RFP – 100AZ-2205

Questions and Responses

Was the idea to go forward with the project motivated by your business, development or DevOpts teams?

The impetus for RFP-100AZ-2205 was and is the need to support the critical business operations of each Umbrella Corp Hive unit. Research and Development activities must continue twenty-four hours a day, three hundred and sixty-five days a year with no system or 'other' interruptions. Sensors and systems that support Hive sensors are critical to continued business operations.

Have these teams supported distributed NoSQL solutions as part of their current job responsibilities at Umbrella Corp or at previous jobs?

Technical staff of Umbrella Corp have significant experience with relational database engines making the adoption of NoSQL simple and efficient. There will be no learning curve.

Finally, what does success look like for this project?

Success is the complete and uninterrupted support of all Research and Development operations. Like Umbrella Corp, a successful project means a system that is unstoppable with no weakness and palpable power.

Are there any reports that you can share with us that illustrate the results you desire?
See reports section

Do you have an idea of the amount of data that will be stored in your Global Information Data Platform ? Ideally, do you have estimation for the next 3 years ?
*See sensor section * All sensor data must be stored for a ninety days with summary data stored for one year. **

You have apparently not addressed the data reliability subject, what would be your requirements in term of high availability, data loss, multi-datacenter architecture ?

RFP-100AZ-2205 respondents will clearly illustrate operational functionality that supports zero data loss operations that support ongoing Research and Development activities that must continue twenty-four hours a day, three hundred and sixty-five days a year. Successful respondents will propose a solution that provides a zero data loss system that operates with no downtime.

What are your constraints in term of security ?

See security section

How do you need to secure access to your data ?

See security section

What features or innovations do you plan for interoperability with other data sources and systems?

RFP-100AZ-2205 respondents are to address requirements in the RFP and those further detailed in this question response document. No other areas are to be disclosed.

If we think about platform management, it's important to be able to monitor and manage your platform, what do you expect in term of management tools ?

RFP-100AZ-2205 respondents will clearly illustrate and describe robust management and monitoring tools for any system being proposed to Umbrella Corp.

Do you already use monitoring and management tools internally ?
Extensive monitoring tools are in place as well as a central HPC and Mainframe clusters powering an advanced artificial intelligence. Any proposed tools for management and monitoring must provide a programmatic interface for Hive systems.

What will be the structure of the Sensor data, Sensor Network, and Sensor Metadata?

See sensor section

How will our solution receive the data from the sensor network?

RFP-100AZ-2205 respondents will clearly illustrate and describe data consumption patterns and functionality where data will be written directly to a receiving platform and data pulled from a queue application.

Please provide clarification on this sentence:

"Dependencies in the network must be retrievable for operational evaluation within 200 ms of the request being received.". What do you mean by "dependencies in the network"?

See sensor section

I see that no user interface is required for the working demo. However, does Umbrella Corp have any specific visualization tools for integration with this solution?

RFP-100AZ-2205 respondents will provide a list of certified/compatible data access and visualization tools that seamlessly integrate with the proposed solution.

What is your predicted size of the sensor data being generated per Hive in daily basis?

See sensor section

What is your growth pattern of more new Hive facilities to come online since this phase is in production?

Hive facilities are scheduled to obtain operational certification from Umbrella Corp at a rate of one new facility per quarter. There is no end date for this expansion plan.

Is there any geospatial information associated with each sensor?

See sensor section

Will data be handled on a hive by hive basis for jobs or more of a company wide analysis?

See reporting section

Will the sensor data be used for real time streaming jobs such as tracking and alerts or for large batch calculations like statistical pattern analysis?
See sensor section

Will replicas of the data from each hive be stored in the other hives or will data for each be stored locally?

RFP-100AZ-2205 respondents will clearly illustrate operational functionality that supports zero data loss operations that support ongoing Research and Development activities that must continue twenty-four hours a day, three hundred and sixty-five days a year. Successful respondents will propose a solution that provides a zero data loss system that operates with no downtime.

