

# Creating Cognitive Applications *Powered by IBM Watson: Getting started with the API*



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## Background

Cognitive computing systems are built to learn from how they are used and adapt to their processing. They provide insight into content; offer context specific responses and guidance, and learn through iterative feedback cycles. While there are numerous ways to understand and extract meaningful information from structured data, the process of understanding and making sense of unstructured data is in its infancy. It requires systems to **cull** through and analyze complex and heterogeneous content sources to identify vague and abstruse information, patterns and relationships.

IBM Watson is at the forefront of cognitive computing. It furthers advances in natural language processing and analytics and provides the unique ability to comprehend the subtle nuances of human language, sift through vast amounts of content, and provide evidence-based responses to users' questions. Watson can be trained to provide responses with an increasing relevance over time. These capabilities, when access to them are embedded within an application, start them on a journey to building cognitive applications.

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*Companies can embed Watson's cognitive capabilities in their application without the need for building deep natural language, machine learning and ranking algorithms or other core technology skills.*

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## Introduction – Embedding Watson

Companies can embed Watson's cognitive capabilities in their application without the need for building deep natural language, machine learning and ranking algorithms or other core technology skills. They could accomplish this by being able to embed the Watson platform capabilities as a service, through the use of API and tools on the Watson Developer Cloud.

The Watson Developer Cloud is a part of the Watson Ecosystem, along with the Watson Content Store and the Watson Talent Hub. Companies submit a request and follow a methodology to get access the Watson Developer Cloud in the Watson Ecosystem.

Once access is obtained to the Watson Developer Cloud, the capabilities of the Watson platform can be embedded in an app using tools and an Application Programming Interface (API) in one of two ways –

1. Using a customizable User Interface

A prepackaged IBM hosted user experience could be integrated within the customer application via an HTML inline Frame (iframe). An iframe can place another HTML document in a frame. This frame can be customized to look and feel like the target application.

2. Application Programming Interface (API)

The Watson Question and Answer API (QAAPI) is a Representational State Transfer (REST1) service interface that allows applications to interact with Watson. Using this API, one can pose questions to Watson, retrieve responses, and submit feedback on those responses. In addition to simple question and responses, Watson can provide transparency into how it reached its conclusions through the REST services.

There are other functions like ingesting content in the Watson platform that will also be exposed as tools and APIs and can be accessed from within an application.

## Scope and Audience

This paper is intended to provide a technical understanding on how Watson's capabilities can be embedded within an application using the Watson Question and Answer API (QAAPI). The QAAPI provides access to the insight that Watson derives from the question asked on the content it ingested and allow a seamless integration with the application.

It assumes a basic knowledge about Watson and the premise of when and why one would embed capabilities of Watson in an application. It also assumes that the application developer has obtained access to the Watson Developer Cloud, provided

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<sup>1</sup> [http://en.wikipedia.org/wiki/Representational\\_state\\_transfer](http://en.wikipedia.org/wiki/Representational_state_transfer): REST is an architectural style that abstracts the architectural elements within a distributed hypermedia system. It ignores the details of component implementation and protocol syntax in order to focus on the roles of components, the constraints upon their interaction with other components, and their interpretation of significant data elements. REST has emerged as a predominant web API design model

content for Watson to ingest, and gone through initial training to get increasingly relevant responses.

This paper gives a fairly detailed overview of the QAAPI, but is not intended to be an API reference guide. The API reference guide will be published separately.

## Question and Answer API (QAAPI)

The Watson Platform Question and Answer API (QAAPI) enables developers to post questions to Watson and retrieve responses and supporting evidence. The evidence contains supporting information based on the passages in the documents that Watson ingested and may have been trained with.

Watson could be embedded in an application in a number of ways. As shown in Figure 1, the question being posed to Watson could come directly from a user or from another component upstream in the application architecture.

Similarly, the response text, evidence and other response metadata can either directly be sent to a user as part of a conversation; or to a component in the system downstream for further processing.

