in OpenIMIS are :

- [FHIR - Claim](#)
- [FHIR - ClaimResponse](#)
- [FHIR - Coverage](#)
- [FHIR - Patient](#)
- [FHIR - Practitioner](#)
- [FHIR - Location](#)
- [FHIR EligibilityRequest](#)
- [FHIR EligibilityResponse](#)
- [FHIR - CommunicationRequest](#)

This documentation refers to resources of FHIR STU3.

### 3. OpenIMIS FHIR Resources and APIs

#### 3.1 API Authentication

**URL :** [http://<openimis.host>/api/api\\_fhir/](http://<openimis.host>/api/api_fhir/)

**Method:** Get

**Authentication type :** Basic

**Authentication Parameters :**

Username: <value>

Password: <value>

**Header Parameter :**

remote-user : <value>

**Response:**

```
{  
  "Patient": "http://<openimis.host>/api/api\_fhir/Patient/",  
  "Location": "http://<openimis.host>/api/api\_fhir/Location/",  
  "PractitionerRole": "http://<openimis.host>/api/api\_fhir/PractitionerRole/",  
  "Practitioner": "http://<openimis.host>/api/api\_fhir/Practitioner/",  
  "Claim": "http://<openimis.host>/api/api\_fhir/Claim/",  
  "ClaimResponse": "http://<openimis.host>/api/api\_fhir/ClaimResponse/",  
  "CommunicationRequest": "http://<openimis.host>/api/api\_fhir/CommunicationRequest/",  
  "EligibilityRequest": "http://<openimis.host>/api/api\_fhir/EligibilityRequest/",  
  "Coverage": "http://<openimis.host>/api/api\_fhir/Coverage/"  
}
```

### 3.2 FHIR ELIGIBILITY RESOURCE : POST REQUEST

**URL:** [http://<openimis.host>/api/api\\_fhir/EligibilityRequest/](http://<openimis.host>/api/api_fhir/EligibilityRequest/)

**Authentication:** AS IN #1

**Method:** Post

**Reques Body:**

```
{
  "resourceType": "EligibilityRequest",
  "patient": {
    "reference": "Patient/<patiend_id>"
  }
}
```

Name	Type	Description
ResourceType	Domain Resource	CoverageEligibilityRequest resource
Patient	Reference(Patient)	The party who is the beneficiary of the supplied coverage and for whom eligibility is sought.

#### RESPONSE:

```
{
  "resourceType": "EligibilityResponse",
  "insurance": [
    {
      "benefitBalance": [
        {
          "category": {
            "text": "<value>"
          },
        },
      ],
    },
  ],
}
```



```

    "financial": [
      {
        "allowedMoney": {
          "value": <amt>
        },
        "usedMoney": {
          "value": <amt>
        }
      }
    ]
  },
  "contract": {
    "reference": "Contract/<Policy_id>/<Expiry_date>"
  }
}

```

Name	Type	Description
resourceType	DomainResource	CoverageEligibilityResponse resource
insurance	BackBone Element	Patient insurance information
benefitBalance	BackBone Element	Benefit Summary
category	<u>CodeableConcept</u>	Code to identify the general type of benefits under which products and services are provided
financial		Financial Benefits used to date
allowedMoney	UnsignedInt  string  Money	The quantity of the benefit which is permitted under the coverage
usedMoney	unsignedInt   string  Money	The quantity of the benefit which have been consumed to date

contract	string	A reference from the Insurer to which these services pertain to be used on further communication and as proof that the request occurred.
----------	--------	--

## Configuration required for extracting policy information in OpenIMIS server

```
"stu3_fhir_eligibility_config": {
  "fhir_serializer": "PolicyEligibilityRequestSerializer"
}
```

### 3.3 Patient FHIR Resource and API

#### 3.3.1 GET PATIENT USING PATIENT UUID

**URL:** [http://<openimis.host.address>/api/api\\_fhir/Patient/<Patient\\_UUID>](http://<openimis.host.address>/api/api_fhir/Patient/<Patient_UUID>)