Is the end goal cost saving, security, general usage statistics or something else?

The impetus for RFP-100AZ-2205 was and is the need to support the critical business operations of each Umbrella Corp Hive unit. Research and Development activities must continue twenty-four hours a day, three hundred and sixty-five days a year with no system or 'other' interruptions. Sensors and systems that support Hive sensors are critical to continued business operations.

Page 2 "Sensor Data" paragraph 1, it is written that:

There are seven types of sensors with three categories of sensor data; motion, temperature and humidity

What are the attributes of the sensor data that will captured?

See sensor section

Page 2 "Sensor Data" paragraph 1, it is written that:

All sensor data must be stored for a ninety days with summary data stored for one year

Please define “summary data”, and expand on the specific fields captured and/or calculated. For example, “We want the temperature to be stored by hour with a calculated min, max, average."

See report section

Page 2 “Sensor Data” paragraph 2, it is written that:

The proposed solution must provide the ability to further analyze the data through yet to be determined analytic patterns.

Can you please provide some clarification on the types of analytics that are under consideration?

See report section

Sensors

There are seven types of sensors with three categories of sensor data; motion, temperature and humidity. All sensors generate similar data with the 'payload' differing by type:

- movement: movement [0-100]
- temperature: temperature in Celsius with 2 digits of precision
- humidity: relative percentage

Sample data for movement sensors in included in Appendix A.

Metadata for each sensor:

- vendor
- serial number
- manufacture date
- deployment date
- maintenance history
- retirement date and sensor type
- floor
- wing
- hive number

Sensors operate in networks with dependencies based on placement and location within the network. Umbrella Corp requires the respondent to describe and illustrate how networks of sensors can be stored and analyzed. Failures of specific sensors effect the performance of the sensor network, the ability to locate specific sensors in the network and determine adjacent sensors is critical to any successful RFP response. Location, type and sensor id are all appropriate search criteria in the network.

All sensor data must be stored for a ninety days with summary data stored for one year. Each sensor reports data every five seconds.

****** RFP-100AZ-2205 respondents will propose storage structure, data size estimates and provide pertinent sizing analysis. Assumptions are acceptable if based on algorithms that can be easily used to project full sizing data given Umbrella Corp operational information post award ******

Security

- All Hive data are encrypted in flight and at the storage layer.
- All Hive systems require integration with Kerberos servers for Authentication.
- All Hive systems require granular Authorization controls based on authenticated User Roles.
- All Hive systems must provide granular Auditing capabilities for all data mutation.

****** RFP-100AZ-2205 proposals must describe compliance with and adhere to Hive security requirements. ******

Summary/Reporting/Analytics

- Summary data may include but are not limited to time boxed average, min, max and standard deviation by sensor type.
- Time windows for long term storage include 10, 30 and 60 minutes.
- Short term storage may be as granular as 1 minute intervals.
- Daily summary data based on 24 hour time periods, will be available to all Hive units as local data.
- Ad-hoc reporting on any field with predicate based filtering on any field must be supported.
- Regression analysis may be required to predict continuous values based on time series window data.
- Data reporting will be on a Hive by Hive basis.