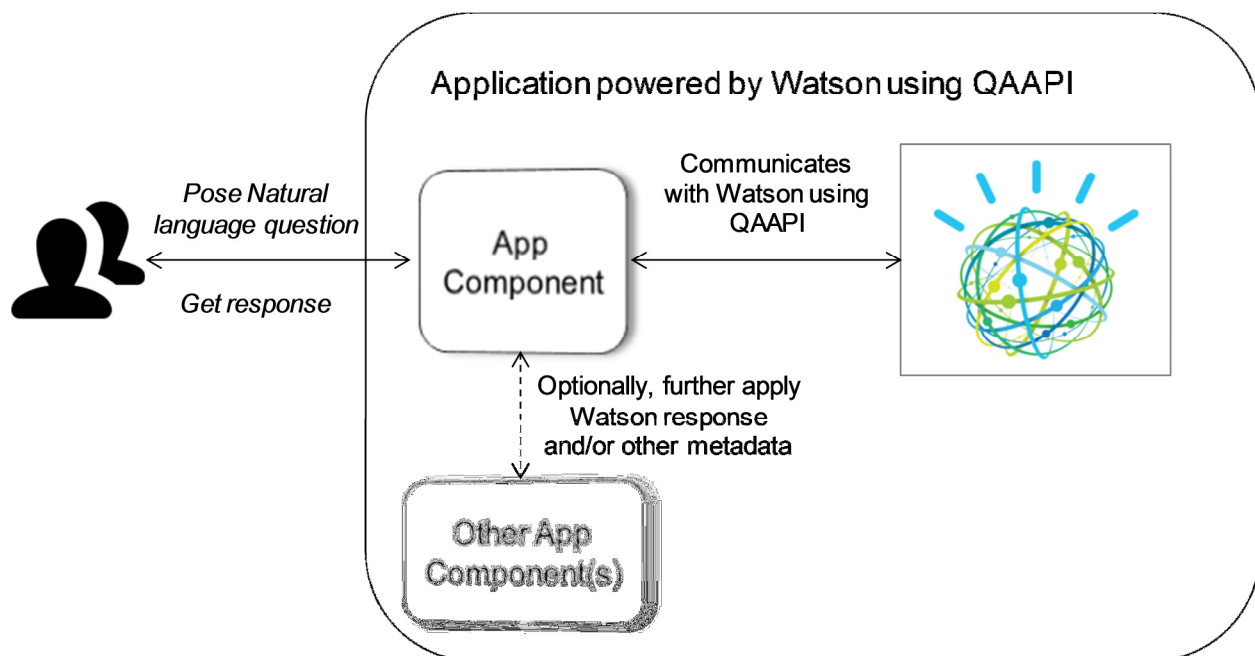


Figure 1- Application using QAAPI with Watson

## QAAPI access modes

Watson supports two ways of using the QAAPI – Asynchronous and synchronous mode.

1) Asynchronous mode:

In the asynchronous mode, the question is posted to Watson and the response returns a link to retrieve the answer when it is ready. The server needs to be polled to check if the question has completed processing. A status field in the response will indicate if the question contains the final answer. This mode can also be used if a bulk set of questions need to be submitted to Watson, with the answers being retrieved later.

2) Synchronous mode:

In the synchronous mode, a POST operation sends the question to Watson. The answer is received synchronously. This eliminates the need for a polling logic in the client application. In order to make the request synchronous the following HTTP Header needs to be provided:

X-SyncTimeout : <time in seconds>

If this Header is absent, asynchronous mode is assumed.

The <time in seconds> refers to the length of time the service should wait before giving up on a response. Thirty seconds is typically used as the default value. A value of -1 indicates the server should wait indefinitely. The timeout value does not refer to how long the browser or client application should wait, but rather how long processing time on the server should take to answer the question, before it times out.