**Authentication:** AS IN #1

**Method:** GET

**Response Body:**

```
{
  "resourceType": "Patient",
  "address": [
    {
      "text": "<full address>",
      "type": "physical",
      "use": "<use-home/work>"
    }
  ],
```

```

    {
      "text": " ",
      "type": "both",
      "use": "<use-home/work>"
    }
  ],
  "birthDate": "<date of birth>",
  "extension": [
    {
      "url":
"https://openimis.atlassian.net/wiki/spaces/OP/pages/960069653/FHIR+extension+isHead",
      "valueBoolean": true
    },
    {
      "url":
"https://openimis.atlassian.net/wiki/spaces/OP/pages/960331779/FHIR+extension+registrationDate",
      "valueString": "<registration-date>"
    },
    {
      "url":
"https://openimis.atlassian.net/wiki/spaces/OP/pages/960495619/FHIR+extension+Location",
      "valueString": ""
    },
    {
      "url":
"https://openimis.atlassian.net/wiki/spaces/OP/pages/960331788/FHIR+extension+Education",
      "valueString": ""
    },
    {

```

```

        "url":
"https://openimis.atlassian.net/wiki/spaces/OP/pages/960135203/FHIE+extension+Profession",
        "valueString": ""
    }
],
"gender": "<gender",
"id": "<patient-uuid>",
"identifier": [
    {
        "type": {
            "coding": [
                {
                    "code": "ACSN",
                    "system": "https://hl7.org/fhir/valueset-identifier-type.html"
                }
            ]
        },
        "use": "usual",
        "value": "<patient-uuid>"
    },
    {
        "type": {
            "coding": [
                {
                    "code": "SB",
                    "system": "https://hl7.org/fhir/valueset-identifier-type.html"
                }
            ]
        },
        "use": "usual",
        "value": "<patient-uuid>"
    }
],

```

```

        "use": "usual",
        "value": "<patient-id>"
    }
],
"name": [
    {
        "family": "<family-name>",
        "given": [
            "<given-name> "
        ],
        "use": "usual"
    }
],
"telecom": [
    {
        "system": "phone",
        "use": "home",
        "value": "<phone-number>"
    },
    {
        "system": "email",
        "use": "home",
        "value": "<email-id>"
    }
]
}

```

### 3.3.2 GET PATIENT USING PATIENT ID

**URL:** <http://<openimis.host.address>/api/fhir/Patient/?identifier=<patient-id>>

**Authentication:** AS IN #1

**Method:** GET

**Response Body:**

```
{
  "resourceType": "Bundle",
  "entry": [
    {
      "fullUrl": "http://demoimis.ssf.gov.np/api/api_fhir/Patient/<patient-uuid>",
      "resource": {
        "resourceType": "Patient",
        "address": [
          {
            "text": "",
            "type": "physical",
            "use": "home"
          }
        ],
        "birthDate": "<date of birth>",

        "extension": [

          {
            "url":
"https://openimis.atlassian.net/wiki/spaces/OP/pages/960069653/FHIR+extension+isHead",
```

"valueBoolean": true

},

{

"url":

"https://openimis.atlassian.net/wiki/spaces/OP/pages/960331779/FHIR+extension+registrationDate",

"valueString": "<registration-date>"

},

{

"url":

"https://openimis.atlassian.net/wiki/spaces/OP/pages/960495619/FHIR+extension+Location",

"valueString": ""

},

{

```
    "url":  
    "https://openimis.atlassian.net/wiki/spaces/OP/pages/960331788/FHIR+extension+Education",
```

```
    "valueString": ""
```

```
  },
```

```
  {
```

```
    "url":  
    "https://openimis.atlassian.net/wiki/spaces/OP/pages/960135203/FHIE+extension+Profession",
```

```
    "valueString": ""
```

```
  }
```

```
],
```

```
"gender": "<gender>",
```

```
"id": "<patient-uuid>",
```

```
"identifier": [
```

```
  {
```



```
"type": {

  "coding": [

    {

      "code": "ACSN",

      "system": "https://hl7.org/fhir/valueset-identifier-type.html"

    }

  ]

},

"use": "usual",

"value": "<patient-uuid>"

},

{

  "type": {
```

```
"coding": [  
  
  {  
  
    "code": "SB",  
  
    "system": "https://hl7.org/fhir/valueset-identifier-type.html"  
  
  }  
  
],  
  
  },  
  
  "use": "usual",  
  
  "value": "<patient-id>"  
  
}  
  
],  
  
"name": [  
  
  {
```

```
"family": "<family-name>",

"given": [

    "<given-name> "

],

"use": "usual"

}

],

"telecom": [

{

    "system": "phone",

    "use": "home",

    "value": "<phone-number>"

},
```

```

{

    "system": "email",

    "use": "home",

    "value": "<email-id>"

}

],
"link": [
    {
        "relation": "self",
        "url": "http://demoimis.ssf.gov.np/api/api_fhir/Patient/?identifier=<patient-id>"
    }
],
"total": 1,
"type": "searchset"
}

