REST API Design

REST at ease!

Inspired on presentation with a similar name given by Michael Smart

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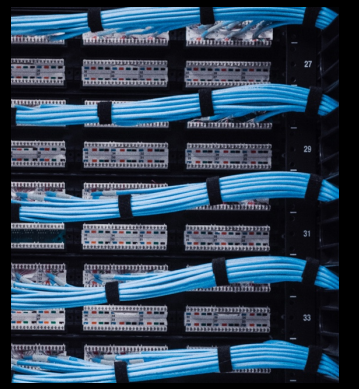
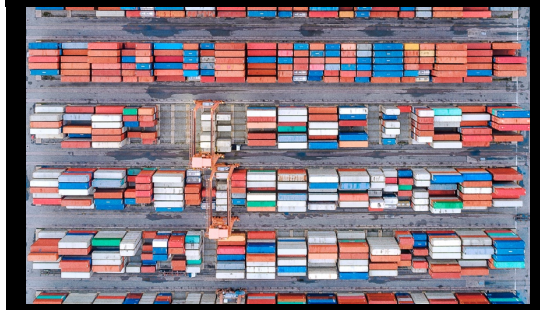
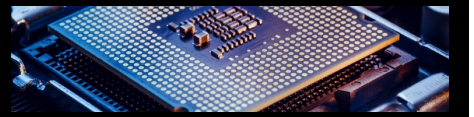
Amir Samary

Manager, Solution Architecture







Part One

Design

Two parts to every HTTP request

HTTP Method (Verb)

Resource

GET http://localhost:57772/csp/myapp/reservations

Server and Port

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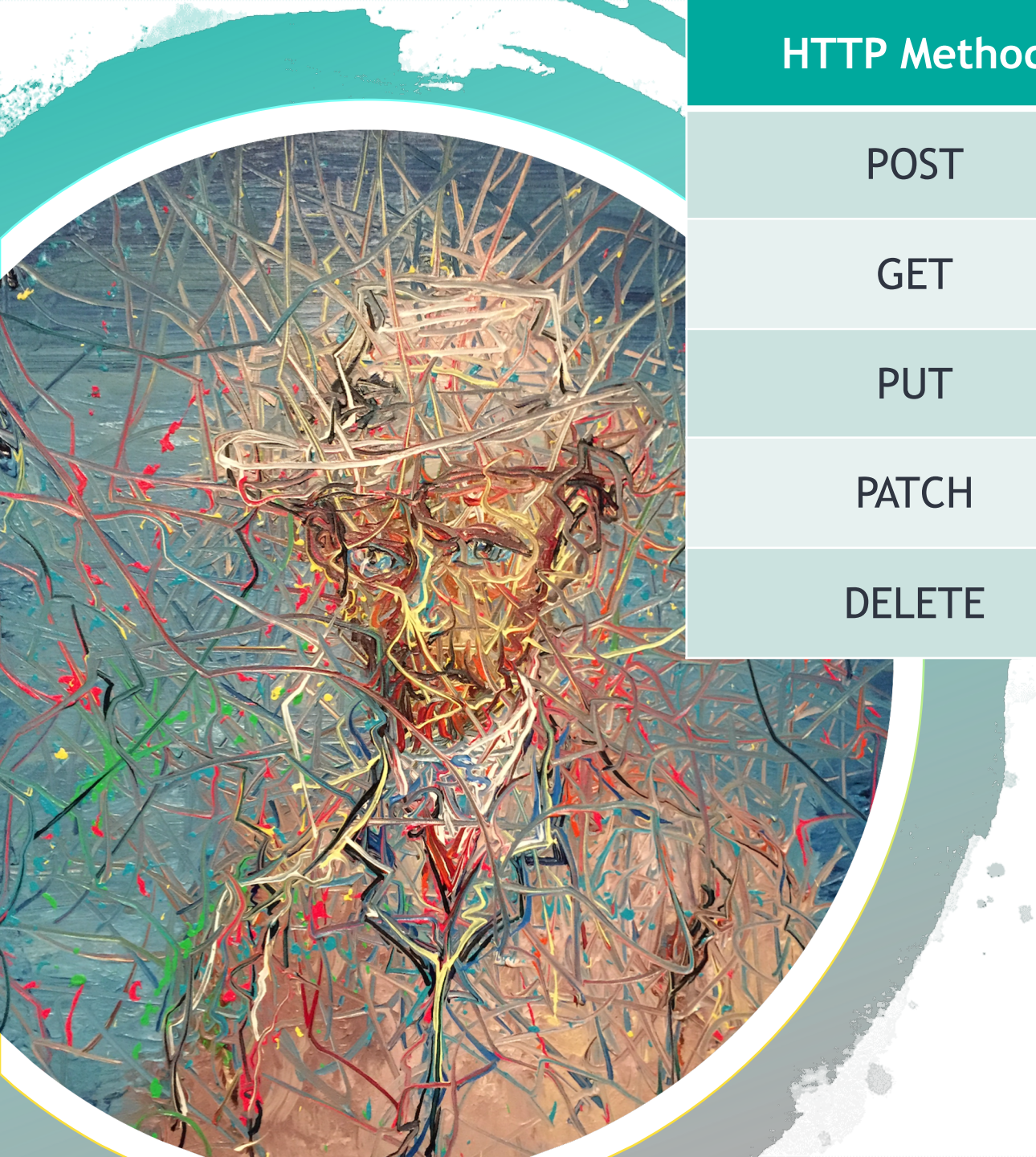

HTTP Method	Action	SQL
POST	Create	INSERT
GET	Read	SELECT
PUT	Replace	DELETE + INSERT ?
PATCH	Update	UPDATE
DELETE	Delete	DELETE

Choosing your HTTP method

HTTP Method	Action	SQL
POST	Create	INSERT
GET	Read	SELECT
PUT	Replace	~~DELETE + INSERT ?~~ Maybe “FULL” UPDATE?
PATCH	Update	UPDATE
DELETE	Delete	DELETE

Choosing your HTTP method

How to choose your resource names

GET http://localhost:57772/csp/myapp/rest/**getReservations**

vs.

GET http://localhost:57772/csp/myapp/rest/**reservations**

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POST

POST http://localhost:57772/csp/myapp/rest/reservations

```
{
    "customer": "Amir",
    "startLocation": "Brazil",
    "destination": "Boston",
    "startDate": "2018-02-01",
    "endDate": "2018-02-10"
}
```

HTTP Status: 201 Created
Location: /csp/myapp/rest/reservations/**7**

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Expectations about “Idempotence” and “Safeness”

HTTP Method	Idempotent?	Safe?
POST	No	No
GET	Yes	Yes
PUT	Yes	No
PATCH	No	No
DELETE	Yes	No

An **idempotent** request can be repeated multiple times with the same end result on the server.

A **safe** request indicates that the data will not be changed on the server.

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Statelessness

GET http://localhost:57772/csp/myapp/rest/**reservation/12345**

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Demo!

