

Informatica® Cloud Application Integration August 2024

# Simple React Al Agent with Search Tools

Informatica Cloud Application Integration Simple React AI Agent with Search Tools August 2024

#### © Copyright Informatica LLC 2024

This software and documentation contain proprietary information of Informatica LLC and are provided under a license agreement containing restrictions on use and disclosure and are also protected by copyright law. Reverse engineering of the software is prohibited. No part of this document may be reproduced or transmitted in any form, by any means (electronic, photocopying, recording or otherwise) without prior consent of Informatica LLC. This Software may be protected by U.S. and/or international Patents and other Patents Pending.

Use, duplication, or disclosure of the Software by the U.S. Government is subject to the restrictions set forth in the applicable software license agreement and as provided in DFARS 227.7202-1(a) and 227.7702-3(a) (1995), DFARS 252.227-7013<sup>©</sup>(1)(ii) (OCT 1988), FAR 12.212(a) (1995), FAR 52.227-19, or FAR 52.227-14 (ALT III), as applicable.

The information in this product or documentation is subject to change without notice. If you find any problems in this product or documentation, please report them to us in writing.

Informatica, Informatica Platform, Informatica Data Services, PowerCenter, PowerCenterRT, PowerCenter Connect, PowerCenter Data Analyzer, PowerExchange, PowerMart, Metadata Manager, Informatica Data Quality, Informatica Data Explorer, Informatica B2B Data Transformation, Informatica B2B Data Exchange Informatica On Demand, Informatica Identity Resolution, Informatica Application Information Lifecycle Management, Informatica Complex Event Processing, Ultra Messaging, Informatica Master Data Management, and Live Data Map are trademarks or registered trademarks of Informatica LLC in the United States and in jurisdictions throughout the world. All other company and product names may be trade names or trademarks of their respective owners.

Portions of this software and/or documentation are subject to copyright held by third parties, including without limitation: Copyright DataDirect Technologies. All rights reserved. Copyright © Sun Microsystems. All rights reserved. Copyright © RSA Security Inc. All Rights Reserved. Copyright © Ordinal Technology Corp. All rights reserved. Copyright © Andacht c.v. All rights reserved. Copyright © International Copyright © Meta Integration Technology, Inc. All rights reserved. Copyright © Copyright © Integration All rights reserved. Copyright © Integration All rights reserved. Copyright © Microsoft Corporation. All rights reserved. Copyright © Integration All rights reserved. Copyright © Integration Builders, Inc. All rights reserved. Copyright © International Dusiness Machines Copyright © e-technologies GmbH. All rights reserved. Copyright © International Dusiness Machines Corporation. All rights reserved. Copyright © Works GmbH. All rights reserved. Copyright © Unicode, Inc. Copyright © Unicode, Inc. Copyright © International Business Machines Corporation. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © International Business Machines Corporation. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © Toronto. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © Toronto. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © Toronto. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © Toronto. All rights reserved. Copyright © Daniel Veillard. All rights reserved. Copyright © Toronto. All rights re

This product includes software developed by the Apache Software Foundation (http://www.apache.org/), and/or other software which is licensed under various versions of the Apache License (the "License"). You may obtain a copy of these Licenses at http://www.apache.org/licenses/. Unless required by applicable law or agreed to in writing, software distributed under these Licenses is distributed on an "AS IS" BASIS, WITHOUT WARRANTIES OR CONDITIONS OF ANY KIND, either express or implied. See the Licenses for the specific language governing permissions and limitations under the Licenses.

This product includes software which was developed by Mozilla (http://www.mozilla.org/), software copyright The JBoss Group, LLC, all rights reserved; software copyright © 1999-2006 by Bruno Lowagie and Paulo Soares and other software which is licensed under various versions of the GNU Lesser General Public License Agreement, which may be found at http://www.gnu.org/licenses/lgpl.html. The materials are provided free of charge by Informatica, "as-is", without warranty of any kind, either express or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose.

The product includes ACE(TM) and TAO(TM) software copyrighted by Douglas C. Schmidt and his research group at Washington University, University of California, Irvine, and Vanderbilt University, Copyright (©) 1993-2006, all rights reserved.

This product includes software developed by the OpenSSL Project for use in the OpenSSL Toolkit (copyright The OpenSSL Project. All Rights Reserved) and redistribution of this software is subject to terms available at http://www.openssl.org and http://www.openssl.org/source/license.html.