```

### 3.4 CLAIM FHIR RESOURCES :

#### 3.4.1 GET ALL CLAIMS

**URL:** [http://<openimis.host.address>/api/api\\_fhir/Claim](http://<openimis.host.address>/api/api_fhir/Claim)

**Authentication:** AS IN #1

**Method:** GET

**Response Body:**

```
{
  "resourceType": "Bundle",
  "entry": [
    {
      "fullUrl": "http://<openimis.host.address>/api/api_fhir/Claim/<claim-uuid>",
      "resource": {
        "resourceType": "Claim",
        "billablePeriod": {
          "end": "<date>",
          "start": "<date>"
        },
        "created": "<date>",
        "diagnosis": [
          {
            "diagnosisCodeableConcept": {
              "coding": [
                {
                  "code": "<code>"
                }
              ]
            }
          },
          {
            "sequence": 1,
            "type": [
              {
```

```

        "text": "<icd-code>"
      }
    ]
  }
],
"enterer": {
  "reference": "Practitioner/<practioner-uuid>"
},
"facility": {
  "reference": "Location/<location-uuid>      },
"id": "<claim-uuid>",
"identifier": [
  {
    "type": {
      "coding": [
        {
          "code": "ACSN",
          "system": "https://hl7.org/fhir/valueset-identifier-type.html"
        }
      ]
    },
    "use": "usual",
    "value": "<claim-uuid>"
  }
],
"information": [
  {

```

```

    "category": {
      "text": "<category-type>"
    },
    "sequence": 1,
    "valueString": "<visit-type>"
  }
],
"item": [
  {
    "category": {
      "text": "<category-type>"

    },
    "quantity": {
      "value": <amount>
    },
    "sequence": 1,
    "service": {
      "text": "<category-text>"
    },
    "unitPrice": {
      "value": <unit-amount>

    }
  },
  {
    "category": {

```

```

        "text": "<category-type>"
    },
    "quantity": {
        "value": < quantity >
    },
    "sequence": 2,
    "service": {
        "text": "<category-text>"
    },
    "unitPrice": {
        "value": <unit-amount>

    }
}

    ],
    "patient": {
        "reference": "Patient/<patient-uuid>"
    },
    "total": {
        "value":<amount>
    },
    "type": {
        "text": "O"
    }
}

},
{...},

```



{....}

}

Name	Type	Description
resourceType	Resource	Contains a collection of resources
billablePeriod	Period(startDate, endDate)	Relevant time frame for the claim
created	dateTime	Resource creation date
diagnosis[x]		Nature of illness or problem
diagnosisCodeableConcept	codableConcept	
enterer	reference	The party responsible for the entry of the Claim
facility	reference	Facility where the products or services have been or will be provided
Id,identifier	Identifier	Pre-assigned Claim number
information		Supporting Information
item	BackBone Element	Product or service provided
category	CodableConcept	Benefit classification
quantity	SimpleQuantity	Count of products or services
sequence	positiveInt	Item instance identifier
service	Date,Period	Date or dates of service or product delivery
unitPrice	Money	Fee, charge or cost per item
patient	Reference(Patient)	The recipient of the products and services
total	Money	Total claim cost
type	CodableConcept	Category or discipline

### 3.4.2 GET CLAIM BY Claim UUID

URL: [http://<openimis.host.address>/api/api\\_fhir/Claim/<Claim\\_UUID>](http://<openimis.host.address>/api/api_fhir/Claim/<Claim_UUID>)

Authentication: AS IN #1

Method: GET

### RESPONSE:

{

"resourceType": "ClaimResponse",

```

"addItem": [
  {
    "sequenceLinkId": [
      1
    ],
    "service": {
      "coding": [
        {
          "code": "<code>"
        }
      ]
    }
  },
  {
    "sequenceLinkId": [
      2
    ],
    "service": {
      "coding": [
        {
          "code": "<code>"
        }
      ]
    }
  },
  {
    "sequenceLinkId": [
      3
    ],
    "service": {
      "coding": [