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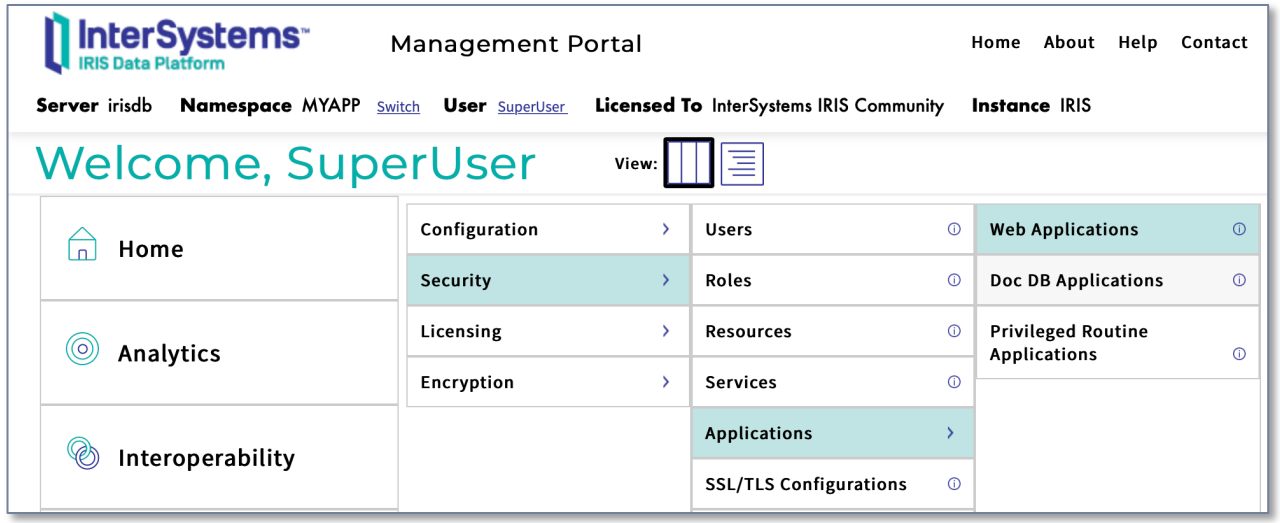
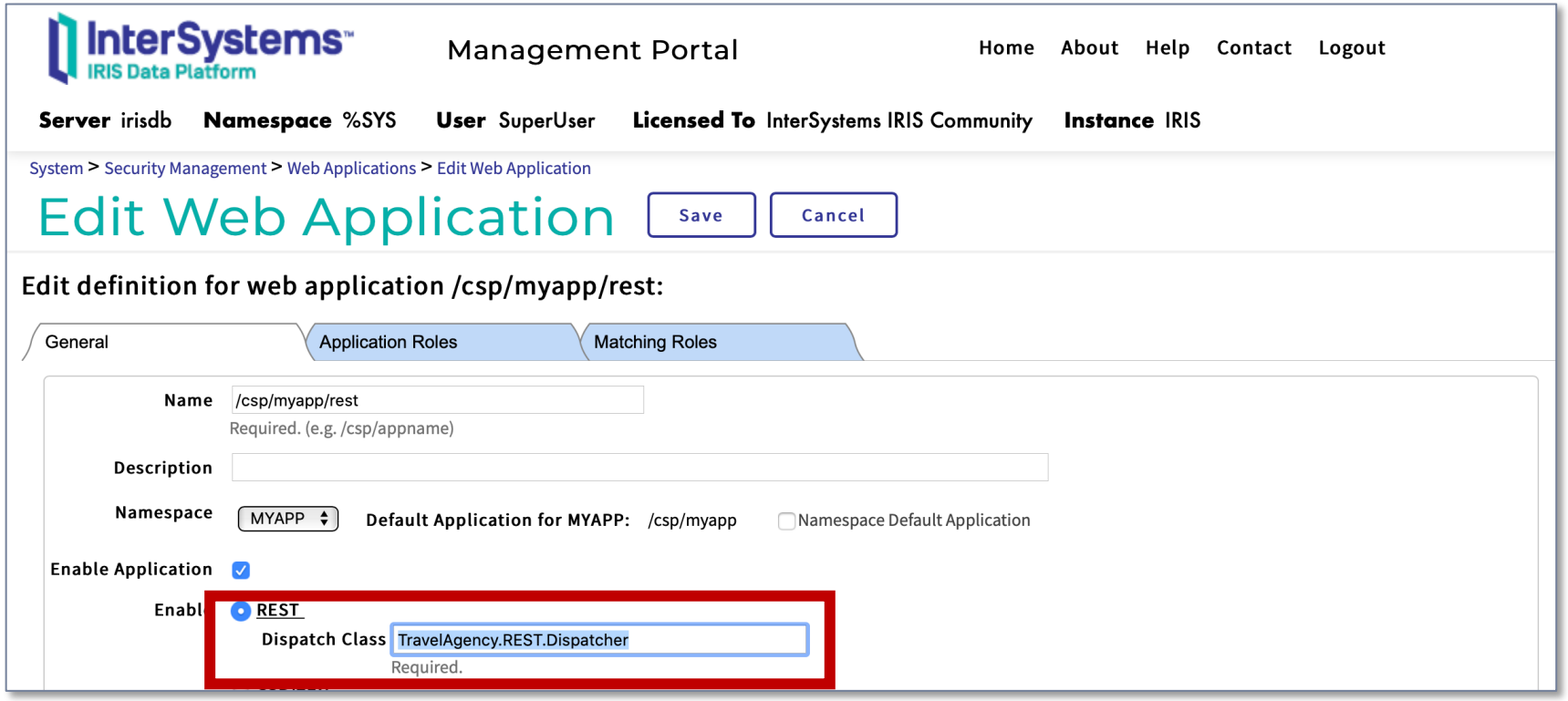
Part Two

Implementation

Configure the REST Dispatcher





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Demo!

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D.R.Y.

(Don’t Repeat Yourself)

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Identifying repeated code

GET	POST	PATCH
Open reservation object	Convert request body into dynamic object	Convert request body into dynamic object
If it does not exist, handle errors	If not valid JSON, handle errors	Open reservation object
Create dynamic object	Create new reservation object	If it does not exist, handle errors
Return JSON string	Set properties and save	Set properties and save
		If not valid JSON, handle errors

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Identifying repeated code

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Identifying repeated code

Don’t repeat yourself.

GET	POST	PATCH
Open reservation object	Convert request body into dynamic object	Convert request body into dynamic object
If it does not exist, handle errors	If not valid JSON, handle errors	If not valid JSON, handle errors
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Return JSON string	Set properties and save	If it does not exist, handle errors
		Set properties and save

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Exceptions.

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Using helper methods and exceptions

- REST dispatch class calls helper methods
  - Improves readability
  - Modularizes code
- If errors occur in helper methods, throw an exception
  - REST dispatcher responsible for catching exceptions
- When an exception is caught, set the HTTP response status accordingly
  - Use custom exception classes for known problem cases

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Demo!

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https://github.com/intersystems/rest-and-relaxation

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Part Three

Advanced topics.

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CORS

Cross-Origin Resource Sharing

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CORS — Request from same origin

1. Web browser requests web application

2. Web server returns javascript code needed for web application

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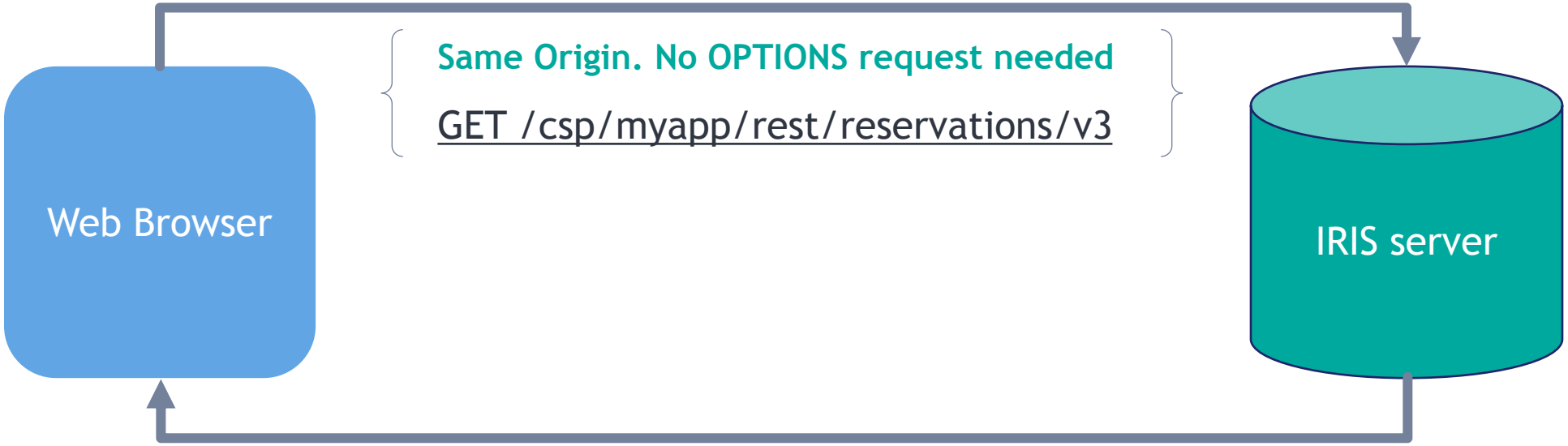
CORS — Request from same origin

3. Javascript code makes request to REST service



4. REST response returned to browser.

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CORS — Request from different origin