This product includes Curl software which is Copyright 1996-2013, Daniel Stenberg, <a href="mailto:daniel@haxx.se">daniel@haxx.se</a>. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at http://curl.haxx.se/docs/copyright.html. Permission to use, copy, modify, and distribute this software for any purpose with or without fee is hereby granted, provided that the above copyright notice and this permission notice appear in all copies.

The product includes software copyright 2001-2005 (®) MetaStuff, Ltd. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at http://www.dom4j.org/ license.html.

The product includes software copyright © 2004-2007, The Dojo Foundation. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at http://dojotoolkit.org/license.

This product includes ICU software which is copyright International Business Machines Corporation and others. All rights reserved. Permissions and limitations regarding this software are subject to terms available at http://source.icu-project.org/repos/icu/icu/trunk/license.html.

This product includes software copyright © 1996-2006 Per Bothner. All rights reserved. Your right to use such materials is set forth in the license which may be found at http://www.gnu.org/software/kawa/Software-License.html.

This product includes OSSP UUID software which is Copyright © 2002 Ralf S. Engelschall, Copyright © 2002 The OSSP Project Copyright © 2002 Cable & Wireless Deutschland. Permissions and limitations regarding this software are subject to terms available at http://www.opensource.org/licenses/mit-license.php.

This product includes software developed by Boost (http://www.boost.org/) or under the Boost software license. Permissions and limitations regarding this software are subject to terms available at http://www.boost.org/LICENSE\_1\_0.txt.

This product includes software copyright <sup>®</sup> 1997-2007 University of Cambridge. Permissions and limitations regarding this software are subject to terms available at http://www.pcre.org/license.txt.

This product includes software copyright © 2007 The Eclipse Foundation. All Rights Reserved. Permissions and limitations regarding this software are subject to terms available at http://www.eclipse.org/org/documents/epl-v10.php and at http://www.eclipse.org/org/documents/edl-v10.php.

 $This product includes software licensed under the terms at \ http://www.tcl.tk/software/tcltk/license.html, \ http://www.bosrup.com/web/overlib/? License, \ http://$ www.stlport.org/doc/ license.html, http://asm.ow2.org/license.html, http://www.cryptix.org/LICENSE.TXT, http://hsqldb.org/web/hsqlLicense.html, http:// httpunit.sourceforge.net/doc/ license.html, http://jung.sourceforge.net/license.txt , http://www.gzip.org/zlib/zlib\_license.html, http://www.openldap.org/software/ release/license.html, http://www.libssh2.org, http://slf4j.org/license.html, http://www.sente.ch/software/OpenSourceLicense.html, http://fusesource.com/downloads/ license-agreements/fuse-message-broker-v-5-3- license-agreement; http://antlr.org/license.html; http://aopalliance.sourceforge.net/; http://www.bouncycastle.org/ licence.html; http://www.jgraph.com/jgraphdownload.html; http://www.jcraft.com/jsch/LICENSE.txt; http://jotm.objectweb.org/bsd\_license.html; . http://www.y3.org/ Consortium/Legal/2002/copyright-software-20021231; http://www.slf4j.org/license.html; http://nanoxml.sourceforge.net/orig/copyright.html; http://www.json.org/ license.html; http://forge.ow2.org/projects/javaservice/, http://www.postgresql.org/about/licence.html, http://www.sqlite.org/copyright.html, http://www.tcl.tk/ software/tcltk/license.html, http://www.jaxen.org/faq.html, http://www.jdom.org/docs/faq.html, http://www.slf4j.org/license.html; http://www.iodbc.org/dataspace/ iodbc/wiki/iODBC/License; http://www.keplerproject.org/md5/license.html; http://www.toedter.com/en/jcalendar/license.html; http://www.edankert.com/bounce/ index.html; http://www.net-snmp.org/about/license.html; http://www.openmdx.org/#FAQ; http://www.php.net/license/3\_01.txt; http://srp.stanford.edu/license.txt; http://www.schneier.com/blowfish.html; http://www.jmock.org/license.html; http://ssom.java.net; http://benalman.com/about/license/; https://github.com/CreateJS/ EaseIJS/blob/master/src/easeljs/display/Bitmap.js; http://www.h2database.com/html/license.html#summary; http://jsoncpp.sourceforge.net/LICENSE; http:// jdbc.postgresql.org/license.html; http://protobuf.googlecode.com/svn/trunk/src/google/protobuf/descriptor.proto; https://github.com/rantav/hector/blob/master/ LICENSE; http://web.mit.edu/Kerberos/krb5-current/doc/mitK5license.html; http://jibx.sourceforge.net/jibx-license.html; https://github.com/lyokato/libgeohash/blob/ master/LICENSE; https://github.com/jedisct1/libsodium/blob/master/LICENSE; https://code.google.com/p/lz4/; https://github.com/jedisct1/libsodium/blob/master/ LICENSE; http://one-jar.sourceforge.net/index.php?page=documents&file=license; https://github.com/EsotericSoftware/kryo/blob/master/license.txt; http://www.scalalang.org/license.html; https://github.com/tinkerpop/blueprints/blob/master/LICENSE.txt; http://gee.cs.oswego.edu/dl/classes/EDU/oswego/cs/dl/util/concurrent/ intro.html; https://aws.amazon.com/asl/; https://github.com/twbs/bootstrap/blob/master/LICENSE; https://sourceforge.net/p/xmlunit/code/HEAD/tree/trunk/ LICENSE.txt; https://github.com/documentcloud/underscore-contrib/blob/master/LICENSE, and https://github.com/apache/hbase/blob/master/LICENSE.txt.