## Using the QAAPI: Walk through an example scenario

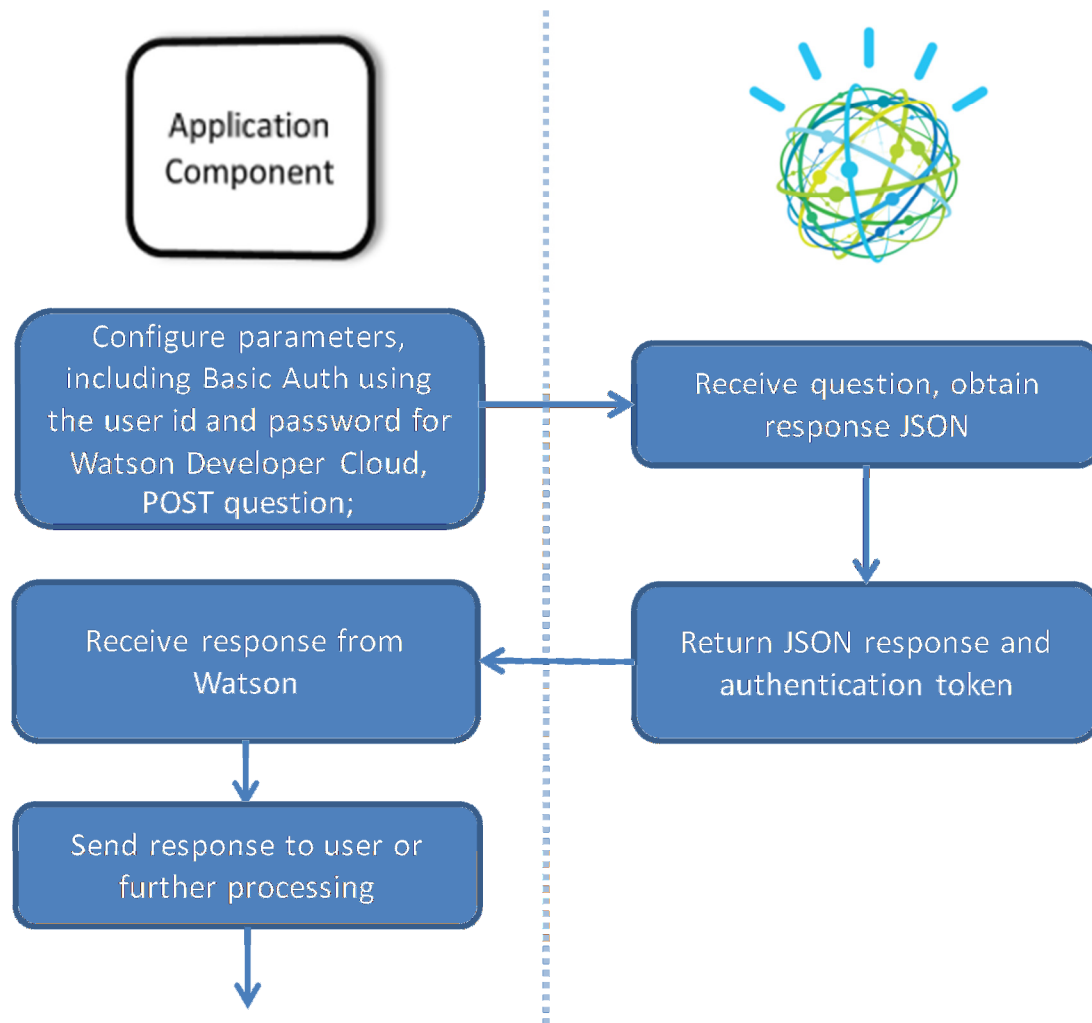
Consider a fictitious company building cognitive capabilities in a travel application. Initially, it wants to allow its users to have a conversation to raise questions while planning or booking a trip, and get relevant responses. It wants to embed Watson's cognitive capability that allows the user to ask questions in Natural Language, as if they are interacting with a human.

It is assumed that the company has obtained access to the Watson Developer Cloud; provided necessary content for Watson to ingest and initiated training for Watson to provide increasingly relevant responses, some of which are used throughout this paper for illustrative purposes only.

Figure 2 describes the flow that an application component would use to access Watson Question and Answer capability using the QAAPI.

The key steps involved are:

1. Configure parameters, including authentication
2. Post question
3. Receive response
4. Process response



*Figure 2- Application component and Watson interaction*

The following sections describe in detail the steps to use the QAAPL.

## Configure parameters

First the user configures various question parameters on the question, including the Basic Authentication, Content type, Accept type, and for a request in a synchronous mode, the sync-timeout, as described above.

### Authentication Model

The QAAPI uses Basic Authentication over SSL. During registration to the Watson Developer Cloud, a user ID and password are provided. This user ID and password is used for basic authentication. Use the Basic Auth HTTP header as part of the request. As an example:

Authorization: Basic qWxhZGRpbjpvcGVulhNlc2FtZQ==

An authentication token is contained as part of the response; that can be reused in subsequent requests. Currently, the authentication token expires in 10 minutes at which point re-authentication is necessary.

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*The QAAPI uses Basic Authentication over SSL to provide security. During registration to the Watson Developer Cloud, a user ID and password are provided. This user ID and password is used for basic authentication.*

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### Content-type and Accept type

The QAAPI supports JSON as the content-type and accept type. The following headers need to be specified during the POST. XML is also supported.

Content-Type: application/json

Accept: application/json

After the required and optional parameters are configured, the question is posted.

### POST question

To POST a question to Watson, first the question needs to be in a JSON format.

## Simple question payload

Example 1 shows a simple example of the payload to provide. Using the travel example described earlier, a question “What is the best day to book air travel to Hawaii?” is used to demonstrate the example.

```
{
  "question": {
    "questionText": "What is the best day of the week to book air travel to Hawaii?"
  }
}
```

*Example 1- Simple payload for question*

The output can be customized by passing in the number of responses to return. This is usually driven by the target use cases that application is being used for. For example, if only one response from Watson is expected, set the “items” to 1. There are scenarios where multiple responses are useful – especially when a user would benefit from seeing the top 2, 3 or more responses on their user interface – either all at the same time or as a “Show more responses” link that displays the additional responses retrieved.

```
{
  "question": {
    "questionText": "Do I need a visa to enter Brazil?",
    "items": "4"
  }
}
```

*Example 2 Simple payload with minimal customization*

## Question processing attributes

The next sections are additional insights into how Watson handled the question. Many of the values are default values Watson assigned when it interpreted the question. These values can be set when the question is specified. As an example, “formattedAnswer”, “items”, “evidenceRequest”, and “category” can be set when the question is asked. Depending on the Watson pipeline, the “evidenceRequest” may be



ignored since the answer and evidence for the answer could be the same. The “category” is currently not used.

```
"pipelineid": "386327212",
"formattedAnswer": false,
"category": "",
"items": 4,
"status": "Complete",
"id": "30081B62A4F3458384EBFCF361145C4C",
"questionText": "Do I need a visa to enter Brazil?",
"evidenceRequest":
{
  "items": -1,
  "profile": "YES"
},
```