1. Web browser requests web application on unrelated web site

2. Web server returns javascript code that calls REST service

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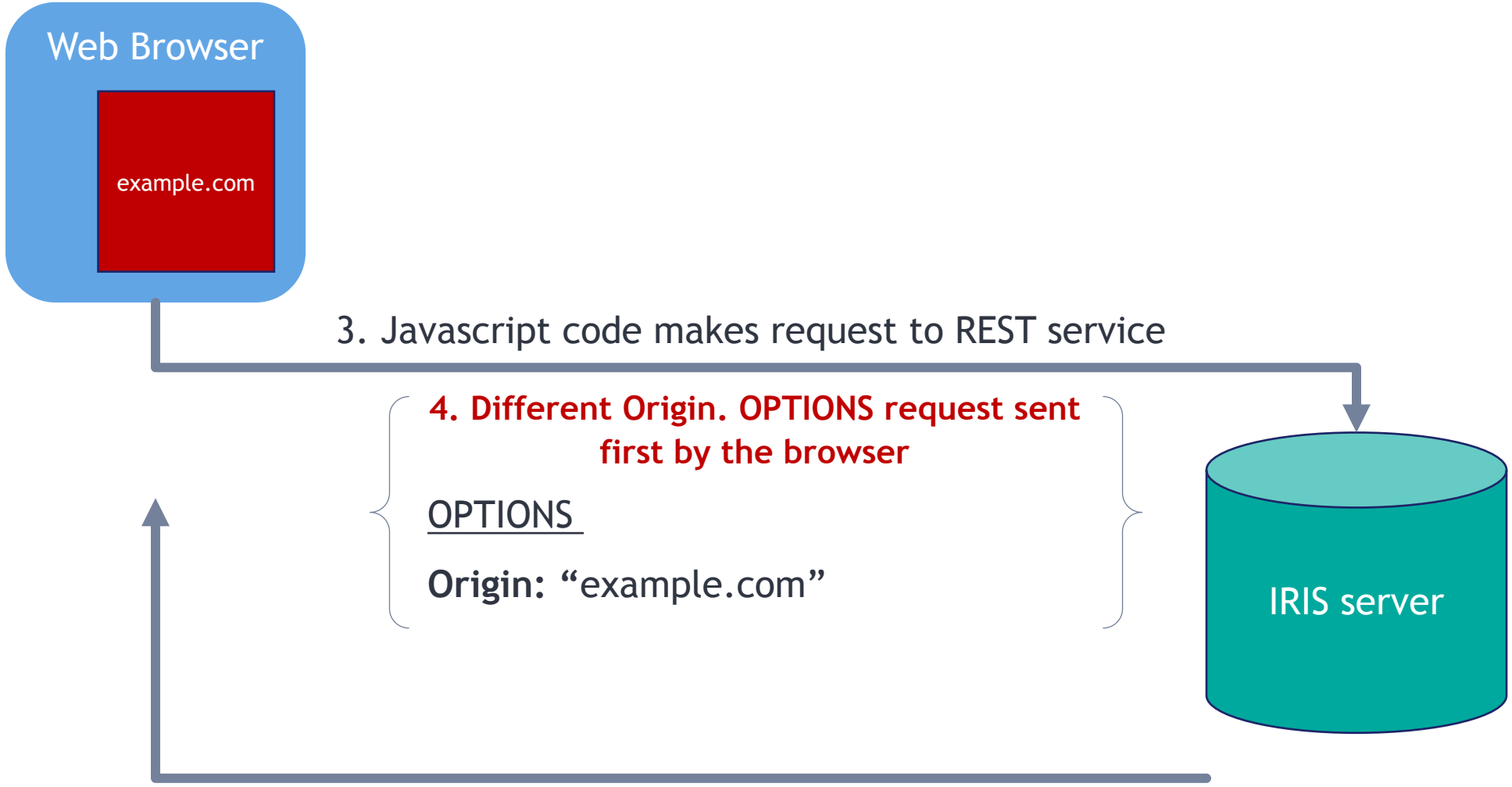
CORS — Request from different origin



5. CORS not allowed!

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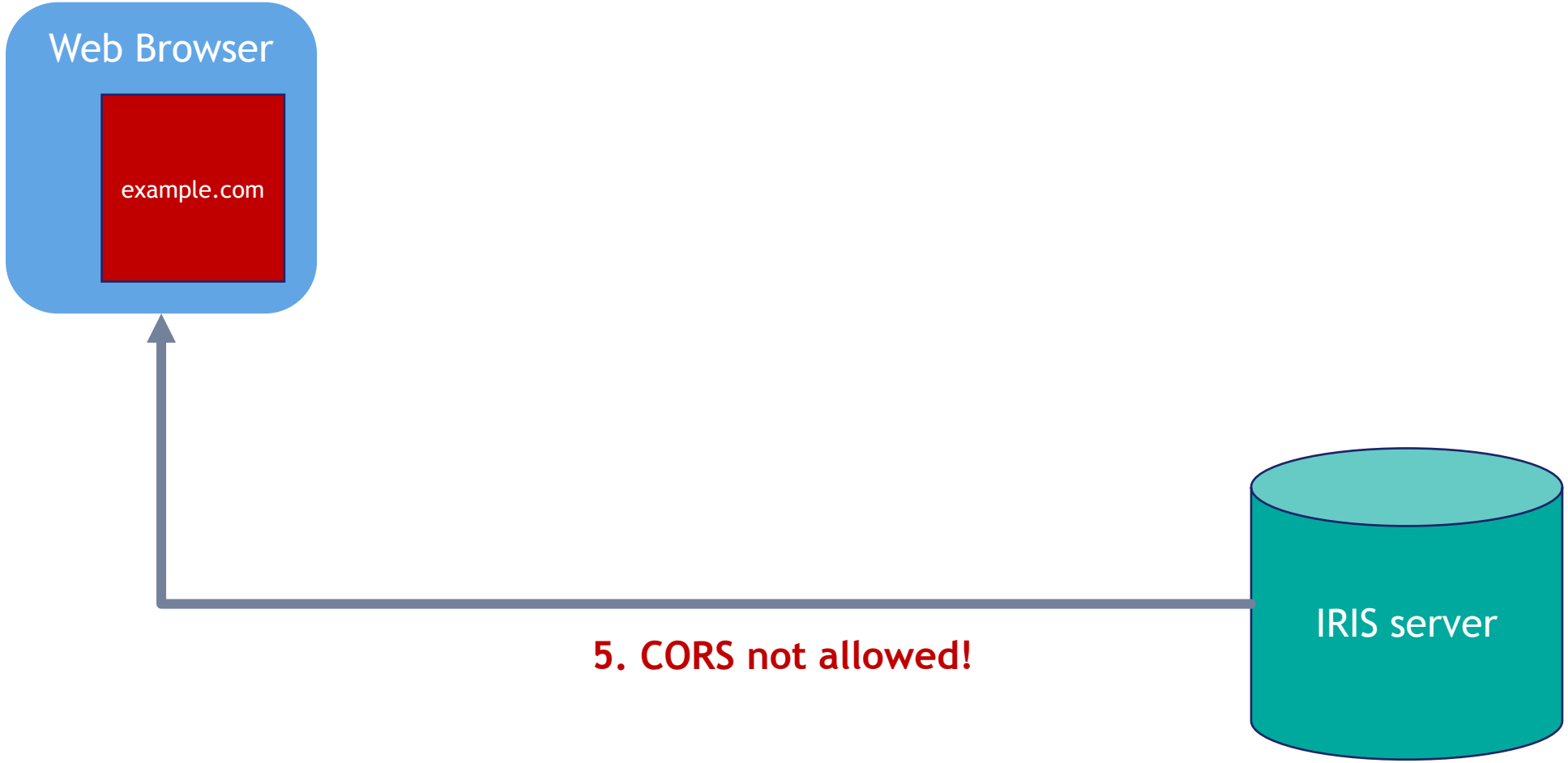
CORS — Request from different origin



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CORS — Request from different origin

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CORS whitelist

- Read the documentation about CORS
- Add to your Dispatcher Class:
  - Parameter HandleCorsRequest = 1;
  - ClassMethod OnHandleCorsRequest(url)
  - Make sure CSPSystem user has access to your database!
- You should only enable this if you are providing REST API services for third party Web applications to use.

