



**Canada Health Infoway**

# **Projectathon Tooling**

CA:eReC Client & Server Simulators

# What are the CA:eReC Client & Server Simulators?



- ❖ **CA:eReC Client Simulator:** A web application, with user interface, used to simulate CA:eReC conformant clients (supports Requester and Performer Client transactions).
- ❖ **CA:eReC Server Simulator:** A FHIR server with RESTful APIs used to simulate CA:eReC conformant servers. Currently supports an open (non-IUA) endpoint.

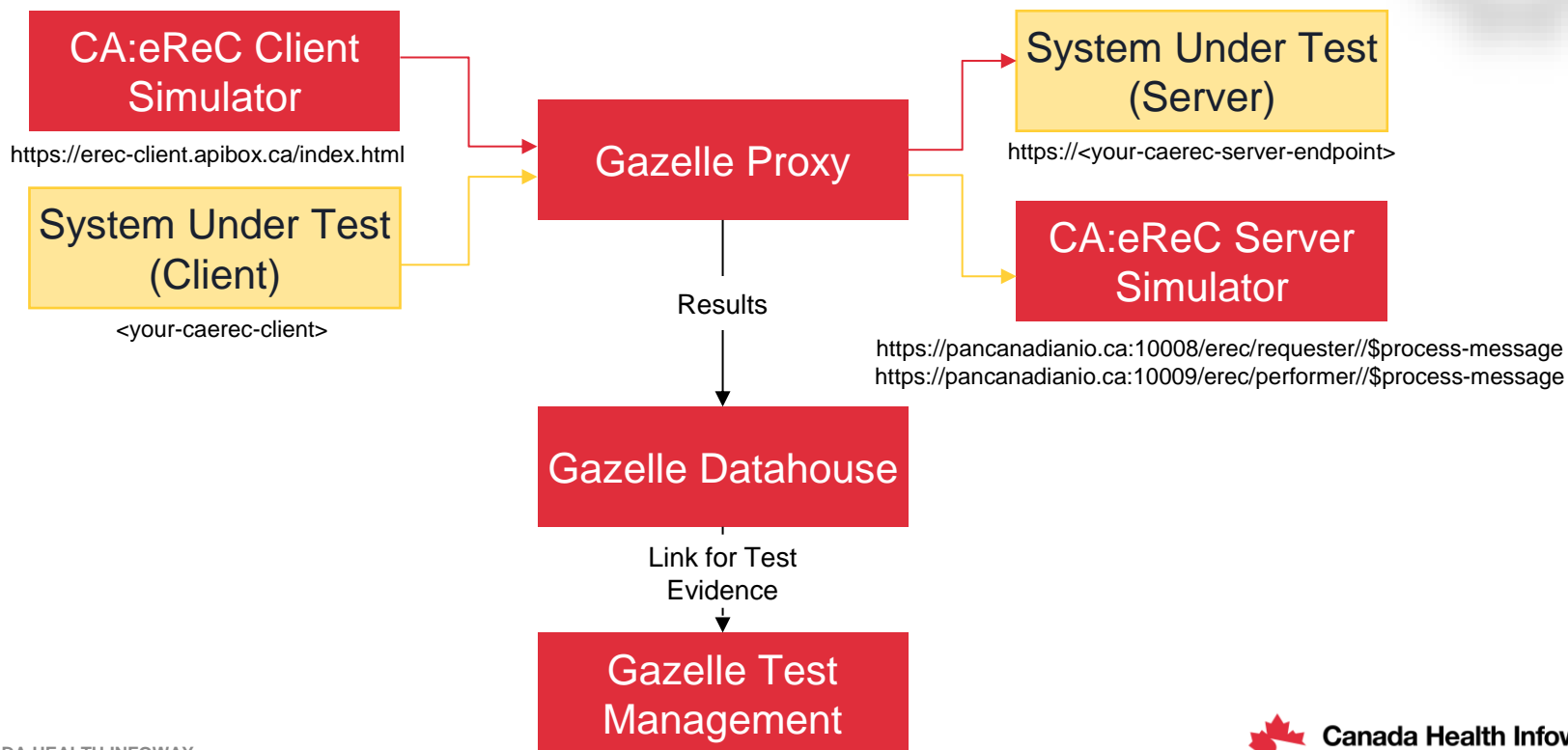
# Training Objectives



This training aims to meet the following objectives:

- ✓ Provide an understanding of the **CA:eReC Client Simulator**, **when** to use it, **how** to use it, and **where** to access it
- ✓ Provide an understanding of the **CA:eReC Server Simulator**, **when** to use it, **how** to use it, and **where** to access it

# CA:eReC Simulators Architectural Overview



# What are the CA:eReC Simulators' Capabilities?



CA:eReC has multiple transactions performed by various actors (eReC Requester, eReC Performer, eReC Informer). Systems participating in eReferral and eConsult may have different levels of maturity / capability to support the full span of transactions.