### *Example 3 - Question processing attributes*

The “pipelineid” is an internal value which the Watson pipeline assigned to this question. The “formattedAnswer” specifies if you want the answer returned with HTML formatting. In this case, we did not specify “formattedAnswer” and Watson defaulted to “false” which means answer text is unformatted. The unformatted version is shown in Example 7. As described earlier, the “items” is the number of responses items to be returned for the current question.

The “status” of “Complete” indicates the question completed successfully. In Synchronous mode, the status is always “Complete” or “Failed” if there was a problem with the processing of the question. The failure will contain additional information, including an error code with which can be used to gather more information on the cause. In Asynchronous mode, the “status” field ranges from “Accepted”, “Queued”, and “Complete”. If there was an error, the status will indicate “Failed” when the server is polled for the answer.

The “id” is the unique identifier assigned to every question. The “questionText” contains the original question which was asked. The “items” in the “evidenceRequest” contains how much supporting evidence should be provided with the response. The “profile” parameter indicates if the source of the evidence should also be included.

There are other parameters that can be set in the payload along with the question. Some of these are explained as part of the response output in the following sections. The response to this question and its associated evidence explained in the section below give a good insight into the types of information returned in the output response.

## **Receive Response**

Next, in the process flow described above is to receive a response from Watson. In this section, the example output used to explain the key elements of the output content is for the question shown in Example 2. The entire output can be viewed in the section titled

Appendix 1.0: Example JSON Answer in this document. In some instances, as noted, the response passages or text have been truncated by the authors for brevity.

The output from Watson contains not just the response, but it also contains the confidence score, the evidence and other metadata about the response. Some of this information provides insight into how the question was interpreted by Watson. In this example, the “qclassList” describes the classification of the question input, “Do I need a visa to enter Brazil?” In this case the classification is “DESCRIPTIVE” and a “FACTOID”.

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*The output from Watson contains not just the response, but it also contains the confidence score, the evidence and other metadata about the response.*

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The LAT or Lexical Answer Type refers to the type of answer being sought. This could be information providing insight into how Watson interpreted the question and may be useful if additional analysis is required, especially during training.

```
"question":
{
  "qclassList":
  [
    {
      "value": "DESCRIPTIVE"
    },
    {
      "value": "FACTOID"
    }
  ],
  "focuslist":
  [
    {
      "value": "I"
    }
  ],
  "latlist":
  [
    {
      "value": "I"
    }
  ]
}
```

```
],
```

*Example 4- qclass list section of the response*

## Answer metadata

Next, in the answer is the “evidenceList.” The “evidenceList” will make up the bulk of the data returned by Watson and will contain the response to the question. Inspecting this section reveals the following, shown in the Example 5.

```
{
  "value": "0.2938396632671356",
  "text": "U.S. Consular Agency Porto Alegre Assis Brasil 4320 Store 84 (Boulevard Strip Mall)
Parque Sao Sebastiao 91110-000 Porto Alegre, RS Telephone 011-55-51-3226-3344 You can find contact
information for U.S. embassies and consulates in neighboring countries at the Department of State's list
of embassies and consulates. Back to Top ENTRY / EXIT REQUIREMENTS FOR U.S. CITIZENS: Brazil
requires U.S. citizens to carry a valid U.S. passport and visa when traveling to Brazil for any purpose.",
  "id": "PB_33577171",
  "title": "BrazilCountry Specific Information : Brazil Country Specific Information : U.S. Consular
Agency Porto Alegre....."2
  "document":
"http://xx.yyy.zz.aa:8080/instance/8/deepqa/v1/question/document/PB_33577171/3243/3729",
  "copyright": "No copyright specified for this supporting passage or document.",
  "termsOfUse": "No license specified for this supporting passage or document."
}
```

*Example 5- An element of the evidenceList in the answer*

As a piece of evidence, the “value” refers to the weighting Watson assigned to the evidence and can be viewed as confidence value as to how relevant the evidence is as an answer. In this example, that confidence level is 29%. This value could be different based on how the system is trained. The “text” is the evidence containing the response.

The “id” represents the id of the document which Watson assigned when it ingested the document. The “title” is the title of the document or section where this piece of evidence was found. The “document” is a URL from where the document can be retrieved.

The “copyright” and “termsOfUse” are the attributions for the document. When content is ingested into Watson, it can be assigned a “copyright” information or “termsOfUse”

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<sup>2</sup> Content truncated by authors for brevity. The complete listing in

with respect to how the content should be used. Often times this may contain a URL to where the terms and copyright information can be found by the user. This is useful to have, since in some instances, content usage terms require this to be displayed to a user.