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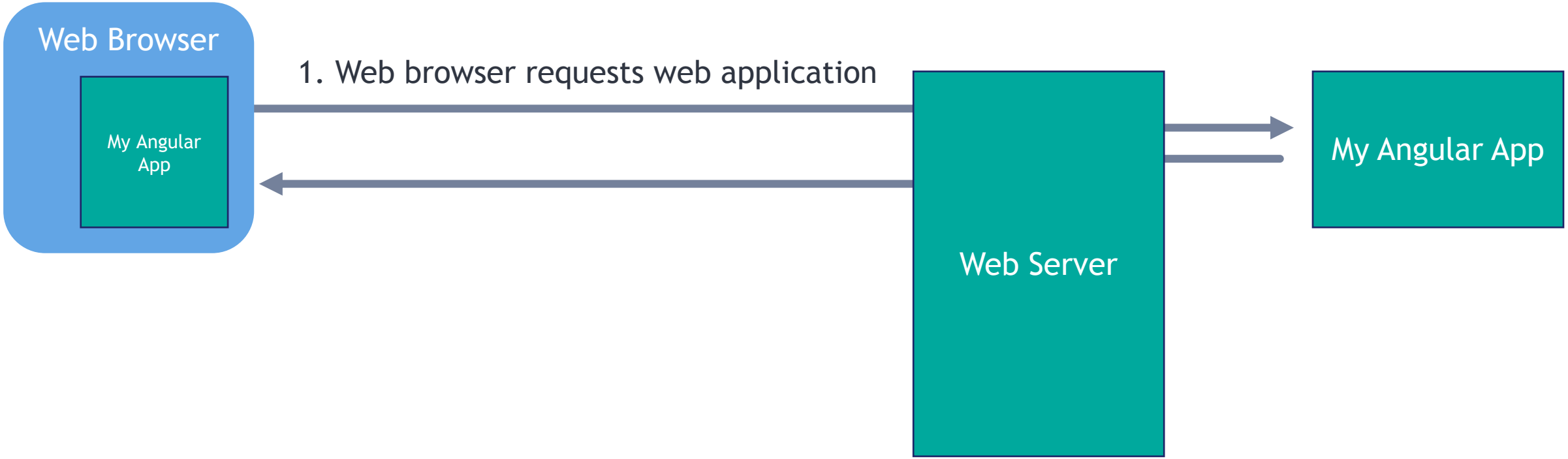
CORS — Request from your own Application



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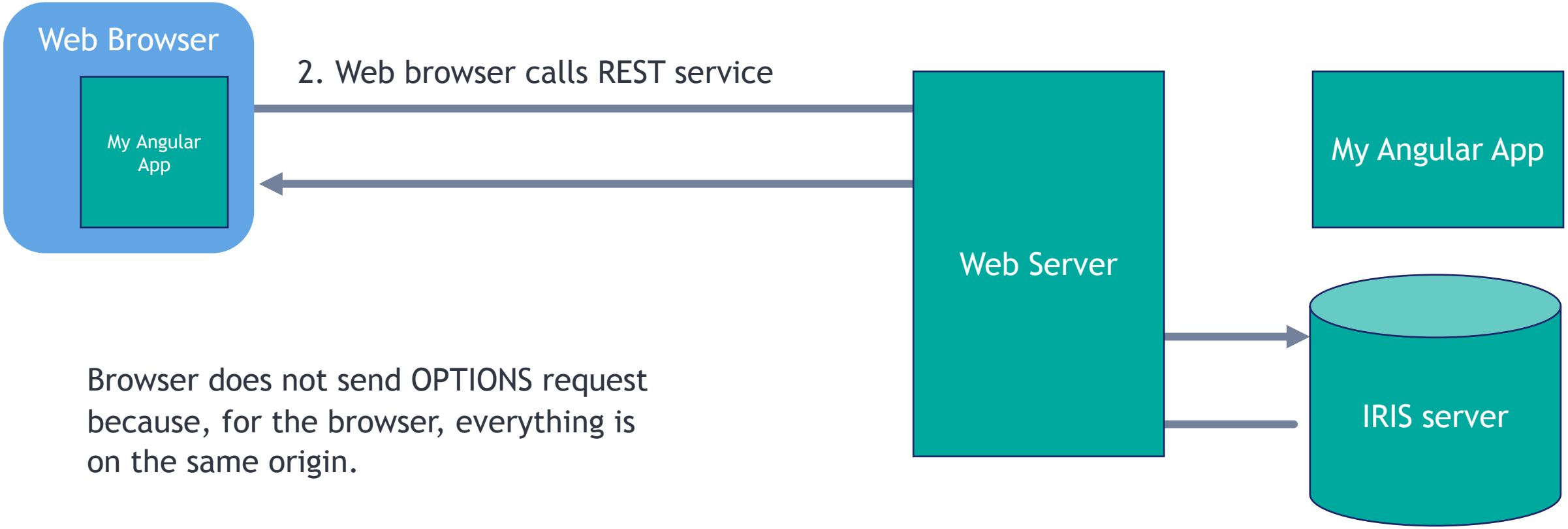
CORS — Request from your own Application



Browser does not send OPTIONS request because, for the browser, everything is on the same origin.

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Always have a Web Server in front of your IRIS Instance

- Fixes the CORS issue for your application
- Protects your backend
- Provides much better performance than the embedded Web Server that comes with IRIS

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Authentication.

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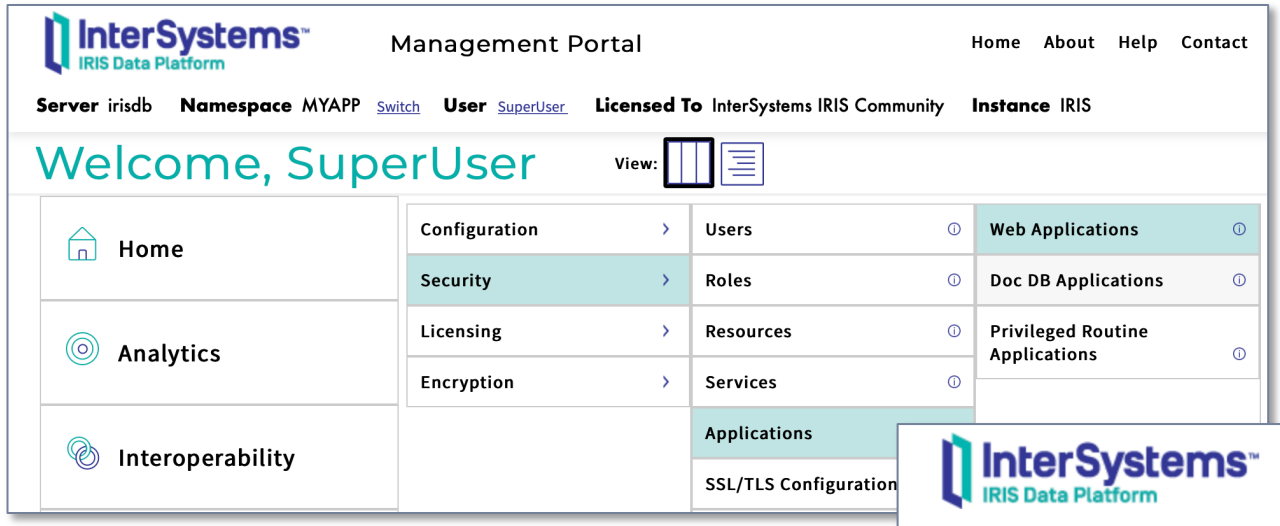
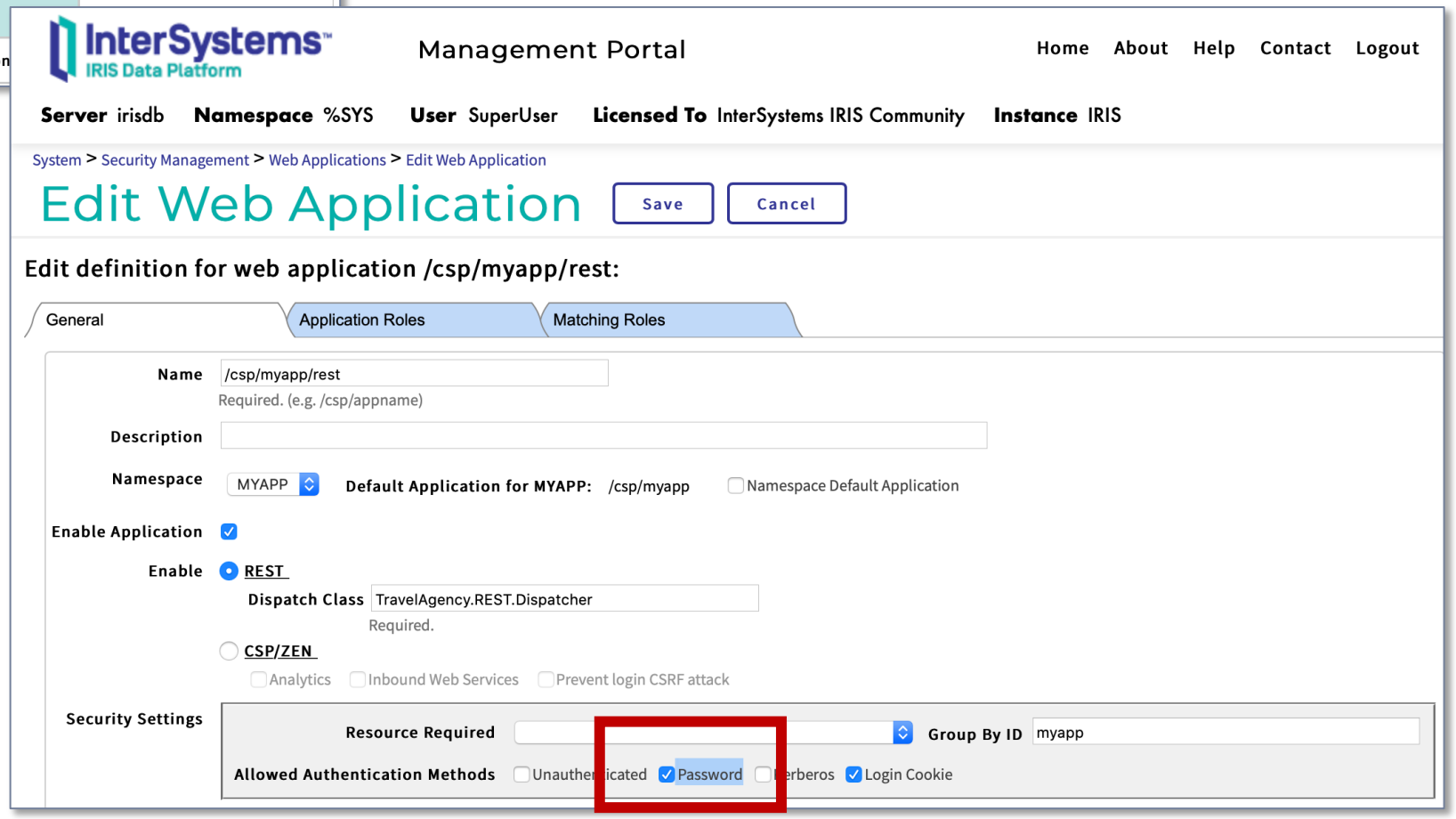
Configure Security Settings