Appendix A

Sample Data

Movement sensor data:


```
[
 {
  "_id": "57c4decc5a69e943a41c6520",
  "sensor_id": "0d7395d7-6e51-4bfb-90db-52dfc1d30799",
  "isActive": true,
  "sensor_type": "movement",
  "movement": 11,
  "reading_time": "2016-02-27T04:45:05 +05:00",
  "latitude": -38.974438,
  "longitude": -110.497153
 },
 {
  "_id": "57c4decc85a051ff6a879c67",
  "sensor_id": "5f9fe3f9-1c7c-4206-8ada-dee26d8c8c26",
  "isActive": false,
  "sensor_type": "movement",
  "movement": 30,
  "reading_time": "2014-10-10T10:37:05 +04:00",
  "latitude": -35.083159,
  "longitude": -42.695634
 },
 {
  "_id": "57c4decc981f049b6c803382",
  "sensor_id": "a81c770b-8237-468d-9f40-32c343766ad2",
  "isActive": true,
  "sensor_type": "movement",
  "movement": 21,
  "reading_time": "2016-04-18T07:01:58 +04:00",
  "latitude": -40.283763,
  "longitude": -168.959618
 },
 {
  "_id": "57c4deccb379b087e0ebe086",
  "sensor_id": "9525e717-44b6-453a-9745-38acb054d5a6",
  "isActive": true,
  "sensor_type": "movement",
  "movement": 92,
  "reading_time": "2015-04-01T12:04:09 +04:00",
  "latitude": -78.964845,
  "longitude": -22.042302
 },
 {
  "_id": "57c4decc1c64e7c1950631b3",
```

```
   "sensor_id": "5f0855b0-46a2-4a6e-9cee-cf752ec081b8",
   "isActive": true,
   "sensor_type": "movement",
   "movement": 49,
   "reading_time": "2016-03-04T03:59:25 +05:00",
   "latitude": -23.438065,
   "longitude": 92.476699
  },
  {
   "_id": "57c4deccb0908d063bb417d1",
   "sensor_id": "c3afe716-a8bc-4169-ad32-257d21ea3fc2",
   "isActive": false,
   "sensor_type": "movement",
   "movement": 19,
   "reading_time": "2015-06-19T12:50:16 +04:00",
   "latitude": -69.664496,
   "longitude": 27.711423
  }
]
```


Temperature sensor data:


```
[
  {
   "_id": "57c4e5b7dd94061c5f17fe92",
   "sensor_id": "77d1aadf-66e2-4010-9866-7318b7599581",
   "isActive": false,
   "sensor_type": "movement",
   "temperature": 1119,
   "reading_time": "2015-10-24T07:42:05 +04:00",
   "latitude": -83.316108,
   "longitude": -30.209102
  },
  {
   "_id": "57c4e5b7f0ec8cebf85436f6",
   "sensor_id": "a146b02f-33d8-467c-9928-f64872bdaeac",
   "isActive": false,
   "sensor_type": "movement",
   "temperature": 242,
   "reading_time": "2016-04-14T12:14:06 +04:00",
   "latitude": 3.087144,
   "longitude": -59.700724
  },
  {
   "_id": "57c4e5b77a69446827bc1d7e",
   "sensor_id": "ebdf1e1e-9b9c-4593-bce8-af1d1655980a",
```

```
  "isActive": false,
  "sensor_type": "movement",
  "temperature": 1201,
  "reading_time": "2014-11-11T08:40:58 +05:00",
  "latitude": 33.931942,
  "longitude": -98.731852
 },
 {
  "_id": "57c4e5b7689271c9a3925a1d",
  "sensor_id": "febca64a-6629-48ad-92a3-4cb9a440dcbd",
  "isActive": false,
  "sensor_type": "movement",
  "temperature": 1124,
  "reading_time": "2015-07-21T05:53:00 +04:00",
  "latitude": -45.777079,
  "longitude": -20.104049
 },
 {
  "_id": "57c4e5b76002b5962ca40b89",
  "sensor_id": "ddcad3ff-39a3-491e-b192-92c9be7c4164",
  "isActive": true,
  "sensor_type": "movement",
  "temperature": 1100,
  "reading_time": "2016-08-25T06:04:20 +04:00",
  "latitude": 30.935948,
  "longitude": 81.007864
 },
 {
  "_id": "57c4e5b7baf6294499e9a3db",
  "sensor_id": "6491b2a4-90c6-4211-a771-521b244092ac",
  "isActive": false,
  "sensor_type": "movement",
  "temperature": 925,
  "reading_time": "2014-04-26T03:26:55 +04:00",
  "latitude": 81.862618,
  "longitude": 20.910257
 }
]
```