Continuing to investigate the output, the next section is “synonymList.” The “synonymList” contains a list of synonyms which Watson may have identified in the question and can be used to provide insight in to training.

```
"synonymList":
[ { "partOfSpeech": "verb",
  "value": "need",
  "lemma": "need",
  "synSet": [ {
    "name": "Wordnet_necessitate-verb-1",
    "synonym":
    [ { "isChosen": true, "value": "ask", "weight": 1 },
      { "isChosen": true, "value": "require", "weight": 1 },
      { "isChosen": true, "value": "take", "weight": 1 },
      { "isChosen": true, "value": "demand", "weight": 1 },
      { "isChosen": true, "value": "involve", "weight": 1 } ] ] },
  { "partOfSpeech": "noun", "value": "brazil", "lemma": "brazil",
    "synSet": [ { "name": "Wordnet_brazil-noun-1", "synonym":
      [ { "isChosen": true, "value": "brasil", "weight": 1 } ] } ] }
]
```

*Example 6 - SynonymList in the Answer output*

Depending on the problem domain Watson is analyzing, there can potentially be a number of different ways a word can be represented. In Example 6, the word “Brazil” can potentially mean the same as “Brasil” and Watson is giving an indication of how it handled similar words. Watson also allows one to provide a custom “synonymList” as input to a question.

As an example, if Watson might benefit from knowing that “Brazil” could also mean “Land of Brazil”, it could have been included in the information with the question. The synonymList can be used in a number of ways – one example would be to use this information as a clarification user prompt.

## Response

This section describes the response Watson returns.

```

"answers": [ {
  "id": 0,
  "text": "Citizens from all other countries (complete list [3]) do require a visa. The fees vary
depending on reciprocity: for example, US citizens have to pay at least US$160 for a tourist visa and
US$220 for a business visa. As of August 2012, citizens of Canada should expect to pay at least
CDN$81.25 for a tourist visa, not including any handling or processing fees. Cost of Brazil visa for citizens
of Taiwan or Taiwanese passport holder pay $20 (Reference from Embassy of Brazil in Lima, Peru) and 5
days to process. , .....",
  "confidence": 0.73947
}, {
  "id": 1,
  "text": "No visa is required for stays of up to 90 days from holders of passports from these
countries, unless otherwise indicated: Andorra, Argentina, Austria, Bahamas, Barbados, Belgium, Bolivia,
Bulgaria, Chile, Colombia, Costa Rica, Croatia, Czech Rep., Denmark, Ecuador, El Salvador, Estonia,
Finland, France, Germany, Greece, Guatemala, Guyana, Honduras, Hong Kong SAR passport, Hungary,
Iceland, Ireland, Israel, Italy, South Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Macau,
Malaysia, Sovereign Military Order of Malta, Mexico, Monaco, Morocco, Namibia, Netherlands, New
Zealand, Norway, Panama, Paraguay, ",
  "confidence": 0.66831
}, {
  "id": 2,
  "text": "Contact information for these consulates may be found at the Brazilian Embassy
website. Special Entry/Exit Requirements for Dual Nationals: U.S. citizens who also have Brazilian
nationality cannot be issued Brazilian visas and must obtain a Brazilian passport from the Brazilian
Embassy or Consulate nearest to their place of residence to enter and depart Brazil. In addition to being
subject to all Brazilian laws affecting U.S. citizens, dual nationals may also be subject to other laws that
impose special obligations on Brazilian citizens. Information about dual nationality can be found on our
website.",
  "confidence": 0.31743
}, {
  "id": 3,
  "text": "U.S. Consular Agency Porto Alegre Assis Brasil 4320 Store 84 (Boulevard Strip Mall)
Parque Sao Sebastiao 91110-000 Porto Alegre, RS Telephone 011-55-51-3226-3344 You can find
contact information for U.S. embassies and consulates in neighboring countries at the Department of
State's list of embassies and consulates. Back to Top ENTRY / EXIT REQUIREMENTS FOR U.S.
CITIZENS: Brazil requires U.S. citizens to carry a valid U.S. passport and visa when traveling to Brazil for
any purpose.",
  "confidence": 0.29384
}
]

```

*Example 7- Sample Answers returned in a response*

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*\* Content truncated by authors for brevity. The complete listing in*

In the travel example above, the “id” refers to the answer number. Answers are numbered sequentially starting at 0. The “text” contains the text of the answer. The “confidence” contains the confidence value of the answer. The answers are always ordered with the highest confidence value occurring first. The next section “evidence” provides additional supporting evidence for the answer. The other values are similar to the section “evidenceList” examined above.

These answers can be displayed directly in the user interface of the person asking the question or used for further processing by the application.