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Demo!

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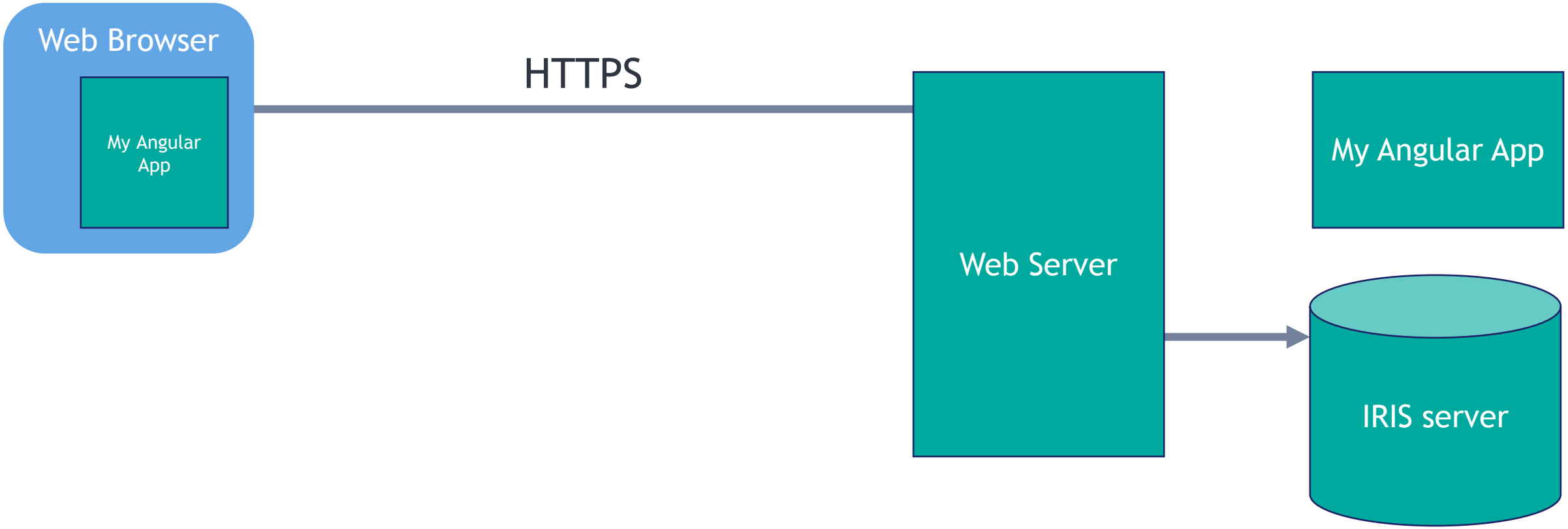
Use TLS (HTTPS) to protect the personal information



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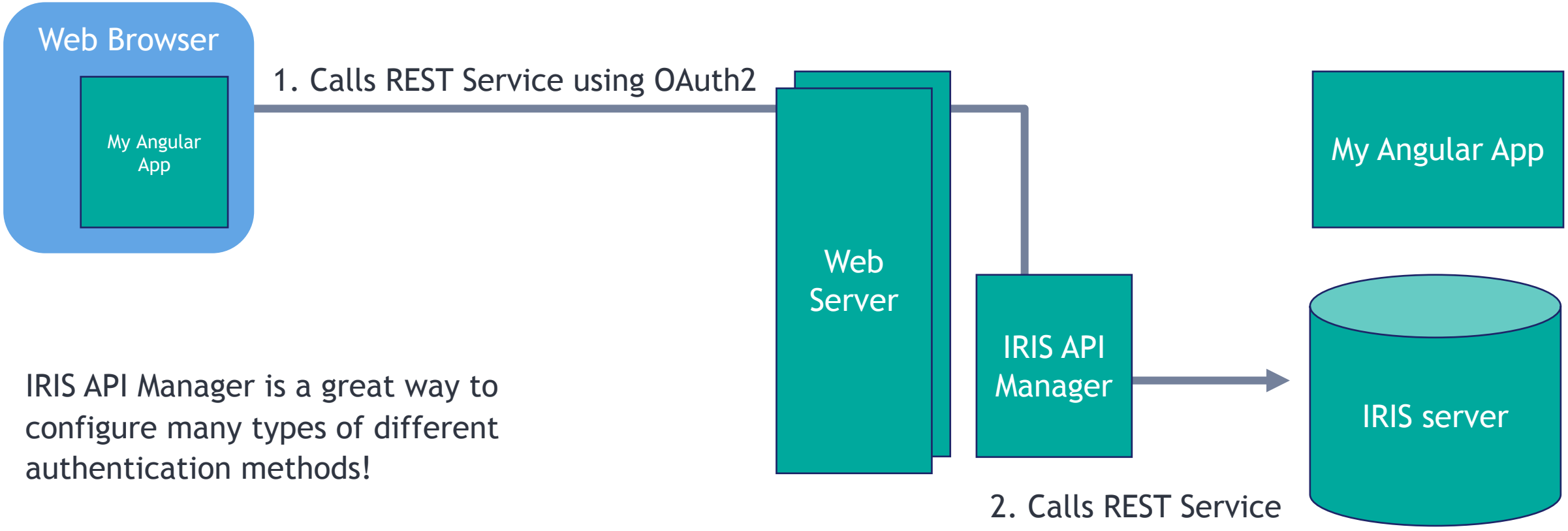
IRIS API Manager to enhance Security of your APIs



IRIS API Manager is a great way to configure many types of different authentication methods!

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Caching.

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Demo!

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Caching

- By default, IRIS doesn’t send any caching headers
- Caching is not easy to test
  - If you call your REST API using your browsers directly, the browser will ignore the caching headers and always make the call
  - Postman does the same thing. Both assume you WANT to ignore the cache to test your API
  - You must have a web page that, after loaded, calls your REST service.