```

```

        {
          "code": "<service-type>"
        }
      ]
    }
  }
],
"created": "<date>",
"id": "<claim-uuid>",
"identifier": [
  {
    "type": {
      "coding": [
        {
          "code": "ACSN",
          "system": "https://hl7.org/fhir/valueset-identifier-type.html"
        }
      ]
    },
    "use": "usual",
    "value": "<claim-uuid>"
  },
  {
    "type": {
      "coding": [
        {
          "code": "MR",
          "system": "https://hl7.org/fhir/valueset-identifier-type.html"
        }
      ]
    }
  }
],

```

```

        "use": "usual",
        "value": "<value>"
    }
],
"item": [
    {
        "adjudication": [
            {
                "category": {
                    "text": "<category-type>"
                },
                "reason": {
                    "coding": [
                        {
                            "code": "1"
                        }
                    ],
                    "text": "<status>"
                }
            }
        ],
        "sequenceLinkId": 1
    },
    {
        "adjudication": [
            {
                "category": {
                    "text": "<category-type>"
                },
                "reason": {
                    "coding": [

```

```

        {
            "code": "1"
        }
    ],
    "text": "<status>"
}
}
],
"sequenceLinkId": 2
},
{
    "adjudication": [
        {
            "category": {
                "text": "<category-type>"
            },
            "reason": {
                "coding": [
                    {
                        "code": "1"
                    }
                ],
                "text": "<status>"
            }
        }
    ],
    "sequenceLinkId": 3
}
],
"outcome": {
    "coding": [

```

```

    {
      "code": "4"
    }
  ],
  "text": "<status>"
},
"request": {
  "reference": "Claim/<uuid>"
}
}

```

Name	Type	Description
resourceType	DomainResource	Response to a claim predetermination or preauthorization
addItem	Backbone Element	Insurer added line items
sequenceLinkId	positiveInt	Claim item instance identifier
service	Date, Period	Date or dates of service or product delivery
created	dateTime	Response creation date
identifier		Business Identifier for a claim response
item	Backbone Element	Adjudication for claim line items
adjudication		Adjudication details
category	CodableConcept	Type of adjudication information
reason	CodableConcept	Explanation of adjudication outcome
outcome	code	queued   complete   error   partial
request	Reference(Claim)	Id of resource triggering adjudication

### 3.4.3 GET CLAIM BY Claim ID

URL: [http://<openimis.host.address>/api/api\\_fhir/ClaimResponse?identifier=<Claim\\_id>](http://<openimis.host.address>/api/api_fhir/ClaimResponse?identifier=<Claim_id>)

Authentication: AS IN #1

Method: GET

## Response

```
{
  "resourceType": "Claim",
  "billablePeriod": {
    "end": "<date>",
    "start": "<date>"
  },
  "created": "<date>",
  "diagnosis": [
    {
      "diagnosisCodeableConcept": {
        "coding": [
          {
            "code": "<code>"
          }
        ]
      },
      "sequence": 1,
      "type": [
        {
          "text": "icd_0"
        }
      ]
    }
  ],
}
```

```

"enterer": {
  "reference": "Practitioner/< Practitioner -uuid>"
},
"facility": {
  "reference": "Location/< Location-uuid>"
},
"id": "<claim-uuid>",
"identifier": [
  {
    "type": {
      "coding": [
        {
          "code": "ACSN",
          "system": "https://hl7.org/fhir/valueset-identifier-type.html"
        }
      ]
    },
    "use": "usual",
    "value": "<claim-uuid>"
  }
],
"item": [
  {
    "category": {
      "text": "< category –text>"
    }
  },

```



```
"quantity": {  
  "value": <quantity>  
},  
"sequence": 1,  
"service": {  
  "text": "<service-type>"  
},  
"unitPrice": {  
  "value": <amount>  
}  
},  
"patient": {  
  "reference": "Patient/<Patient-uuid>"  
},  
"total": {  
  "value": <amount>  
},  
"type": {  
  "text": "<type>"  
}  
}
```

### 3.4.5 Submit CLAIM

**URL:** [http://<openimis.host.address>/api/api\\_fhir/Claim](http://<openimis.host.address>/api/api_fhir/Claim)

**Authentication:** AS IN #1

**Method:** POST

**Request body:**

```
{
  "resourceType": "Claim",
  "billablePeriod": {
    "end": "< billablePeriod-enddate>",
    "start": "< billablePeriod startdate>"
  },
  "created": "<created date>",
  "diagnosis": [
    {
      "diagnosisCodeableConcept": {
        "coding": [
          {
            "code": "<ICD_Code>"
          }
        ]
      }
    }
  ]
}
```

```

        ]
    },
    "sequence": <sequence number>,
    "type": [
        {
            "text": "icd_0"
        }
    ]
}

],
"enterer": {
    "reference": "Practitioner/<enterer-UUID>"
},
"facility": {
    "reference": "Location/<Location-UUID>"
},
"id": "<uuid>",
"identifier": [
    {
        "type": {
            "coding": [
                {
                    "code": "ACSN",
                    "system": "https://hl7.org/fhir/valueset-identifier-type.html"
                }
            ]
        }
    }
],
"use": "usual",
"value": "<uuid>"