There is also a “passthru” which can be used as user defined input to the question. In Asynchronous mode you might use the “passthru” to add a user specific piece of data that you want associated with the question when it is returned. As an example, you might store the user id of the question asker for later reference when the answer is returned.

## Error conditions

If there is an error condition with the pipeline, additional information is returned in the “errorNotifications” and is helpful in working with IBM Support.

“errorNotifications”: [],

## Process Response

Watson can return the number of configured responses and evidence, with the associated degrees of confidence, based on the available corpus.

Each of these artifacts and metadata regarding the response could be very useful to the application developer. This metadata can be used in a number of ways, as described earlier. The response can be shown to a user asking the question as-is, or it could be passed on to another component for additional processing before it is displayed to a user. It could be used to visually represent the response(s), create a way to ask additional simulated questions or process the answer to obtain additional insights on the interactions. After Watson provides the response, the application developer is responsible to integrate that response seamlessly into their application.

This is how Watson capabilities begin to embed as a component in the application.

## Conclusion

This document explained how a developer could get started to build their cognitive application powered by Watson capabilities, using the QAAPL. This should allow the ability to open up ways of embedding Watson capabilities in an application and begin the journey on making an application cognitive.

## Additional reading

- [An Ecosystem of Innovation – Creating Cognitive Applications](#): An overview of the Ecosystem
- [The Era of Cognitive Systems – An Inside Look at IBM Watson and How it works](#) : How Watson works

## About the authors



Kevin Haverlock is a developer for the Watson platform core and is currently focused on surfacing APIs which can be used by developers to harness the power of Watson. He was previously a developer for IBM's emerging technology team which brought Watson out of IBM research towards a commercial application. He has over ten years' experience developing object oriented and distributed systems.



Sridhar Sudarsan is the Lead Architect for the Watson Ecosystem and is in the Watson CTO organization. He works on driving the IBM Watson Solutions with clients and partners. He is a technical leader in IBM Watson solutions team collaborating with the Watson development, research, engineering and services teams. He has over 15 years of experience with object-oriented, distributed and large enterprise solutions. He previously was the Chief Architect for the Batch Strategy for IBM, with architectural responsibility across batch products and solutions.



## Appendix 1.0: Example JSON Answer

```
{
  "question":
  {
    "qclasslist":
    [
      {
        "value": "DESCRIPTIVE"
      },
      {
        "value": "FACTOID"
      }
    ],
    "focuslist":
    [
      {
        "value": "I"
      }
    ],
    "latlist":
    [
      {
        "value": "I"
      }
    ],
    "evidencelist":
    [
      {
```

"value": "0.7394745945930481",

"text": "Citizens from all other countries (complete list [3]) do require a visa. The fees vary depending on reciprocity: for example, US citizens have to pay at least US\$160 for a tourist visa and US\$220 for a business visa. As of August 2012, citizens of Canada should expect to pay at least CDN\$81.25 for a tourist visa, not including any handling or processing fees. Cost of Brazil visa for citizens of Taiwan or Taiwanese passport holder pay \$20 (Reference from Embassy of Brazil in Lima, Peru) and 5 days to process. The reciprocity, however, also frequently applies to visa validity: US citizens can be granted visas valid up to 10 years and, likewise, Canadian citizens for up to 5. Tourist visas (including those granted on the spot in immigration control, as for most Europeans) can be extended at any office of the Policia Federal. All state capitals, and most border towns and international ports have one. Tourist visas only be extended once, for a maximum of 90 days, and under no circumstances can you be granted more than 180 days with a tourist visa for any 365-day period. You should contact the federal police about 1 week before your visa expires. The handling fee is currently R\$ 67 (Oct. 2008). You may be asked for an outbound ticket (book a fully refundable one on the internet, then cancel when your visa is extended), and a proof of subsistence (for which your credit card is mostly accepted.) In order to apply for the extension, you must fill out the Emissao da Guia de Recolhimento on the Federal Police website, which you will carry to the Banco do Brasil in order to pay the fee. Do not pay the fee until you have spoken with a federal police officer about your case. If she/he denies the extension of your visa, you must have a bank account in Brazil in order to receive a refund. The requirement to first enter Brazil within 90 days of the issue of the visa now only applies to nationals of Angola, Bahrain, Burma, Cambodia, Cape Verde, China, Cuba, Equatorial Guinea, Gabon, Ghana, Greece, Honduras, Indonesia, Japan, Jordan, Korea, Kuwait, Laos, Libya, Nigeria, Oman, Pakistan, Paraguay, The Philippines, Portugal, Qatar, Syria, Switzerland, Taiwan, Thailand, and Tunisia. Failure to enter Brazil within 90 days will invalidate the visa, no matter how long it is otherwise valid for. Entry vs. exit stamps.",

"id": "PB\_33555290",

"title": "Brazil travel guide - Wikitravel : Brazil : [edit] Get in : [edit] Visa requirements",

"document":

"http://xx.yy.zz.aa:8080/instance/8/deepqa/v1/question/document/PB\_33555290/1829/4166",

"copyright": "No copyright specified for this supporting passage or document.",

"termsOfUse": "No license specified for this supporting passage or document."