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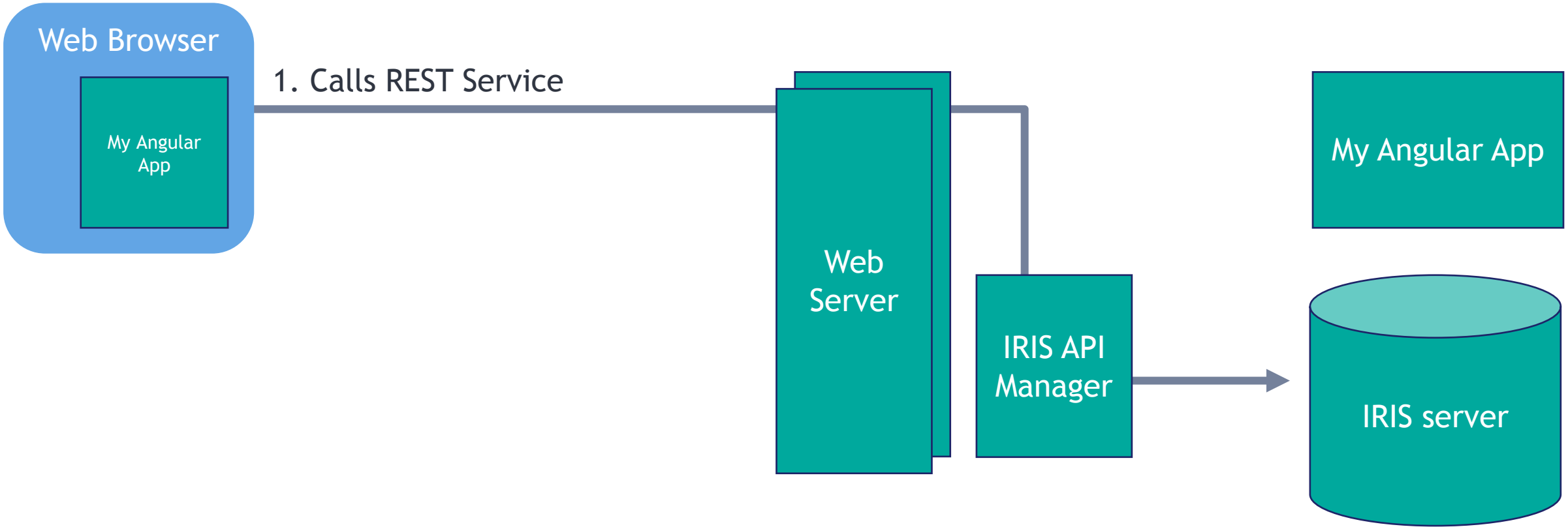
Caching on the Browser



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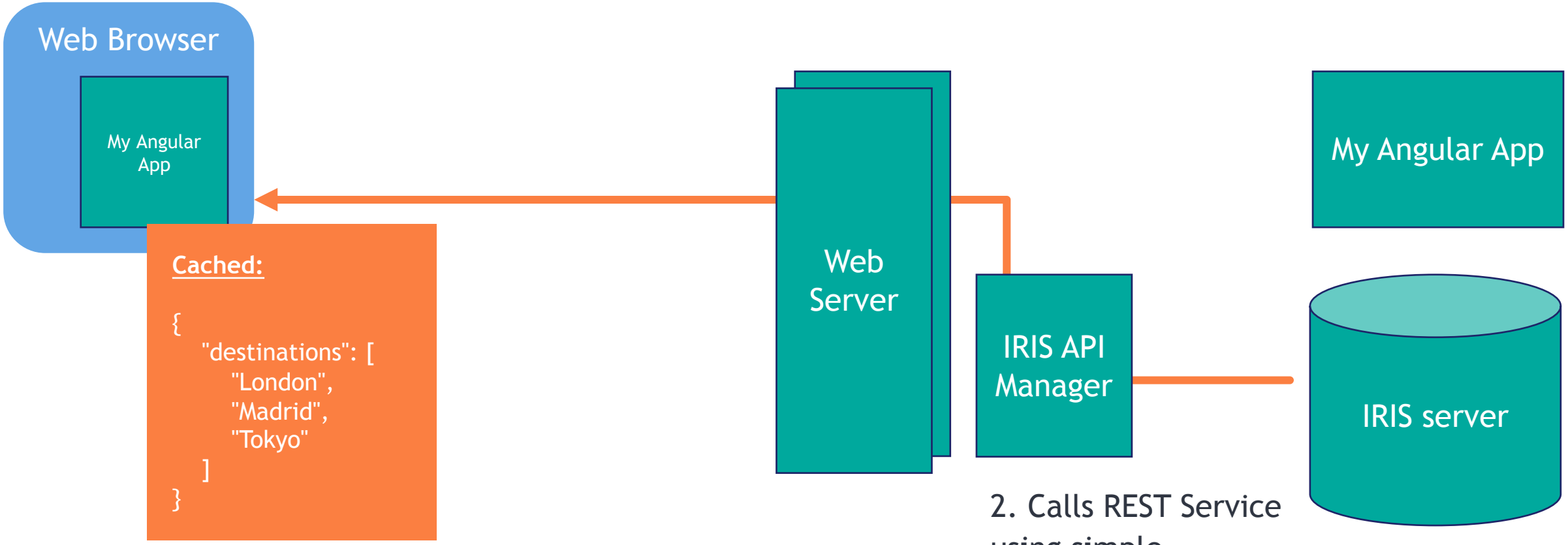
Caching on the Browser



2. Calls REST Service using simple authentication

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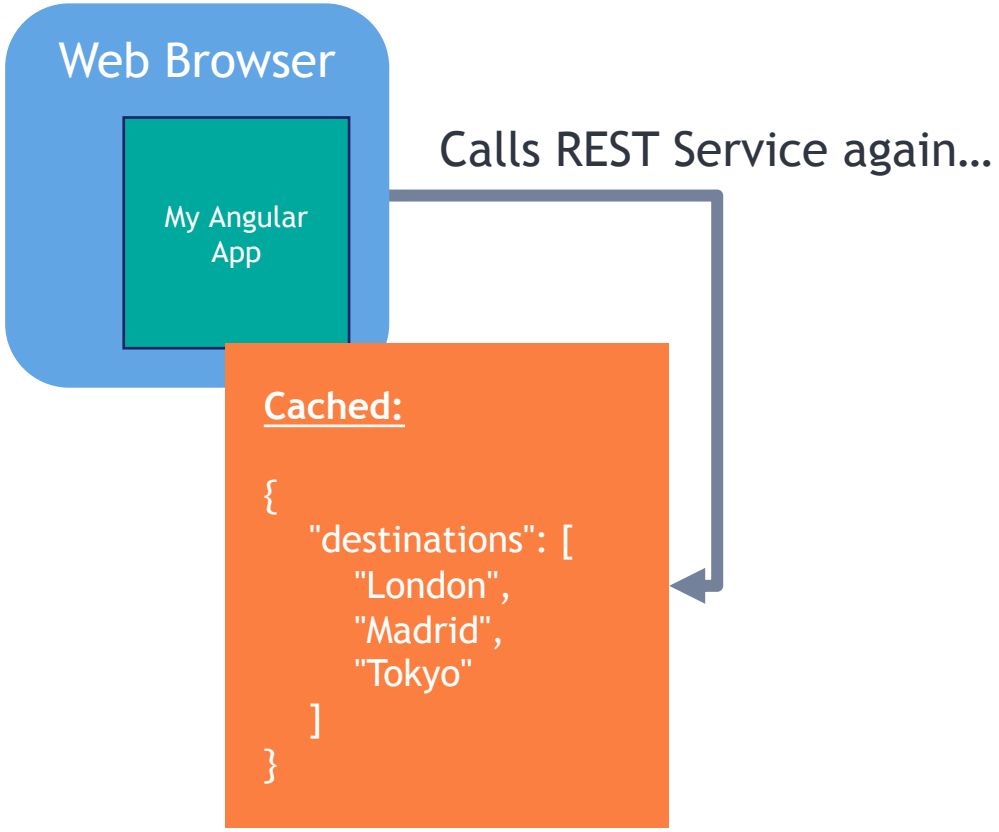
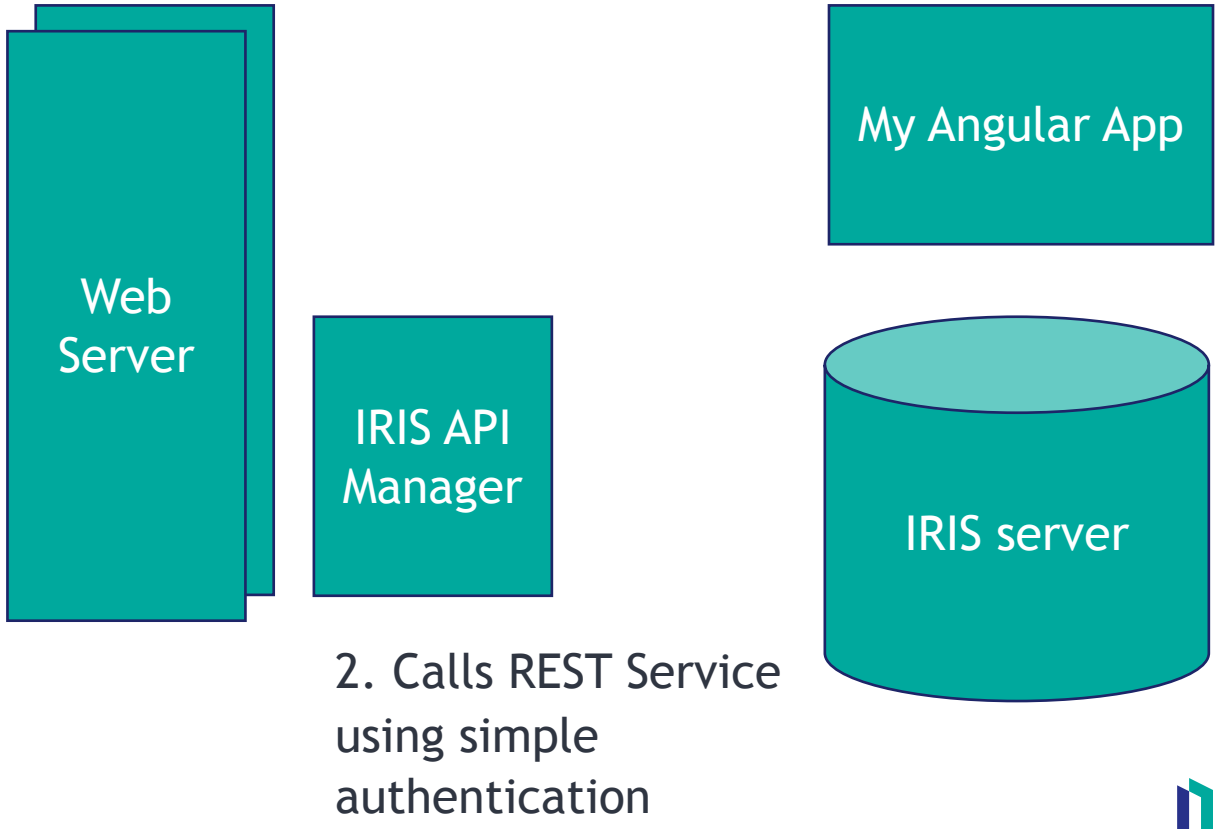
Caching on the Browser





