Notes to the Hackathon Participants

1. This document is the primary document of reference for the ONDC Innovation Hackathon.
2. Please go through the details carefully and raise your queries before **11:00 AM** on **7th January 2022**.
3. Please post your queries in the Slack channel.

1. Instructions to Participants

Participants are requested to follow these instructions that will be applicable during the Innovation Hackathon.

a. Participants are required to use their own device (laptop, mobile phone, etc.), with internet connectivity.

b. Use of software components, including web services, available under Open Source License will be preferred.

c. Participants must use Open Data Sets.

d. Participants can make their own assumptions which should be clearly called out.

e. Github repository link

f. Communication channels:

- Slack
- **Checkin calls**
- **Submission Sheet**

g. Issue resolution

2. Overview of Challenges

Innovation hackathon challenges attempt to address real-world problems in Digital Commerce, so as to make it more inclusive, with the goal of bringing in a wider cross-section of society into the mainstream of digital commerce.

These challenges include the following:

- ***Challenge 1 - Digitization of catalogs***
- ***Challenge 2 - Indic Language Support***
- ***Challenge 3 - Conversational Interface***
- ***Challenge 4 - Intelligent Text Parsing***
- ***Challenge 5 - Dynamic Pricing***
- ***Challenge 6 - Inventory Management***
- ***Challenge 7 - Delivery Route Optimization***
- ***Challenge 8 - Tracking on Open Source Maps***
- ***Challenge 9 - Distributed Ledger for Network***
- ***Challenge 10 - Solutions for Web 3.0***
- ***Challenge 11 - Beckn Protocol Evolution***

For each challenge, the objectives and requirements are defined below. Any participant can decide to participate in ***one or more of these challenges***.

3. Challenge 1 - Digitization of Catalogs

Description

The objective of this challenge is to enable digitization of catalogs, in an intuitive way, that is easy to use and fast, and that can be easily integrated by any participant into their app for the ONDC network.

Requirements

The requirements for this challenge are defined below, under mandatory & optional categories:

Mandatory

a. Define a schema (appropriate for at least 1000 items - an item being a retail SKU) for an online catalog for retail, that includes a set of basic attributes, as defined below, but is extensible for other attributes:

- Store details - name, location i.e. GPS coordinates or equivalent;
- Item details - for the purposes of this challenge, an item includes the following attributes - ID, name, description, price, image, quantity;
- Payment criteria - may be defined at the store level and includes options such as the following - cash, UPI, credit / debit cards, etc.;
- Fulfilment criteria - may be defined at the store level and includes options such as the following - in-store pickup, home delivery;

b. Develop an intuitive interface, using text or voice or image input or a combination of these, for digitizing an item that currently exists in the store. This can work in either of the following ways:

- Take a photo and auto-label or scan machine readable codes (e.g. QR code);
- Add entry through voice to text conversion of voice input;
- Add text entry and supplement with an image;
- Any combination of the above or using any other intuitive mechanism;

c. The intuitive interface developed in (b) above should support:

- Digitization of at least 100 items in 30 minutes;
- Populate the digitized catalog in the schema defined in (a) above;
- Using any one of the following Indic languages - Hindi, Marathi, Telugu, Kannada;

d. Create an open standards based reusable software component for the interface in (b) above that supports at least 2 API endpoints, for adding to the catalog and for updating the catalog item(s) attributes as defined above.

Optional

e. Define an open standards based format for data portability, for the schema defined in (a) above, and implement an API endpoint for porting data to this format.

f. Define an open standards based format for external data feeds (for specific attributes such as price, etc.) and implement an API endpoint for integrating with the external data feed.

g. Extend the schema defined in (a) above to layer-in recommended (e.g. what's popular) and related catalog items (e.g. "toothbrush" could be a related item for "toothpaste"). These are additional attributes that can be enabled or disabled as a group.

4. Challenge 2 - Indic Language Support

Description

The objective of this challenge is to enable Indic language support for apps, in the ONDC network, so that it becomes a mainstream language for Digital Commerce in India.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Develop an intuitive interface for enabling Indic language that accepts input, using text or voice or a combination of both, and that meets the following requirements:

- Using any one of the following Indic languages - Hindi, Telugu, Tamil, Marathi, Gujarati, Bengali, Kannada;
- Using a data set of at least 10,000 distinct words for that language;
- Accepting text input using virtual keyboard or other intuitive interface with appropriate encoding such as ISCII (Indian Script Code for Information Interchange) or equivalent;
- Using the most common dialect of the Indic language for voice input;
- Rendering output using appropriate open fonts;

b. Implement an algorithm for linguistic collation for the Indic language that can be verified for the data set identified above.

c. Create an open standards based reusable software component, for (a) & (b) above, that provides end points for accepting input and rendering output.