This product includes software licensed under the Academic Free License (http://www.opensource.org/licenses/afl-3.0.php), the Common Development and Distribution License (http://www.opensource.org/licenses/cddl1.php) the Common Public License (http://www.opensource.org/licenses/cpf1.0.php), the Sun Binary Code License Agreement Supplemental License Terms, the BSD License (http:// www.opensource.org/licenses/bsd-license.php), the new BSD License (http:// opensource.org/licenses/bsd-license.php), the Artistic License (http://www.opensource.org/licenses/artistic-license-1.0) and the Initial Developer's Public License Version 1.0 (http://www.firebirdsql.org/en/initial-developer-s-public-license-version-1-0/).

This product includes software copyright © 2003-2006 Joe Walnes, 2006-2007 XStream Committers. All rights reserved. Permissions and limitations regarding this software are subject to terms available at http://xstream.codehaus.org/license.html. This product includes software developed by the Indiana University Extreme! Lab. For further information please visit http://www.extreme.indiana.edu/.

This product includes software Copyright (c) 2013 Frank Balluffi and Markus Moeller. All rights reserved. Permissions and limitations regarding this software are subject to terms of the MIT license.

See patents at https://www.informatica.com/legal/patents.html.

DISCLAIMER: Informatica LLC provides this documentation "as is" without warranty of any kind, either express or implied, including, but not limited to, the implied warranties of noninfringement, merchantability, or use for a particular purpose. Informatica LLC does not warrant that this software or documentation is error free. The information provided in this software or documentation may include technical inaccuracies or typographical errors. The information in this software and documentation is subject to change at any time without notice.

#### **NOTICES**

This Informatica product (the "Software") includes certain drivers (the "DataDirect Drivers") from DataDirect Technologies, an operating company of Progress Software Corporation ("DataDirect") which are subject to the following terms and conditions:

- 1. THE DATADIRECT DRIVERS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NON-INFRINGEMENT.
- 2. IN NO EVENT WILL DATADIRECT OR ITS THIRD PARTY SUPPLIERS BE LIABLE TO THE END-USER CUSTOMER FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, CONSEQUENTIAL OR OTHER DAMAGES ARISING OUT OF THE USE OF THE ODBC DRIVERS, WHETHER OR NOT INFORMED OF THE POSSIBILITIES OF DAMAGES IN ADVANCE. THESE LIMITATIONS APPLY TO ALL CAUSES OF ACTION, INCLUDING, WITHOUT LIMITATION, BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY, MISREPRESENTATION AND OTHER TORTS.

Publication Date: 2024-08-27

## **Table of Contents**

Preface	5
Chapter 1: Introduction to Simple React Al Agent with Search Tools recipe	6
Simple React AI Agent with Search Tools contents	6
Simple React Al Agent with Search Tools recipe assets	7
Chapter 2: Using the Simple React Al Agent with Search Tools recipe	8
Copying and accessing the recipe	8
Publishing the GoogleAPIConnector service connector	9
Configuring and publishing the GeminiAlSearchConnection connection	9
Configuring and publishing the GoogleSearchAPIConnection connection	9
Configuring and publishing the processes	0
Invoking the process	1

# **Preface**

Use Simple React AI Agent with Search Tools to learn how to use Google Search to gather information, perform tasks, and answer user queries. This guide assumes that you have an understanding of the Google API Connector and Gemini Connector concepts.