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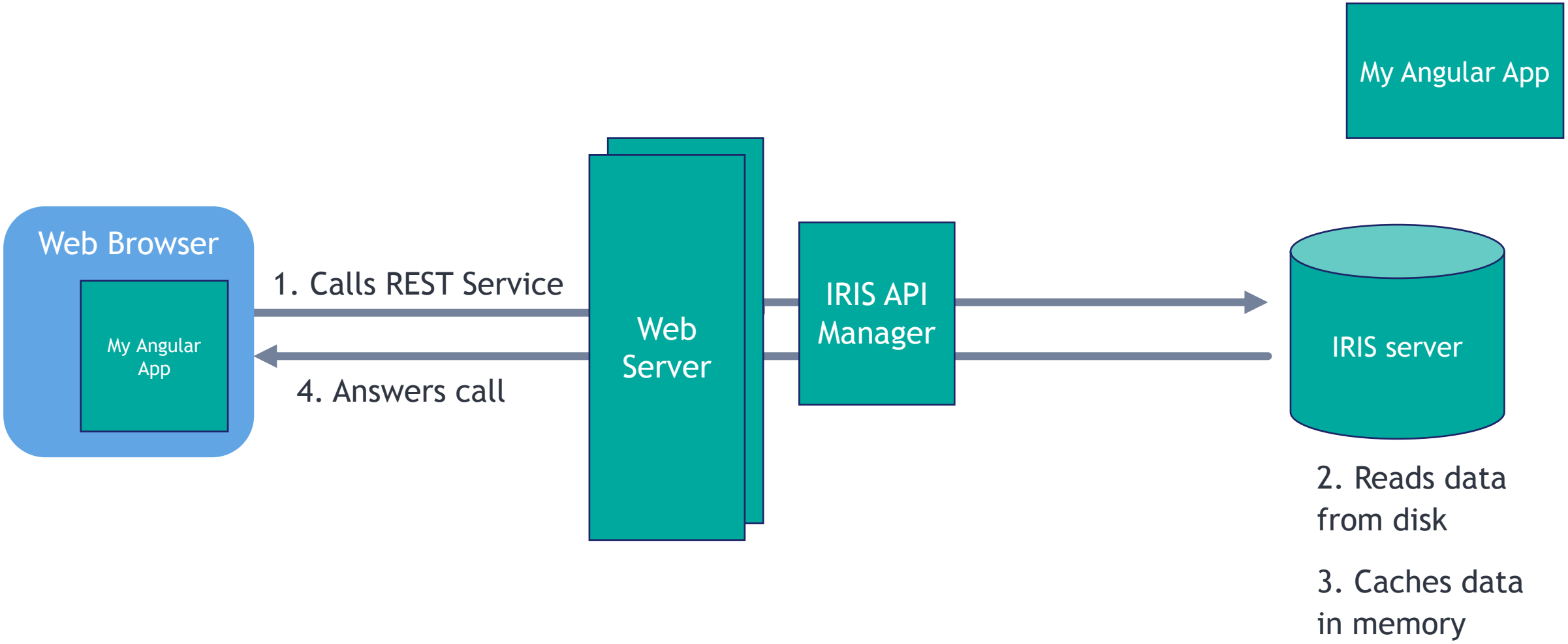
Data Caching on the Server (1)



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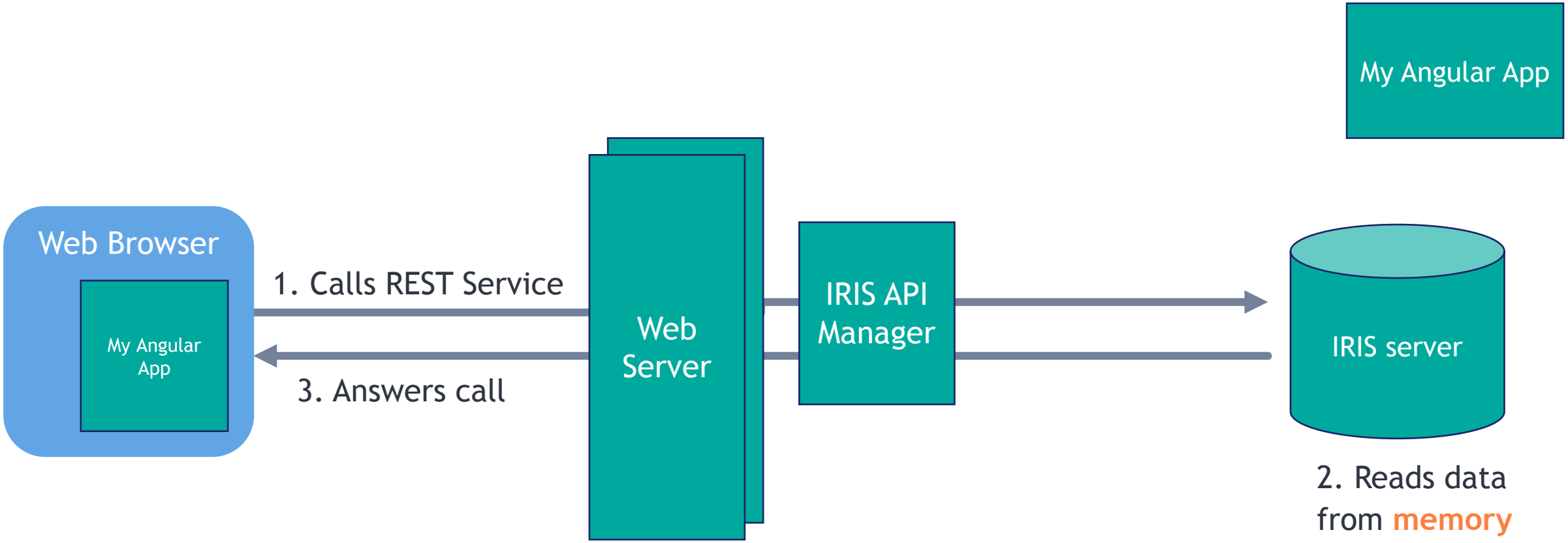
Data Caching on the Server (2)