Optional

d. Create an open standards based reusable software component that provides an endpoint for translating any input from the data set identified above into English and vice-versa using the appropriate character set encoding;

5. Challenge 3 - Conversational Interface

Description

The objective of this challenge is to enable an online interface that provides an immersive user experience and is different from the point & click web-based and mobile app interfaces.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Develop a conversational interface that allows buyers to provide their input through Natural Language speech or text or a combination of both to simulate a digital commerce transaction that goes through the following flow in sequence. The conversational interface should use any one of the following Indic languages - Hindi, Telugu, Tamil, Marathi, Gujarati, Bengali, Kannada.

- Search - search one or more items from a catalog which is either already available (e.g. as in online mall) or fetch the catalog items on demand using mock data;
- Select - select one or more items from the catalog after providing necessary details (e.g. quantity for each item) using the appropriate metaphor (e.g. cart or something better);
- Checkout - initialize checkout after agreeing to terms & conditions and providing payment & fulfilment details;
- Confirm - confirm order;

b. Provide a guided UX to a buyer who is not tech savvy so that at any stage of the transaction flow, they're aware of what they need to do next and how.

c. Create a software component, from the conversational interface, with specific endpoints which can be reused as a mobile app or embedded in popular messaging platforms;

Optional

d. Extend the conversational interface to provide a different type of UX using immersive technologies such as AR/VR or equivalent.

6. Challenge 4 - Intelligent Text Parsing

Description

The objective of this challenge is to enable intelligent searches, for different buyer apps in the ONDC network, so that there is better discoverability of seller catalogs.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Define a retail data set of at least 10,000 items (an item in this case is a retail SKU) that can be used to identify items being searched. This should include items in various sectors of retail including but not limited to groceries, hyperlocal retail, food & beverage, fashion, etc.

b. Develop a software component that uses the dataset defined in (a) above as a pluggable data model and provides the following functionality on text input in English:

- Autocorrect
- Autosuggest
- Identify items using the above data set as a model
- Conversion of unstructured text into structured text

Examples of use-cases that may to be considered, for one or more of the above, include:

- “bread and butter” should be parsed to 2 separate items - bread, butter;
- separate adjective or other part of speech from item in the search text, e.g. “gorgeous dress” should be parsed into adjective (“gorgeous”) and item (“dress”);
- “Blue denim jeans” should be parsed into “denim jeans” of blue colour;
- Translation of transliterated text e.g. “pani” translated to “water”;
- Conversion of unstructured text into structured text e.g. “I want to buy a 12 pack of mineral water” should return an attribute “item” - “mineral water”, with an attribute “quantity” - 12;
- Location awareness e.g. “find stores near me” should provide the location coordinates for “near me” based on default parameters, such as geographical radius;

Optional

c. Extend the support for language to any one of the following Indic languages - Hindi, Telugu, Tamil, Marathi, Gujarati, Bengali, Kannada;

7. Challenge 5 - Dynamic Pricing

Description

The objective of this challenge is to enable dynamic pricing, for small retailers and merchants, so that they can get the best market price for their products & services.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Create a dynamic pricing model (using formal programming language) for specific domain, such as retail, that accepts inputs such as weather, market data feeds, seasonality, supply & demand in specific locations, whether perishable item, quantity in inventory, etc. to determine the optimal price for an item (an item is a retail SKU).

b. Generate test data for at least 10 different items, clearly defining the relevant inputs and the dynamic price as the output.

c. Develop an open standards based software component that computes the price for an item, at varying levels of granularity (e.g. once per day, at a specific time, etc.) using the pricing model defined above.

Optional

d. Extend the software component to accept input data feeds and provide output data feeds.