```

```

    },
    {
      "type": {
        "coding": [
          {
            "code": "MR",
            "system": "https://hl7.org/fhir/valueset-identifier-type.html"
          }
        ]
      },
      "use": "usual",
      "value": "<value>"
    }
  ],
  "item": [
    {
      "category": {
        "text": "<service or item>"
      },
      "quantity": {
        "value": <quantity-number>
      },
      "sequence": 1,
      "service": {
        "text": "<service-name>"
      },
      "unitPrice": {
        "value": <unit price>
      }
    }
  ]
}

```

```

    }
  ],
  "total": {
    "value": <Total_value sum of above items/services >
  },
  "patient": {
    "reference": "Patient/<Patient_uuid>"
  },

  "type": {
    "text": "<visit type : 0>"
  }
}

```

Name	Type	Description
resourceType	DomainResource	A Claim resource or Bundle of claims, either as individual Claim resources or as Bundles each containing a single Claim plus referenced resources.
billablePeriod	Period	Relevant time frame for the claim containing start and end date
created	dateTime	Resource creation date
diagnosis	Backbone Element	Pertinent diagnosis information
diagnosisCodeableConcept	Codable Concept	Concept code
coding		code
sequence	PositiveInt	Diagnosis instance identifier
type	Codable Concept	Timing or nature of the diagnosis
enterer	reference	The party responsible for the entry of the Claim
item	Backbone Element	Product or service provided

category	Codable Concept	Benefit classification
quantity	Simple Quantity	Count of products or services
sequence	positiveInt	Item instance identifier
service	Codable Concept	Billing, service, product, or drug code
unitPrice	Money	Fee, charge or cost per item
total	Money	Total Claim cost
patient	reference	Patient receiving the products or services
type	CodableConcept	The type of the diagnosis: admitting, principal, discharge

### Claim Response:

```
{
  "resourceType": "ClaimResponse",
  "addItem": [
    {
      "sequenceLinkId": [
        <sequence number>
      ],
      "service": {
        "coding": [
          {
            "code": "<service/item-code>"
          }
        ]
      }
    }
  ]
}
```

```

        }
    ]
}
}
],
"created": "<created-date>",
"id": "<id>",
"identifier": [
{
    "type": {
        "coding": [
            {
                "code": "ACSN",
                "system": "https://hl7.org/fhir/valueset-identifier-type.html"
            }
        ]
    },
    "use": "usual",
    "value": "<value>"
},
{
    "type": {
        "coding": [
            {
                "code": "MR",
                "system": "https://hl7.org/fhir/valueset-identifier-type.html"
            }
        ]
    },
    "use": "usual",
    "value": "<value>"
}
]
}

```

```

        }
    ]
},
"use": "usual",
"value": "<Claim code returned value>"
}
],
"item": [
{
    "adjudication": [
        {
            "category": {
                "text": "general"
            },
            "reason": {
                "coding": [
                    {
                        "code": "<code-number>"
                    }
                ],
                "text": "<status-passed/rejected>"
            }
        }
    ]
},
"sequenceLinkId": <sequence number>
}

```



```

],
"outcome": {
  "coding": [
    {
      "code": "<code-number>"
    }
  ],
  "text": "<claim status - checked, processed, valued>"
},
"request": {
  "reference": "Claim/<Claim-UUID>"
}
}

```

Name	Type	Description
resourceType	DomainResource	Response to a claim predetermination or preauthorization
addItem	Backbone Element	Insurer added line items
sequenceLinkId	positiveInt	Claim item instance identifier
service	Date, Period	Date or dates of service or product delivery
created	dateTime	Response creation date
identifier		Business Identifier for a claim response
item	Backbone Element	Adjudication for claim line items
adjudication		Adjudication details
category	CodableConcept	Type of adjudication information
reason	CodableConcept	Explanation of adjudication outcome
outcome	code	queued   complete   error   partial

request	Reference(Claim)	Id of resource triggering adjudication
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