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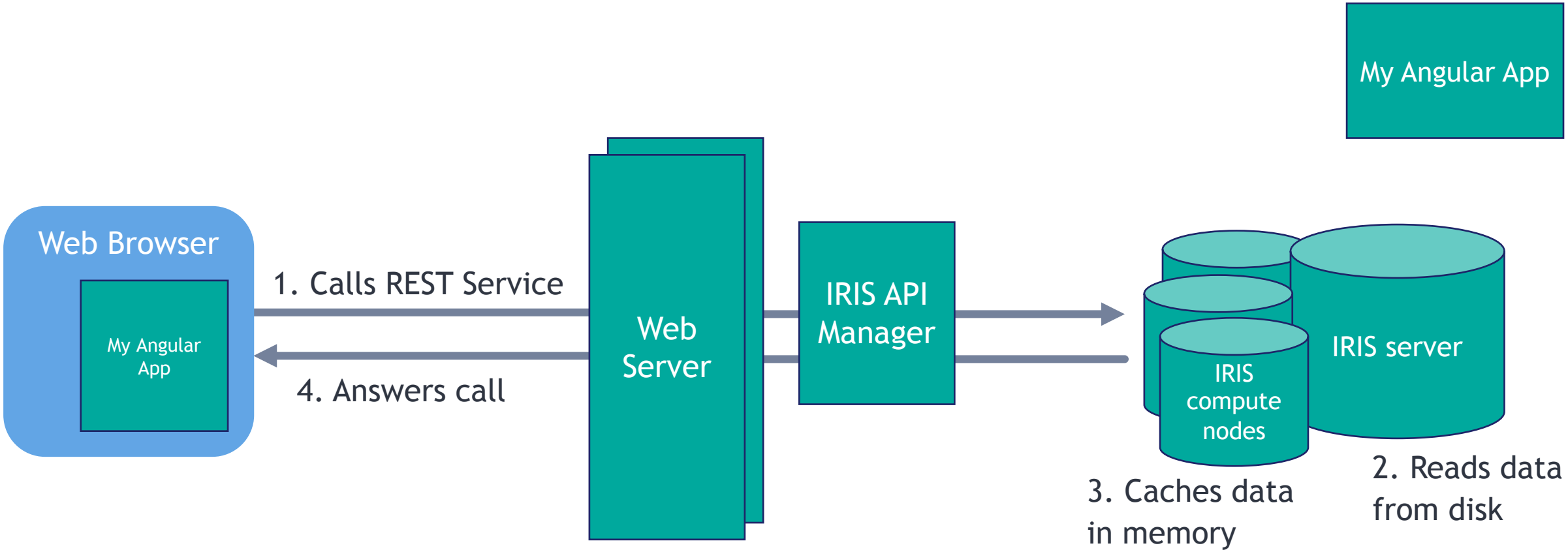
Data Caching on Compute Nodes (ECP)



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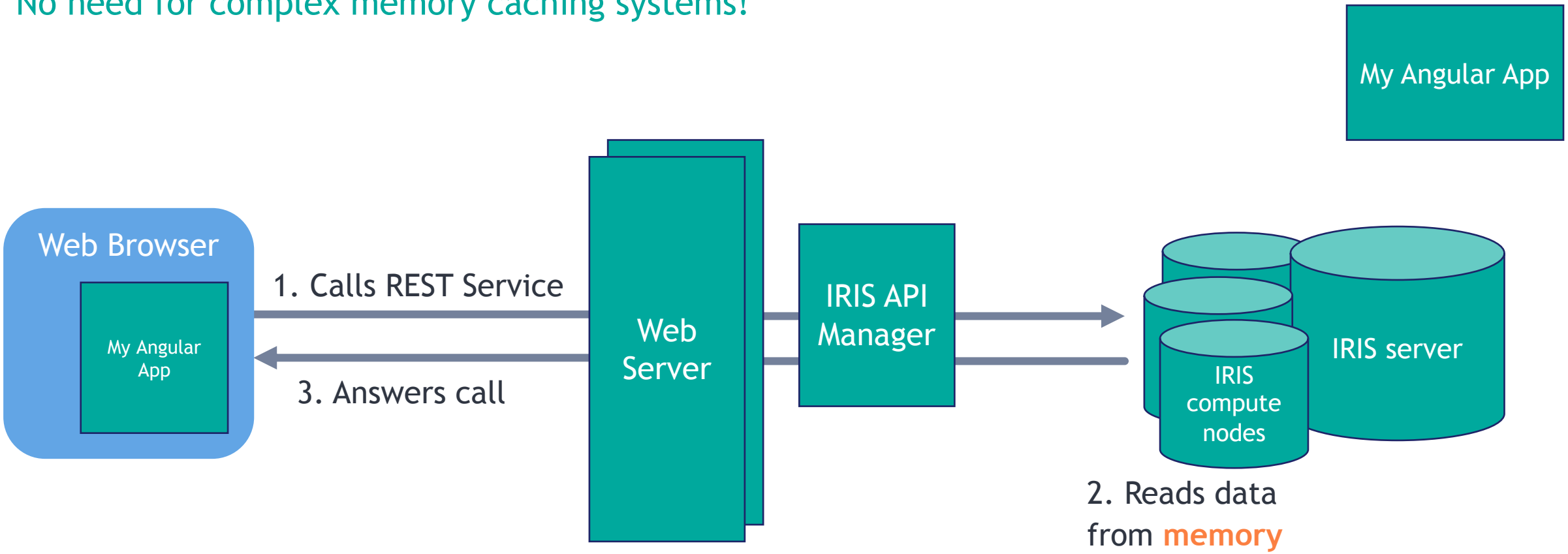
Data Caching on Compute Nodes (ECP)

No need for complex memory caching systems!



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In summary…

1. Design your service around its resources.
2. Your service should be stateless.
3. Use request forwarding to modularize your service.
   - Maintain multiple versions of the interface.
4. Don’t repeat yourself.
5. For handling errors, use exceptions.
6. User a Web Server and configure it with HTTPS!
7. Use IRIS API Manager for security and monitoring of your REST APIs!
8. Allow clients to cache REST response data if appropriate.
9. Use IRIS native memory caching

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Questions?

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Thank you!

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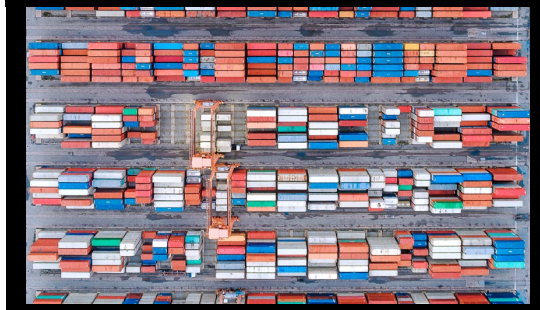
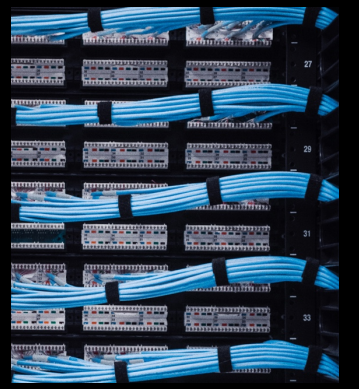
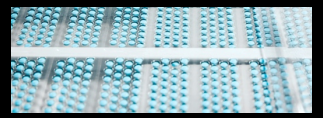
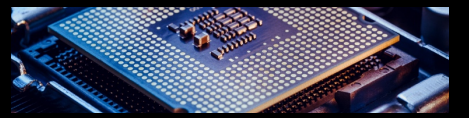
Amir Samary

Manager, Solution Architecture









JSON

```
{
    "customer": "Amir",
    "startLocation": "Brazil",
    "destination": "Boston",
    "startDate": "2018-02-01",
    "endDate": "2018-02-10"
}
```

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Dynamic Objects — Object to JSON

```
Set obj = {
            "customer": "Amir",
            "startLocation": "Brazil",
            "destination": "Boston",
            "startDate": "2018-02-01",
            "endDate": "2018-02-10"
          }
```

```
Write obj.%ToJSON()
```

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Dynamic Objects — JSON to Object

```
##class(%DynamicObject).%FromJSON(jsonStream)
```

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