8. Challenge 6 - Inventory Management

Description

The objective of this challenge is to allow small retailers, kirana stores and similar vendors to order optimal quantities of items to reduce wastage and inventory costs.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Create a model (using formal programming language) for non-deterministic inventory management to determine the optimal “lot size” to minimize the operational costs related to ordering and moving goods through the retail supply chain. This should consider different variables in the retail supply chain, such as demand patterns, costs, delivery times, cycle time, stock-out costs, etc.

b. Generate test data for at least 10 different retail items of different types (e.g. consumables vs non-consumables, etc.) and determine the optimal lot size for each item after considering the different variables.

c. Develop an open standards based reusable software component that implements the model and provides end points for accepting inputs and configuring the model variables.

Optional

d. Extend the model defined in (a) above for a different domain that provides services (e.g. logistics) and identify variables required to optimize capital costs for delivery of specific services in the domain.

9. Challenge 7 - Delivery Route Optimization

Description

The objective of this challenge is to allow small retailers and logistics providers to optimize their delivery costs.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Given a set of locations (GPS points or equivalent) in a map, create an algorithm that optimizes the route along the given set of locations, based on specific criteria such as time taken, distance covered, etc.

b. For (a) above, generate test data for at least 100 different delivery routes (with different optimization criteria), and with minimum of 5 locations in each delivery route.

c. Develop an open standards based reusable software component that implements the algorithm and provides end points for accepting input variables (e.g. array of location coordinates, number of delivery agents) and generating the optimal route.

Optional

d. Extend the algorithm in (a) to generate the optimal route after processing input data feeds for other criteria such as road closures, water logging, etc. along the route.

10. Challenge 8 - Tracking on Open Source Maps

Description

The objective of this challenge is to allow buyer and seller apps to provide delivery tracking using easy to use & maintain Open Source Maps..

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Develop an open standards based reusable software component that provides functionality for tracking on open source maps such as OpenStreetMap, Mapbox and can be reused in other maps with minimal configurations.

b. For (a) above, generate test data of at least 100 different tracking endpoint URLs, with different start & end points.

Optional

c. Enable in-line rendering of the software component in (a) in web-based or mobile apps.

11. Challenge 9 - Distributed Ledger for Network

Description

The objective of this challenge is to create and maintain a distributed ledger of open data in ONDC.

Requirements

The requirements for this challenge are defined, under mandatory & optional categories, below.

Mandatory

a. Design a distributed ledger for a network that sources events, at different levels of granularity, from different nodes of the network, aggregates the data by applying mathematical transforms and synchronizes the resultant data across the nodes of the network; examples of data that may be considered for sourcing include ratings data, aggregate data for sales and inventory, etc.

b. The design should consider a network with at least 1 million nodes.

c. Develop an open standards based reusable software component that implements (a) above.

Optional

d. Extend the distributed ledger in (a) above to handle exception & edge cases, such as a node joining the network at any time and synchronizing with the latest aggregates, a node becoming offline for sometime, having its aggregates synchronized once it becomes online, etc..

12. Challenge 10 - Solutions for Web 3.0

Description

The objective of this challenge is to create e-commerce solutions for the decentralized web (Web 3.0)

Requirements

The requirements for this challenge are defined below.

Perform a technology demonstration of a decentralized beckn protocol-enabled network that

a. Creates smart commerce contracts between buyer and seller via Solidity

b. Rewards edge computation done for discovery, ordering and fulfillment and post-fulfillment services via cryptocurrencies

c. Validates transactions via consensus protocols like PoW, PoS, DPoS, PoSpace etc

Please note that this solution should be accompanied by detailed documentation containing the architecture and user guide.

13. Challenge 11 - Beckn Protocol Evolution

Description

The objective of this challenge is to propose enhancements to beckn protocol specification

Requirements

The requirements for this challenge are defined below. Choose any of the following.

a. Submit a proposal for a standard algorithm to map any domain-specific knowledge model to the generic core schema of beckn protocol. The algorithm can be AI powered as well.
b. Submit a proposal for an open certification framework that can be used to certify participants of any beckn-enabled network
c. Beckn protocol is intended to be form agnostic and transport layer agnostic. Therefore, submit a proposal for supporting other formats for beckn protocol than simple JSON on HTTP. Think other protocols; think hardware; think firmware; think operating systems; think across all layers of implementation.
d. Submit a proposal for a consent framework that allows data to be shared across the network only via user consent.
e. Submit a proposal for a Zero Knowledge Proof exchange mechanism for data sharing on a beckn-enabled network
f. Submit a proposal for a serverless architecture for beckn-enabled open commerce networks. By serverless, we mean that the only computational power will be handheld, wearable or edge-mounted devices. No computation will be done on the cloud.