The **Client Simulator** and **Server Simulator** are configured to execute and receive the following transactions for Level 1, Level 2, and Level 3 systems:

- ❖ Send new service request [eReCm-1]
- ❖ Notify update service request [eReCm-3]\*
- ❖ Notify data correction [eReCm-4]\*
- ❖ Revoke service request [eReCm-5]
- ❖ Notify new request processing [eReCm-6]\*
- ❖ Notify update request processing [eReCm-7]\*
- ❖ Notify new appointment [eReCm-8]\*\*
- ❖ Send communication from requester [eReCm-9]\*\*
- ❖ Send communication from performer [eReCm-10]\*\*

\*Not required for Level 1 testing

\*\* Not required for Level 2 testing

# When to use the CA:eReC Client Simulator



The **CA:eReC Client Simulator** is used in Pre-Projectathon and No Peer testing when a participant wants to test that their FHIR Server (System Under Test) can receive FHIR Resources and respond to requests according to the CA:eReC transactions

- ❖ The Client Simulator UI is organized into a Requester Screen and a Performer Screen, each screen has a visual documentation and buttons to submit CA:eReC FHIR messages in XML/JSON to a server endpoint. Participants can test some or all of the supported transactions using this tool
- ❖ The user designates the server endpoint that the Client Simulator will interact with, typically entering the proxied endpoint that allows traffic to be logged for test evidence
- ❖ The UI is pre-loaded with examples in addition to an editor that allows the tester to customize what is sent to their System Under Test
- ❖ Responses to API calls (in the form of response messages) are viewable in the UI and stored in the Gazelle Datahouse-Proxy to use for test evidence

# When to use the CA:eReC Server Simulator



The **CA:eReC Server Simulator** is used in Pre-Projectathon and No Peer testing when a participant wants to test that their FHIR Client (System Under Test) can receive FHIR Resources and respond to requests according to the CA:eReC transactions

- ❖ The Server Simulator has no UI but is configured to support the required transactions for CA:eReC Level 1, 2, & 3 systems. Participants can test some or all of the CA:eReC transactions using this tool
- ❖ The Server Simulator has an open endpoint to emulate the Requester Server ([https://pancanadianio.ca:10008/erec/requester/\\$process-message](https://pancanadianio.ca:10008/erec/requester/$process-message)) and an open endpoint to simulate the Performer Server ([https://pancanadianio.ca:10009/erec/performer/\\$process-message](https://pancanadianio.ca:10009/erec/performer/$process-message)). These are proxied to allow traffic to be logged for test evidence
- ❖ Responses to API calls (in the form of response messages) are returned to the Client and stored in the Gazelle Datahouse-Proxy to use for test evidence

# Tool Demonstration – Client Simulator UI



1 Select the desired screen based on the role you would like the Client Simulator to play (i.e., CA:eReC Requester, CA:eReC Performer)

2 Populate the eReC Server URL with your server's proxied endpoint information

See instructions for setting up proxy:  
<https://pancanadianio.ca/gazelle-documentation/Proxy/user.html>

Canada Health Infoway  
Inforoute Santé du Canada

eReferral - eConsult Client Simulator

1 CA:EREC REQUESTER CA:EREC PERFORMER

### CA:eReC Requester Simulator

The CA:eReC requester simulator acts as a message exchange partner to send CA:eReC messages to an CA:eReC performer based on the pan-Canadian eReferral-eConsult specifications (CA:eReC v1.0.3 DFT)

Please do not include any PII/PHI into the documents.