},

{

"value": "0.6683115363121033",

"text": "No visa is required for stays of up to 90 days from holders of passports from these countries, unless otherwise indicated: Andorra, Argentina, Austria, Bahamas, Barbados, Belgium, Bolivia, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Czech Rep., Denmark, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Guyana, Honduras, Hong Kong SAR passport, Hungary, Iceland, Ireland, Israel, Italy, South Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Macau, Malaysia, Sovereign Military Order of Malta, Mexico, Monaco, Morocco, Namibia, Netherlands, New Zealand, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, San Marino, Slovakia, Slovenia, South Africa, Spain, Suriname, Sweden, Switzerland, Thailand, Trinidad &

Tobago, Tunisia, Turkey, United Kingdom (Including British National (Overseas) passport holders), Uruguay, Venezuela (60 days) and Vatican City. Note that the immigration officer has the right to restrict your visa to less than 90 days, if he deems fit. (This has been done routinely for lone male travellers arriving in Fortaleza, allegedly to combat prostitution tourism.) He will then state the number of days (e.g. 60 or 30) in pen writing inside the stamp just given in your passport; if not, it remains as 90 days. Citizens from all other countries (complete list [3]) do require a visa. The fees vary depending on reciprocity: for example, US citizens have to pay at least US\$160 for a tourist visa and US\$220 for a business visa. As of August 2012, citizens of Canada should expect to pay at least CDN\$81.25 for a tourist visa, not including any handling or processing fees. Cost of Brazil visa for citizens of Taiwan or Taiwanese passport holder pay \$20 (Reference from Embassy of Brazil in Lima, Peru) and 5 days to process. The reciprocity, however, also frequently applies to visa validity: US citizens can be granted visas valid up to 10 years and, likewise, Canadian citizens for up to 5. Tourist visas (including those granted on the spot in immigration control, as for most Europeans) can be extended at any office of the Policia Federal. All state capitals, and most border towns and international ports have one. Tourist visas only be extended once, for a maximum of 90 days, and under no circumstances can you be granted more than 180 days with a tourist visa for any 365-day period. You should contact the federal police about 1 week before your visa expires. The handling fee is currently R\$ 67 (Oct. 2008). You may be asked for an outbound ticket (book a fully refundable one on the internet, then cancel when your visa is extended), and a proof of subsistence (for which your credit card is mostly accepted.) In order to apply for the extension, you must fill out the Emissao da Guia de Recolhimento on the Federal Police website, which you will carry to the Banco do Brasil in order to pay the fee. Do not pay the fee until you have spoken with a federal police officer about your case. If she/he denies the extension of your visa, you must have a bank account in Brazil in order to receive a refund. The requirement to first enter Brazil within 90 days of the issue of the visa now only applies to nationals of Angola, Bahrain, Burma, Cambodia, Cape Verde, China, Cuba, Equatorial Guinea, Gabon, Ghana, Greece, Honduras, Indonesia, Japan, Jordan, Korea, Kuwait, Laos, Libya, Nigeria, Oman, Pakistan, Paraguay, The Philippines, Portugal, Qatar, Syria, Switzerland, Taiwan, Thailand, and Tunisia. Failure to enter Brazil within 90 days will invalidate the visa, no matter how long it is otherwise valid for."

```

    "id": "PB_33555290",

    "title": "Brazil travel guide - Wikitravel : Brazil : [edit] Get in : [edit] Visa requirements",

    "document":
"http://xx.yy.zz.aa:8080/instance/8/deepqa/v1/question/document/PB_33555290/532/4143",

    "copyright": "No copyright specified for this supporting passage or document.",

    "termsOfUse": "No license specified for this supporting passage or document."

},

{

```

```

    "value": "0.3174297511577606",

    "text": "Contact information for these consulates may be found at the Brazilian Embassy website. Special Entry/Exit Requirements for Dual Nationals: U.S. citizens who also have Brazilian nationality cannot be issued Brazilian visas and must obtain a Brazilian passport from the Brazilian Embassy or Consulate nearest to their place of residence to enter and depart Brazil. In addition to being subject to all Brazilian laws affecting U.S. citizens, dual nationals may also be subject to other laws that
```

impose special obligations on Brazilian citizens. Information about dual nationality can be found on our website.",

"id": "PB\_33576558",

"title": "Brazil",

"document":

"http://xx.yy.zz.aa:8080/instance/8/deepqa/v1/question/document/PB\_33576558/6075/6686",

"copyright": "No copyright specified for this supporting passage or document.",

"termsOfUse": "No license specified for this supporting passage or document."