All proposals should use open standards and technologies. Proprietary standards and technologies will not be considered.

14. Resources

List of resources, compiled for the hackathon, is given below. Participants are encouraged to supplement this with other resources for the purpose of this hackathon.

a. **Open Source Maps**

OpenStreetMap

MapBox

b. **Open Data Sets**

Technology Development for Indian Languages

Bhashini

Sunbird

NLTK - Indian Language Corpus

MINST - Fashion Image Data Sets

E-commerce Data Sets

Retail, Sales E-commerce Data Sets

Variety-wise Daily Market Prices

WordNet - a lexical database for English

15. Evaluation

The evaluation process is defined below:

1. To qualify for an award for a challenge, a participant needs to comply with the following:
    a. Use of Software components, including Web Services, available under Open Source License is preferred;
    b. Use of Open Data Sets, as may be required, for executing the challenge;
    c. Preferably complete all requirements, marked as mandatory, for the challenge;
2. A participant submits their response, for **each challenge**, for evaluation as follows:
    a. Provide access to a fork of their source code base (including source code, dependencies and data sets used) **as of the completion of the hackathon**, in the form of a pull request, to the ONDC GitHub repo (participants should name their branch as <teamname>-"Challenge"<No> e.g. team "ABCD" submitting response for Challenge 1 will create a branch "**ABCD-Challenge1**";
    b. Fill up the submission sheet with the required information such as the following:
        - Challenge for which submission is made, requirements completed;
        - Information (if any) that could help with better understanding of their submission;
        - Short video which demonstrates a prototype of their submission;
        - Other information required in the submission sheet;
    c. All submissions must be licensed under an OSI approved license;
3. The inspection of the claim will be, based on verification of the submission, by the Hackathon evaluation team, who will accordingly accept or reject the submission.
4. A shortlisted set of submissions will be presented to the jury along with the evaluation report.
5. The jury will review the shortlisted set of submissions and the evaluation report and decide the awards as per the criteria defined below.

16. Award

The award distribution criteria will be as follows:

Challenge	Definition	Award	Prize money	Winner Criteria
Challenge 1	Digitization of Catalog	1st prize	₹ 5.25 lakhs	a. Successful verification of implementation of requirements and submission made; b. In case of tie, jury decision will be final;
		2nd prize	₹ 3.5 lakhs	
Challenge 2	Indic Language Support	1st prize	₹ 5.25 lakhs	a. Successful verification of implementation of requirements and submission made; b. In case of tie, jury decision will be final;
		2nd prize	₹ 3.5 lakhs	
Challenge 3	Conversational Interface	1st prize	₹ 5.25 lakhs	a. Successful verification of implementation of requirements and submission made; b. In case of tie, jury decision will be final;
		2nd prize	₹ 3.5 lakhs	
Challenge 4	Intelligent Text Parsing	1st prize	₹ 5.25 lakhs	a. Successful verification of implementation of requirements and submissions made; b. In case of tie, jury decision will be final;
		2nd prize	₹ 3.5 lakhs	
Challenge 5	Dynamic Pricing	1st prize	₹ 4 Lakhs	a. Successful verification of implementation of requirements and submissions made; b. In case of tie, jury decision will be final;
Challenge 6	Inventory Management	1st prize	₹ 4 lakhs	a. Successful verification of implementation of requirements and submissions made; b. In case of tie, jury decision will be final;
Challenge 7	Delivery Route Optimization	1st prize	₹ 4 lakhs	a. Successful verification of implementation of requirements and submissions made; b. In case of tie, jury decision will be final;
Challenge 8	Tracking on Open Source Maps	1st prize	₹4 lakhs	a. Successful verification of implementation of requirements and submissions made; b. In case of tie, jury decision will be final;
Challenge 9	Distributed Ledger for Network	1st prize	₹ 4 lakhs	a. Successful verification of implementation of requirements and submissions made;

				b. In case of tie, jury decision will be final;
Challenge 10	Solutions for Web 3.0	1st Prize	NA	a. Successful verification of implementation of requirements and submissions made; b. In case of tie, jury decision will be final;
Challenge 11	Beckn Protocol Evolution	1st Prize	NA	a. Peer review of proposals by the core working group of beckn protocol b. In case of tie, jury decision will be final;