SEND MESSAGE BROWSE MESSAGES

2 Server URL

https://pancanadianio.ca:<your-caerec-proxied-endpoint>/\$process-message

Send CA:eReC FHIR Message Bundle (JSON/XML)

Load CA:eReC sample data

1
---



# Tool Demonstration – Client Simulator UI



3 Click “Load CA:eReCm sample data”, select the desired message from the dropdown menu of loaded eReC example messages

This will populate the selected message in the viewer

The destination endpoint in the example will be populated with the Server URL that is supplied

3.1 If desired, the message can be directly entered/edited in the viewer interface

Canada Health Infoway  
Inforoute Santé du Canada

eReferral - eConsult Client Simulator

CA:EREC REQUESTER CA:EREC PERFORMER

Server URL  
https://pancanadianio.ca:<your-caerec-proxied-endpoint>/\$process-message

Send CA:eReC FHIR Message Bundle (JSON/XML)  
Load CA:eReC sample data

3 CA:eReCm-1 (e-referral request for Gastric care management - 1)

```
23 "meta": {  
24   "profile": [  
25     "http://fhir.inforoute.ca/io/CA-eReC/StructureDefinition/CA-eReC-MessageHeader"  
26   ]  
27 },  
28 "eventCoding": {  
29   "system": "http://fhir.inforoute.ca/io/CA-eReC/CodeSystem/message-event-code",  
30   "code": "add-service-request"  
31 },  
32 "destination": [  
33   {  
34     "name": "RMS_Target",  
35     "endpoint": "https://pancanadianio.ca:<your-caerec-proxied-endpoint>/$process-message"  
36   }  
37 ]  
38 }
```

1

VALIDATE CA:EREC MESSAGE SEND CA:EREC MESSAGE

# Tool Demonstration – Client Simulator UI



3.2 If sending a message that is in response to another message (e.g., CA:eReCm-3, CA:eReCm-5, etc.) you can also select a previously exchanged bundle to reply to.

This will populate the contents in your bundle with relevant details from the original Bundle the message is in response to (e.g., ServiceRequest.identifier, Communication.basedOn, etc.)

Canada Health Infoway  
Inforoute Santé du Canada

eReferral - eConsult Client Simulator

CA:EREC REQUESTER CA:EREC PERFORMER

Server URL  
https://pancanadianio.ca:10009/erec/performer/\$process-message

Send CA:eReC FHIR Message Bundle (JSON/XML)  
Load CA:eReC sample data  
CA:eReCm-3 (update e-referral request to update Gastric care management)

Select bundle to reply  
2024-12-23 12:28 — add-service-request — http://example-identifier-system-uri.c...  
2024-12-23 12:28 — add-service-request — http://example-identifier-system-uri.ca | 6BF5ACDE  
2024-12-23 12:13 — add-service-request — http://example-identifier-system-uri.ca | AC0537FE  
2024-12-23 12:08 — add-service-request — http://example-identifier-system-uri.ca | 08F0D90F

Number of bundles to load  
Last 10

```

6 http://fhir.infoway-inforoute.ca/10/CA-EREC/StructureDefinition/CA-eReC-Bundle"
7   ]
8   },
9   "identifier": {
10    "system": "http://ex-erec-identifier-system.org",
11    "value": "ba4f9df0-0b70-4729-8b67-b91e36f6aaf8"
12  }
13 }

```

VALIDATE CA:EREC MESSAGE SEND CA:EREC MESSAGE

# Tool Demonstration – Client Simulator UI



4 Click “Validate CA:EREC Message”, to validate the message

4.1 A valid message will return an `OperationOutcome` with “All Ok” details in the viewer

Any errors (e.g., mandatory elements missing) will display with issue details.

Note: The validation only performs checks against hard constraints, additional manual checks are required to check for optional/conditional `mustSupport` elements

```
1 {
2   "resourceType": "OperationOutcome",
3   "issue": [
4     {
5       "extension": [
6         {
7           "url": "http://hl7.org/fhir/StructureDefinition/operationoutcome-issue-line",
8           "valueInteger": 1
9         },
10        {
11          "url": "http://hl7.org/fhir/StructureDefinition/operationoutcome-issue-col",
12          "valueInteger": 2
13        },
14        {
15          "url": "http://hl7.org/fhir/StructureDefinition/operationoutcome-message-id",
16          "valueString": "Validation_VAL_Profile_Minimum_SLICE"
17        }
18      ],
19      "severity": "error",
20      "code": "processing",
21      "details": {
22        "coding": [
23          {
24            "system": "http://hl7.org/fhir/java-core-messageId",
25            "code": "Validation_VAL_Profile_Minimum_SLICE"
26          }
27        ]
28      }
29    }
30  ]
31 }
```