},

{

"value": "0.2938396632671356",

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Francisco. Contact information for these consulates may be found at the Brazilian Embassy website. Special Entry/Exit Requirements for Dual Nationals: U.S. citizens who also have Brazilian nationality cannot be issued Brazilian visas and must obtain a Brazilian passport from the Brazilian Embassy or Consulate nearest to their place of residence to enter and depart Brazil. In addition to being subject to all Brazilian laws affecting U.S. citizens, dual nationals may also be subject to other laws that impose special obligations on Brazilian citizens. Information about dual nationality can be found on our website. Special Entry/Exit Requirements for Minors: Brazilian minors age 17 years and under, including minors who have both Brazilian and U.S. citizenship, are subject to strict exit requirements. Brazilian minors departing Brazil, if not accompanied by both parents, must",

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"confidence": 0.73947

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"id": 1,

"text": "No visa is required for stays of up to 90 days from holders of passports from these countries, unless otherwise indicated: Andorra, Argentina, Austria, Bahamas, Barbados, Belgium, Bolivia, Bulgaria, Chile, Colombia, Costa Rica, Croatia, Czech Rep., Denmark, Ecuador, El Salvador, Estonia, Finland, France, Germany, Greece, Guatemala, Guyana, Honduras, Hong Kong SAR passport, Hungary, Iceland, Ireland, Israel, Italy, South Korea, Latvia, Liechtenstein, Lithuania, Luxembourg, Macau, Malaysia, Sovereign Military Order of Malta, Mexico, Monaco, Morocco, Namibia, Netherlands, New Zealand, Norway, Panama, Paraguay, Peru, Philippines, Poland, Portugal, Romania, Russia, San Marino, Slovakia, Slovenia, South Africa, Spain, Suriname, Sweden, Switzerland, Thailand, Trinidad & Tobago, Tunisia, Turkey, United Kingdom (Including British National (Overseas) passport holders), Uruguay, Venezuela (60 days) and Vatican City. Note that the immigration officer has the right to restrict your visa to less than 90 days, if he deems fit. (This has been done routinely for lone male travellers



arriving in Fortaleza, allegedly to combat prostitution tourism.) He will then state the number of days (e.g. 60 or 30) in pen writing inside the stamp just given in your passport; if not, it remains as 90 days. Citizens from all other countries (complete list [3]) do require a visa. The fees vary depending on reciprocity: for example, US citizens have to pay at least US\$160 for a tourist visa and US\$220 for a business visa. As of August 2012, citizens of Canada should expect to pay at least CDN\$81.25 for a tourist visa, not including any handling or processing fees. Cost of Brazil visa for citizens of Taiwan or Taiwanese passport holder pay \$20 (Reference from Embassy of Brazil in Lima, Peru) and 5 days to process. The reciprocity, however, also frequently applies to visa validity: US citizens can be granted visas valid up to 10 years and, likewise, Canadian citizens for up to 5. Tourist visas (including those granted on the spot in immigration control, as for most Europeans) can be extended at any office of the Policia Federal. All state capitals, and most border towns and international ports have one. Tourist visas only be extended once, for a maximum of 90 days, and under no circumstances can you be granted more than 180 days with a tourist visa for any 365-day period. You should contact the federal police about 1 week before your visa expires. The handling fee is currently R\$ 67 (Oct. 2008). You may be asked for an outbound ticket (book a fully refundable one on the internet, then cancel when your visa is extended), and a proof of subsistence (for which your credit card is mostly accepted.) In order to apply for the extension, you must fill out the Emissao da Guia de Recolhimento on the Federal Police website, which you will carry to the Banco do Brasil in order to pay the fee. Do not pay the fee until you have spoken with a federal police officer about your case. If she/he denies the extension of your visa, you must have a bank account in Brazil in order to receive a refund. The requirement to first enter Brazil within 90 days of the issue of the visa now only applies to nationals of Angola, Bahrain, Burma, Cambodia, Cape Verde, China, Cuba, Equatorial Guinea, Gabon, Ghana, Greece, Honduras, Indonesia, Japan, Jordan, Korea, Kuwait, Laos, Libya, Nigeria, Oman, Pakistan, Paraguay, The Philippines, Portugal, Qatar, Syria, Switzerland, Taiwan, Thailand, and Tunisia. Failure to enter Brazil within 90 days will invalidate the visa, no matter how long it is otherwise valid for."

"confidence": 0.66831

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"text": "Contact information for these consulates may be found at the Brazilian Embassy website. Special Entry/Exit Requirements for Dual Nationals: U.S. citizens who also have Brazilian nationality cannot be issued Brazilian visas and must obtain a Brazilian passport from the Brazilian Embassy or Consulate nearest to their place of residence to enter and depart Brazil. In addition to being subject to all Brazilian laws affecting U.S. citizens, dual nationals may also be subject to other laws that impose special obligations on Brazilian citizens. Information about dual nationality can be found on our website."

"confidence": 0.31743

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November 2013

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