#### CHAPTER 1

# Introduction to Simple React Al Agent with Search Tools recipe

The Simple React AI Agent with Search Tools recipe is based on REST and SOAP APIs. The recipe shows you how to build a simple React Agent with a search tool, Google Search, using the Serp API. The React AI agent logic alternates between generating thoughts and performing task-specific actions dynamically.

The Gemini Large Language Model (LLM) follows a step-by-step problem-solving approach, utilizing the search tool to gather information and perform tasks to answer user queries. The process orchestrates the whole workflow based on the LLM response.

The process accepts a user query. It passes the query to the LLM with additional system instructions to respond in a format that includes a question, thought, action, action input, observation, final thought, and final answer.

After receiving the response from the LLM, the process checks for the presence of the action and action input fields. If these fields are present, a request for the SearchTool service is formulated. Otherwise, it creates the final answer.

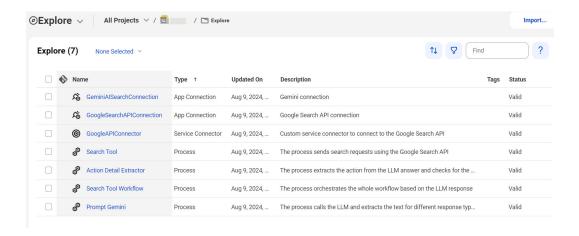
If the final answer is not set, a request is sent to the SearchTool service. The parent process is called with new parameters, such as user query and Agent\_Scratchpad. Agent\_Scratchpad is a template that contains fields. For example, Action: Action Input: Observation.

The process repeats until all the actions from the initial LLM response are processed or the number of repetitions does not exceed the specified limit. When the process execution time approaches 60 seconds, the process provides a final response. If the process ends prematurely, the final response might be inaccurate.

### Simple React AI Agent with Search Tools contents

The Simple React AI Agent with Search Tools recipe contains app connections, a service connector, and processes.

The following image shows the assets that the Simple React Al Agent with Search Tools recipe package contains:



# Simple React AI Agent with Search Tools recipe assets

The following table lists the assets that the Simple React Al Agent with Search Tools recipe package contains:

Asset Name	Asset Type	Description
GeminiAlSearchConnection	App Connection	Gemini connection.
GoogleSearchAPIConnection	App Connection	Google Search API connection.
GoogleAPIConnector	Service Connector	Custom service connector to connect to the Google Search API.
Search Tool	Process	Sends search requests using the Google Search API.
Action Detail Extractor	Process	Extracts the action from the LLM answer, checks for the final answer, verifies that the execution time does not exceed 50 seconds, and monitors the number of times the process is called.
Search Tool Workflow	Process	Orchestrates the whole workflow based on the LLM response.
Prompt Gemini	Process	Calls the LLM and extracts the text for different response types, such as Python, JSON, SQL, and SOQL.

#### CHAPTER 2

# Using the Simple React Al Agent with Search Tools recipe

To use the Simple React AI Agent with Search Tools recipe, you must perform the following steps manually:

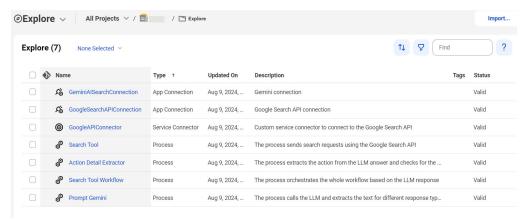
- Step 1: Copy and access the recipe
- Step 2: Publish the GoogleAPIConnector service connector
- Step 3: Configure and publish the GeminiAlSearchConnection connection
- Step 4: Configure and publish the GoogleSearchAPIConnection connection
- Step 5: Configure and publish the processes
- Step 6: Invoke the process

## Copying and accessing the recipe

Copy the pre-configured assets in the recipe to a separate project or folder.