# Tool Demonstration – Client Simulator UI



5 Click “Send CA:eReC Message” to submit the message to the destination server

- 5.1 The Client Simulator will display any details that are sent in response to the message, this may be in the form of:
- FHIR Message sent in response (e.g., an eReCm-6 in response to an eReCm-1 message)
  - OperationOutcome in the case of an error

The screenshot shows the 'eReferral - eConsult Client Simulator' interface. At the top, it displays 'Canada Health Infoway' and 'Infouroute Santé du Canada'. Below this, there are two tabs: 'CA:EREC REQUESTER' and 'CA:EREC PERFORMER'. The main area contains a JSON response in a code editor, with a red circle '5' next to the 'SEND CA:EREC MESSAGE' button. Below the JSON, there is a 'Status Code: 200 OK' and another JSON response in a code editor, with a red circle '5.1' next to it.

```
4- "meta": {
5-   "profile": [
6-     "http://fhir.infoway-inforoute.ca/io/CA-eReC/StructureDefinition/CA-eReC-Bundle"
7-   ]
8- },
9- "identifier": {
10-  "system": "http://ex-erec-identifier-system.org",
11-  "value": "a936ece0-6dc0-4a86-9cb0-6daf0d54b874"
12- }
13- }
```

5 VALIDATE CA:EREC MESSAGE SEND CA:EREC MESSAGE

5.1 Status Code: 200 OK

```
1- {
2-  "resourceType": "Bundle",
3-  "id": "2f2ca160-1242-4cf9-a84f-9d92c93ab1a3",
4-  "type": "message",
5-  "timestamp": "2024-12-23T16:28:19.638+00:00",
6-  "entry": [
7-    {
8-      "fullUrl": "urn:uuid:bcac4e1a-fb62-4d16-83df-0c7b6f4ba117",
9-      "resource": {
10-        "resourceType": "MessageHeader",
11-        "id": "bcac4e1a-fb62-4d16-83df-0c7b6f4ba117",
12-        "meta": {
13-          "profile": [
14-            "http://fhir.infoway-inforoute.ca/io/CA-eReC/StructureDefinition/CA-eReC-MessageHeader"
15-          ]
16-        }
17-      }
18-    }
19-  ]
20- }
```



# Tool Demonstration – Client Simulator UI

- 6 You can look up previously exchanged bundles (e.g., to find business identifiers) by clicking “Browse Messages”
- 6.1 Choose from “Sent Bundles” or “Received Bundles” and indicate the number of bundles you would like to load for selection
- 6.2 Select the bundle you would like to load into the viewer

Canada Health Infoway  
Inforoute Santé du Canada

eReferral - eConsult Client Simulator

CA:EREC REQUESTER CA:EREC PERFORMER

SEND MESSAGE **BROWSE MESSAGES** 6

Server URL  
https://pancanadianio.ca:10009/erec/performer/\$process-message

View Sent/Received CA:eReC Message Bundles

6.1  Sent Bundles  Received Bundles

RETRIEVE SENT/RECEIVED BUNDLES NUMBER OF BUNDLES TO LOAD  
Last 10

3 bundles loaded

6.2 Select bundle to load

- 2024-12-23 12:28 — add-service-request — http://example-identifier-system-uri.ca | 6BF5ACDE
- 2024-12-23 12:28 — add-service-request — http://example-identifier-system-uri.ca | 6BF5ACDE
- 2024-12-23 12:13 — add-service-request — http://example-identifier-system-uri.ca | AC0537FE
- 2024-12-23 12:08 — add-service-request — http://example-identifier-system-uri.ca | 08F0D90F

```
6 - lastUpdated : 2024-12-23T16:28:18.940+00:00 ,
7 - "profile": [
8 -   "http://fhir.infoway-inforoute.ca/io/CA-eReC/StructureDefinition/CA-eReC-Bundle"
9 - ],
10 - },
11 - "identifier": {
```

# Tool Demonstration – Client Simulator UI



7 After successfully executing the request against your proxied endpoint, navigate to the Gazelle Datahouse to select the "Access detail" you would like to use for evidence

8 In Message View, Review your Message Content and Click "Validate" button

The screenshot shows the Gazelle Datahouse Proxy interface. At the top, there are search filters for Standard, Sender hostname, Sender ip address, Proxy port, and Receiver hostname. Below these are filters for Receiver ip address, Message type, and Secured message. A date range selector is set to 'Date from / to mm/dd/yyyy, --:-- AM AST - mm/dd/yyyy, --:-- AM AST'. A table lists messages with columns for Standard, Timestamp, Sender, Proxy, Receiver, Message type, and Action. The first message is highlighted, and its 'Access details' link is circled in red. A second screenshot shows the 'Message View' for this message, with the 'Permanent link' field circled in red. At the bottom of the message view, a 'Validate' button is circled in red.

Standard	Timestamp	Sender	Proxy	Receiver	Message type	Action
HTTP [TLS]	10:48:31:690 AM - AST	Dec 05, 2024 erc-fhir-server.apibox.ca	10008	ec2-15-222-108-49.ca-central-1.compute.amazonaws.com	200	Access details
				box.ca	POST	Access details
				ca-central-laws.com	200	Access details
				box.ca	POST	Access details

**Message View Details:**

- Connection detail:** Type: HTTP [TLS], Connection id: 6751b386a18e5a76cb08f3da, Permanent link: copy, Proxy port: 10008, Certificate subject: CN=pancanadianio.ca
- Initiator:** Hostname: ec2-15-222-108-49-ca-central-1.compute.amazonaws.com, IP address: 15.222.108.49, Port: 48081, TLS version: TLSv1.3, Cipher suite: TLS\_AES\_256\_GCM\_SHA384
- Responder:** Hostname: erc-fhir-server.apibox.ca, IP address: 15.156.17.89, Port: 443, TLS version: TLSv1.3, Cipher suite: TLS\_AES\_128\_GCM\_SHA256, Certificate subject: CN=apibox.ca, CN=Amazon RSA 2048 M02, O=Amazon, C=US, CN=Amazon Root CA 1, O=Amazon, C=US, CN=Starfield Services Root Certificate Authority - G2, O=Starfield Technologies, Inc., L=Scottsdale, ST=Arizona, C=US

# Tool Demonstration – Remote Message Validation



- 9 In the pop-up window, Select “Body only” and select the FHIR profile you would like to validate the message against
- 10 Click “Validate” button
- 11 A summary of validation results will appear in the validation box.  
Tip: Click the EVS Validation Report for detailed view of validation findings
- 12 Once passed, Copy permanent link for pasting into Gazelle Test Instance

The screenshot shows the 'Validate' tool interface. A pop-up window titled 'Validate' is open, showing a dropdown menu with 'Body only' selected and a search bar for validation profiles. A 'Validate' button is visible. Below the pop-up, the main interface displays validation results for a connection to 'dev-ps-swagger-api.apibox.ca'. The results include connection details, TLS version (TLSv1.3), cipher suite (TLS\_AES\_256\_GCM\_SHA384), and a 'PASSED' status. A 'View EVS validation report' button is present, and the validation timestamp is 11:31:27:709 AM - AST on Nov 21, 2024.

# Where to Access the CA:eReC Simulators



Simulator	URL
CA:eReC Client Simulator	<a href="https://erec-client.apibox.ca/index.html">https://erec-client.apibox.ca/index.html</a>
CA:eReC Server Simulator (without authorization)	<a href="https://pancanadianio.ca:10008/erec/requester/\$process-message">https://pancanadianio.ca:10008/erec/requester/\$process-message</a> <a href="https://pancanadianio.ca:10009/erec/performer/\$process-message">https://pancanadianio.ca:10009/erec/performer/\$process-message</a>
CA:eReC Specification	<a href="https://simplifier.net/CA-eReC">https://simplifier.net/CA-eReC</a>





**Canada Health Infoway**

# Thank you!

**To learn more about the Projectathon 2025, visit:**

<https://infoscribe.infoway-inforoute.ca/display/PCI/Scope%3A+Projectathon+2025>

## **Contact Information:**

interoperability@infoway-inforoute.ca

**VISIT OUR WEBSITE**  
infoway-inforoute.ca

**VISIT OUR SURVEY WEBSITE**  
insights.infoway-inforoute.ca/

**LET'S CONNECT ON LINKEDIN**  
linkedin.com/company/canada-health-infoway/

**LET'S CONNECT ON TWITTER**  
@infoway