- 1. Open the Simple React Al Agent with Search Tools recipe and click Use.
- 2. Select the location where you want to copy the recipe, and then click Continue.
- In the Copying the recipe dialog box, click OK.
  It might take some time for the recipe to get copied. You will receive a notification when the recipe is ready for use.
- 4. After the recipe is copied, click **Explore** to access the recipe content.

5. Navigate to the project or folder where you copied the recipe or enter the recipe name in the **Find** box. All the assets in the recipe are displayed as shown in the following image:



# Publishing the GoogleAPIConnector service connector

You can publish the GoogleAPIConnector service connector from the assets page.

To publish the **GoogleAPIConnector** service connector, click **Actions** in the row that contains the service connector and select **Publish**.

## Configuring and publishing the GeminiAlSearchConnection connection

Configure the API key in the GeminiAlSearchConnection connection, and then publish the connection.

- 1. Open the GeminiAlSearchConnection connection.
- 2. In the **Connection Properties** section, enter the API key in the **API\_Key** property. The **API\_Key** property authenticates Gemini connection requests.
- 3. Save and publish the connection.

# Configuring and publishing the GoogleSearchAPIConnection connection

Configure the API key in the GoogleSearchAPIConnection connection, and then publish the connection.

1. Open the GoogleSearchAPIConnection connection.

- In the Connection Properties section, enter the API key in the API\_KEY property. The API\_Key property authenticates Google Search API connection requests.
- 3. Save and publish the connection.

Note: You can get the API key for the Google search tools from https://serpapi.com/.

### Configuring and publishing the processes

To configure and publish the processes, perform the following steps:

- To publish the Search Tool process, click Actions in the row that contains the process and select Publish.
- To publish the Action Detail Extractor process, click Actions in the row that contains the process and select Publish.
- Open the Prompt Gemini process.
- 4. On the **Temp Fields** tab of the Start step, the **Model\_LLM** field is set to **gemini-1.5 pro** by default. You can optionally edit the model version. For information about changing the model version, see the Gemini documentation.
- 5. Save and publish the process.
- Open the Search Tool Workflow process.
- 7. On the **Temp Fields** tab of the Start step, the **Loop\_Limit** field is set to **5** by default. You can optionally edit the limit. This field defines the number of times the Search Tool subprocess can be called.

**Note:** You can adjust the number of repeat queries in the Search Tool to get new information and better results. However, this will increase the number of tokens used.

8. On the Assignment tab of the Create Prompt to LLM step, the Prompt field is configured to contain the request template for the prompt to LLM. Optionally, you can configure the LLM behavior in the Prompt\_Request field using the Expression Editor, as shown in the following sample code:

For the **Prompt\_Request** field, enter values for the following properties:

Property	Description
maxOutputTokens	Defines the maximum number of tokens that the model can generate in its response. Setting a limit ensures that the response is concise and fits within the desired length constraints.
temperature	Controls the randomness of the model's output. A lower value close to 0 makes the output more deterministic, while a higher value close to 1 increases randomness and creativity. For example, if temperature is set to 0.5, the model balances between deterministic and creative outputs.
topP	Determines the cumulative probability threshold for token selection. The model considers the smallest set of tokens whose cumulative probability meets or exceeds $topP$ . For example, if $topP$ is set to 0.1, the model considers only the top 10% most probable tokens at each step.
topK	Limits the number of the highest-probability tokens to consider during response generation. For example, if $topK$ is set to 2, the model considers only the top 2 tokens at each step, controlling output diversity and quality.

#### 9. Save and publish the process.

Alternatively, you can also publish the **Search Tool Workflow** process from the assets page. To publish the process, click **Actions** in the row that contains the process and select **Publish**. The subprocesses will be published automatically. You can modify the process as mentioned in steps 7 and 8 before publishing the process if needed.

### Invoking the process

When you invoke the Simple React Al Agent with Search Tools process, the process orchestrates the whole workflow based on the LLM response.

- 1. Open the Search Tool Workflow process and click Actions > Properties Details > Copy Service URL.
- Open a text editor and add the input fields and values to the service URL as shown in the following format:

```
<Cloud Application Integration POD URL>/active-bpel/public/rt/<API_name>? Query=<User Query>
```

3. Open a browser and paste the service URL.

You can also invoke the process using the Run Using option, REST or SOAP API endpoints in any API client, such as cURL, Postman, SOAP UI, or through any programming language.

In Application Integration Console, you can verify whether the process execution was successful or faulted.

The following image shows a successful process execution:

