Deployment guide for the chatbot for healthcare project mapping in the UK

Prerequisites

- Azure account
- Azure account subscription
- Access to bash CLI
- Mysql installed CLI
- MySQL Workbench
- Microsoft bot framework
- .NET Core SDK
- ASP.NET Core runtime
- .NET Core runtime”
- Visual Studio Code

Database deployment

The first step in the deployment is to create a SQL database, for the purpose of our project, this will need to be hosted on Azure.

```
az login

az account set --[subscription ID / name]

az group create \
   --name [resourceGroupName] \
   --location [location (UK South advised)]

az sql server create \
   --name [serverName] \
   --resource-group [resourceGroupName] \
   --location [location (UK South advised)]  \
   --admin-user [adminLogin] \
   --admin-password [password]

az sql db create \
   --resource-group [resourceGroupName] \
   --server [serverName] \
   --name rcgp_projects \
```

Database creation

Next is to install mysql on your computer and connect to the SQL database. You can check if you have mysql installed with the command:

```
mysql --version
```

If it is not installed then run:

```
sudo apt install mysql-server
```

After this, execute the following commands

```
mysql -h [serverName].mysql.database.azure.com -u [adminLogin]@[serverName] -p  \
[password]
```

You should now be connected to the sql database. Run the following MySQL commands in order to create all of the necessary databases

```
CREATE DATABASE  IF NOT EXISTS `rcgp_projects` /*!40100 DEFAULT CHARACTER SET latin1 */;
USE `rcgp_projects`;
-- MySQL dump 10.13  Distrib 8.0.19, for Win64 (x86_64)
--
-- Host: rcgpprojects.mysql.database.azure.com    Database: rcgp_projects
-- ------------------------------------------------------
-- Server version           5.6.42.0

/*!40101 SET @OLD_CHARACTER_SET_CLIENT=@@CHARACTER_SET_CLIENT */;
/*!40101 SET @OLD_CHARACTER_SET_RESULTS=@@CHARACTER_SET_RESULTS */;
/*!40101 SET @OLD_COLLATION_CONNECTION=@@COLLATION_CONNECTION */;
```

```
/*!50503 SET NAMES utf8 */;
/*!40103 SET @OLD_TIME_ZONE=@@TIME_ZONE */;
/*!40103 SET TIME_ZONE='+00:00' */;
/*!40014 SET @OLD_UNIQUE_CHECKS=@@UNIQUE_CHECKS, UNIQUE_CHECKS=0 */;
/*!40014 SET @OLD_FOREIGN_KEY_CHECKS=@@FOREIGN_KEY_CHECKS, FOREIGN_KEY_CHECKS=0 */;
/*!40101 SET @OLD_SQL_MODE=@@SQL_MODE, SQL_MODE='NO_AUTO_VALUE_ON_ZERO' */;
/*!40111 SET @OLD_SQL_NOTES=@@SQL_NOTES, SQL_NOTES=0 */;

--
-- Table structure for table `academics`
--

DROP TABLE IF EXISTS `academics`;
/*!40101 SET @saved_cs_client     = @@character_set_client */;
/*!50503 SET character_set_client = utf8mb4 */;
CREATE TABLE `academics` (
  `academicID` int(11) NOT NULL AUTO_INCREMENT,
  `ethicsApproval` tinyint(1) DEFAULT NULL,
  `reasonForEthicsDisapproval` text,
  `ethicsAssessor` text,
  `primaryAssessor` text,
  `secondaryAssessor` text,
  `dateAssessed` date DEFAULT NULL,
  `institute` text,
  `comments` text,
  PRIMARY KEY (`academicID`)
) ENGINE=InnoDB AUTO_INCREMENT=18 DEFAULT CHARSET=latin1;
/*!40101 SET character_set_client = @saved_cs_client */;

--
-- Table structure for table `contracts`
--

DROP TABLE IF EXISTS `contracts`;
/*!40101 SET @saved_cs_client     = @@character_set_client */;
/*!50503 SET character_set_client = utf8mb4 */;
CREATE TABLE `contracts` (
  `contractID` int(11) NOT NULL AUTO_INCREMENT,
  `requiresContract` tinyint(1) DEFAULT NULL,
  `generatedContract` tinyint(1) DEFAULT NULL,
  `studentSignedContract` tinyint(1) DEFAULT NULL,
  `organizationSignedContract` tinyint(1) DEFAULT NULL,
  `contractSignatories` text,
  `contractDateSigned` date DEFAULT NULL,
  `ndaRequired` tinyint(1) DEFAULT NULL,
  `ndaSigned` tinyint(1) DEFAULT NULL,
  `ndaSignatories` text,
  `ndaDateSigned` date DEFAULT NULL,
  `contractNotes` text,
  PRIMARY KEY (`contractID`)
```

```
) ENGINE=InnoDB AUTO_INCREMENT=22 DEFAULT CHARSET=latin1;
/*!40101 SET character_set_client = @saved_cs_client */;

--
-- Table structure for table `projectentries`
--

DROP TABLE IF EXISTS `projectentries`;
/*!40101 SET @saved_cs_client     = @@character_set_client */;
/*!50503 SET character_set_client = utf8mb4 */;
CREATE TABLE `projectentries` (
  `projectID` int(11) NOT NULL AUTO_INCREMENT,
  `ixnID` int(11) DEFAULT NULL,
  `contractID` int(11) DEFAULT NULL,
  `academicID` int(11) DEFAULT NULL,
  `startDate` date DEFAULT NULL,
  `endDate` date DEFAULT NULL,
  `notes` text,
  `dateUploaded` date DEFAULT NULL,
  PRIMARY KEY (`projectID`),
  KEY `ixnID` (`ixnID`),
  KEY `contractID` (`contractID`),
  KEY `academicID` (`academicID`),
  CONSTRAINT `projectentries_ibfk_1` FOREIGN KEY (`ixnID`) REFERENCES `projects` (`projectID`),
  CONSTRAINT `projectentries_ibfk_2` FOREIGN KEY (`contractID`) REFERENCES `contracts` (`contractID`),
  CONSTRAINT `projectentries_ibfk_3` FOREIGN KEY (`academicID`) REFERENCES `academics` (`academicID`)
) ENGINE=InnoDB AUTO_INCREMENT=22 DEFAULT CHARSET=latin1;
/*!40101 SET character_set_client = @saved_cs_client */;

--
-- Table structure for table `projects`
--

DROP TABLE IF EXISTS `projects`;
/*!40101 SET @saved_cs_client     = @@character_set_client */;
/*!50503 SET character_set_client = utf8mb4 */;
CREATE TABLE `projects` (
  `projectID` int(11) NOT NULL AUTO_INCREMENT,
  `organizationName` text,
  `organizationAddress` text,
  `organizationOverview` text,
  `contactName` text,
  `contactTitle` text,
  `contactEmail` text,
  `contactNumber` text,
  `projectTitle` text,
  `projectDescription` text,
  `projectRequirements` text,
  `projectTechnicalChallenges` text,
  `projectSkills` text,
```

```
  `projectDataSamples` text,
  `projectDevices` text,
  `anyOtherInformation` text,
  `uploadDate` date DEFAULT NULL,
  PRIMARY KEY (`projectID`)
) ENGINE=InnoDB AUTO_INCREMENT=22 DEFAULT CHARSET=latin1;
/*!40101 SET character_set_client = @saved_cs_client */;
```

You should now have all of the databases setup correctly.

Populating databases
Optionally, you can copy the following SQL code in order to populate the databases

```
--
-- Dumping data for table `academics`
--

LOCK TABLES `academics` WRITE;
/*!40000 ALTER TABLE `academics` DISABLE KEYS */;
INSERT INTO `academics` VALUES (1,1,'N/A','Dean
Mohamedally','','',NULL,'\n','UCL'),(2,0,'Exemption','','','',NULL,'\n','UCL'),(3,0,'Doesnt touch upon
ethics','','Dean','Graham',NULL,'\n','UCL'),(4,1,'N/A','Graham Roberts','','',NULL,'\n','University of
Birmingham'),(5,0,'Not enough Information to decide','','','',NULL,'\n','Compton College'),(6,1,'N/A','ASAP
Rocky','Dr Ian Brown','Dr Frank Ocean',NULL,'Distinction Awarded\n','University of
Manchester'),(7,0,'N/A','','','',NULL,'\n','KCL'),(8,1,'N/A','Dr Dean Mohamedally','Dr Dean Mohamedally','Dr
Graham
Roberts',NULL,'\n','UCL'),(9,0,'Other','','','',NULL,'\n','UCL'),(10,0,'N/A','','wang','sap',NULL,'ucl','\n'),(11,0,'N
/A','','lk','kl',NULL,'ucl','\n'),(12,0,'N/A','','dskjs','fjlkd',NULL,'ucl','\n'),(13,1,'N/A','dl',';fl','poeiw',NULL,'ucl','\
n'),(14,0,'N/A','','m','l',NULL,'ucl','\n'),(15,0,'N/A','','n','m',NULL,'ucl','\n'),(16,0,'N/A','','a','a',NULL,'ucl','\n'),(
17,0,'N/A','','a','a','2020-03-25','ucl','\n');
/*!40000 ALTER TABLE `academics` ENABLE KEYS */;
UNLOCK TABLES;

--
-- Dumping data for table `contracts`
--

LOCK TABLES `contracts` WRITE;
/*!40000 ALTER TABLE `contracts` DISABLE KEYS */;
INSERT INTO `contracts` VALUES
(1,1,1,1,1,'Don\nSami\nAdnan\n','2019-11-13',1,0,'\n',NULL,'\n'),(2,1,1,1,0,'Ji Sung\nSymere
Woods\nVenus Williams\n',NULL,1,1,'Symere Woods\nVenus Williams\nJi
Sung\n',NULL,'\n'),(3,1,1,0,0,'\n',NULL,1,0,'\n',NULL,'\n'),(4,1,1,1,1,'Steven A Smith\nWangsap
Ferg\n','2019-11-13',0,0,'\n',NULL,'\n'),(5,1,1,1,0,'Kendrick Lamar\nSchoolboy Q\nJay
Rock\n',NULL,1,0,'\n',NULL,'Organization refused to sign\n'),(6,1,1,0,0,'\n',NULL,1,1,'Duckworth
Smith\nClara Swan\nMark Jagger\n',NULL,'Severe delays with contract due to corona
virus\n'),(7,0,0,0,0,'\n',NULL,1,0,'\n',NULL,'\n'),(8,1,1,1,1,'ASAP Rocky\nPlayboi Carti\nASAP
Ferg\n','2019-11-13',1,1,'Playboi Carti\nASAP Rocky\nASAP
Ferg\n',NULL,'\n'),(9,1,1,0,1,'\n',NULL,1,1,'Sarah Connor\nJack Ripton\n',NULL,'\n'),(10,1,1,1,1,'John
Manning\nSally Wang\nCharlie Duckworth\nMuhammad Muhammad\n','2019-11-12',1,1,'John
```

Manning\nSally Wang\nCharlie Duckworth\nMuhammad Muhammad\n',NULL,'\n'),(11,1,1,1,1,'Steven A Smith\nWoj
E\n','2020-03-25',0,0,'\n',NULL,'\n'),(12,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(13,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(14,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(15,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(16,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(17,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(18,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(19,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(20,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n'),(21,0,0,0,0,'\n',NULL,0,0,'\n',NULL,'\n');
/*!40000 ALTER TABLE `contracts` ENABLE KEYS */;
UNLOCK TABLES;

--
-- Dumping data for table `projectentries`
--

LOCK TABLES `projectentries` WRITE;
/*!40000 ALTER TABLE `projectentries` DISABLE KEYS */;
INSERT INTO `projectentries` VALUES
(1,1,1,1,NULL,NULL,'\n','2020-03-25'),(2,2,2,2,NULL,NULL,'\n','2020-03-25'),(3,3,3,3,NULL,NULL,'\n','2020-03-25'),(4,4,4,4,NULL,NULL,'\n','2020-03-25'),(5,5,5,5,NULL,NULL,'\n','2020-03-25'),(6,6,6,6,NULL,NULL,'\n','2020-03-25'),(7,7,7,NULL,NULL,NULL,'\n','2020-03-25'),(8,8,8,7,NULL,NULL,'\n','2020-03-25'),(9,9,9,NULL,NULL,NULL,'\n','2020-03-25');
/*!40000 ALTER TABLE `projectentries` ENABLE KEYS */;
UNLOCK TABLES;

--
-- Dumping data for table `projects`
--

LOCK TABLES `projects` WRITE;
/*!40000 ALTER TABLE `projects` DISABLE KEYS */;
INSERT INTO `projects` VALUES (1,'GOSH DRIVE','40 Bernard Street London','NHS Trust','Gemma Molyneux','Research Lead','Gemma.molyneux@gosh.nhs.uk','0207 405 9200 ext 4778','Medical drawing','Medical drawings form an important part of the patient record, but currently most are paper-based freehand drawings with associated problems with storage and subjective assessment.The aim of this study was to create a cross-platform medical drawing app that represents data in a standardised, digital format with efficient storage and retrieval.The tool should allow users to upload different templates that can used to mark areas of disease. The templates should be linked to grading systems that support disease classification. ',NULL,'','','Pcs phones tablets',NULL,NULL,'2020-03-25'),(2,'UCL GOS ICH','30 Guilford Street','University','Joe Standing','Research Lead','Gemma.molyneux@gosh.nhs.uk','0207 405 9200 ext 4778','Building an open-source interface for pharmacokinetic papers','Our group has recently developed a machine learning algorithm that uses natural language processing to identify papers from PubMed that contain pharmacokinetic (PK) parameters of certain drugs. With this project the developed algorithm will be integrated into an open-source platform, where end users can run searches to identify scientific papers that contain PK information about specific drugs. Hence, this project would require a web interface to be developed, in which specific papers (selected by the algorithm) would be stored into a database (SQL or similar format). In this platform, end users should be able to perform queries, filtering the papers by the: drugs mentioned, species studied in the paper and year of publication. The database would need to be (1) easily scalable (as more papers are published, or more fields per paper are included (e.g. figures, tables, PK parameters etc.) and (2) automatically updated as new papers are published in PubMed. ',NULL,'','','PC (it would ideally have an open API for programmatic access to the database).
',NULL,NULL,'2020-03-25'),(3,'Aneurin Bevan Health Board/CarefulAI','ABUHB, Newport c/co Victoria

House, 136-140 Corporation Rd, Newport NP19 0BH','The ABUHB manages healthcare for 20% of the Welsh Population 639,000The AGPLV3 PoC arising from this project will be shared across the healthcare system in Wales which services the needs of 3.1 million people CarefulAI supervises students developing AGPLV3 solutions via the IXN','Joseph Connor','Lead','Joseph.c@carefulai.com','07595774919','Activity Rocks AI','The project is an AGPLV3 Proof of Concept. Social prescribing is now available on the NHS e.g. a Doctor can prescribe activity that involves accessing gyms, open spaces and activity groups in various locations. The NHS has no way of passively measuring the effect of such interventions. Or using the content and experience of activities arising as promotional material. Neither can third parties support such activities with rewards (e.g. decreased cost of access to healthy foods)Activity Rocks seeks to address thisOnce an activity has been prescribed people can upload passively sensed phone data (e.g. steps) and actual images arising from a location to a server. The server will allow analysis of activity at a location where prescribed movements are to take place. If consented a person may share this activity with the public to encourage community building. The image uploads from an activity will be displayed on a map to enable promotion of activities at that site. Third parties such as food retailers will be able to sponsor activities at the sites. Prescribed location specific activities will be rated to enable to people to access incentives e.g. discounted food vouchers. The rating will arise as a consequence of an algorithm will be created in collaboration with ABUHB clinicians.','MOSCOW STATEMENTMUST HAVEAdapt an existing IOS and Android activity tracker App send data and images to a server securelyMeasure the temporal activity of App usersWork with clinicians and users to agree a benchmark for what good activity looks like at a site using basic ML/AI techniques (Transforms, Probability, Regression)Enable individual, group, clinician and retailer logins to a server which represents the activity data and visualisations so that they can devise and adapt incentivesInform, enable and adapt variable promotions aimed at increasing activities at particular sites.','The main technical challenges are:Swift and Android developmentUnderstanding of securityData visualisationServer architecturesBasic machine learning ','MUST HAVEVery good spoken and written English language skillsThe ability to write IOS and Android code Be able to create web based data bases that accept IOS/Android dataThe ability to design, test and persist phone and server based systems','No clinical or personal data will be given to this project. Data processing standards and guidance will be shared with the student. ','Android Android Studio, Swift, API builder & test suitesAn environment build out systems that sit on Linode servers (these will be provided)','','2020-03-25'),(4,'Aneurin Bevan Health Board/CarefulAI','ABUHB, Newport c/co Victoria House, 136-140 Corporation Rd, Newport NP19 0BH','The ABUHB manages healthcare for 20% of the Welsh Population 639,000The AGPLV3 PoC arising from this project will be shared across the healthcare system in Wales which services the needs of 3.1 million people CarefulAI supervises students developing AGPLV3 solutions via the IXN','Joseph Connor','Lead','Joseph.c@carefulai.com','07595774919','Live and dynamic FIHR Compliance Public Heath Data Public Health for AI & ML Analysis','The project is an AGPLV3 Proof of Concept. The outcome of social, physical and mental health care is currently assumed from market research. Continuous monitoring systems in the form of native and web apps are being trialled. Transmission of IOS and Android data from these systems into health record systems has not been achieved. This is the objective of this project in a manner that ensured data can also be analysed using existing ML & AI techniques at a population levelThe project will build out a FIHR Data Repro and API ServerThe API Server will enable transmission into multiple care recordsThe FIHR compliant data to be transmitted will come from existing IOS and Android AppsThe end point of the data will be multiple EHRs and Commissioning performance systems','MOSCOW STATEMENTMUST HAVEDevelop a new FIHR standard for live public health data with ABUHBAdapt the output an existing Android and IOS app to persist the dataTransmit data into the existing health record systems and separate FIHR data serverEnable authenticated individuals to interrogate the the FIHR ReproEnable the FIHR server to populate the existing EHR and commissioning systemsEnable the FIHR server to format data in a manner that enables the use of multiple ML & AI analysis techniques.WILL NOT HAVEStudents will not have access to any data which enables a person to be identifiable','The main technical challenges are:Swift and Android developmentUnderstanding of FIHRUnderstanding of securityData visualisationEnabling ML & AI analysis on remote servers','MUST HAVEVery good spoken and

written English language skillsThe ability to write IOS and Android code Be able to create web based data bases that accept IOS/Android dataThe ability to design, test and persist APIsA basic understanding of ML/AI toolboxes and the formats of data needed to implement them','No clinical or personal data will be given to this project. Data processing standards and guidance will be shared with the student. ','Android Android Studio, Swift, API builder & testAn environment build out systems that sit on Linode servers (these will be provided)','','2020-03-25'),(5,'UCL Engineering Digital Innovation Unit','Gower Street, London, WC1E 6BT','Faculty-level team responsible for communications, marketing and digital projects. ','Chris Neil','Head of Strategy and Operations, UCL Engineering DIU','c.neil@ucl.ac.uk','x51005','Student Assistant Mobile App','Design and build a mobile app that acts as a personal assistant for students. The app should be voice responsive and able to provide personalised information on a wide range of activities and events, for example:A daily overview of upcoming lectures and deadlinesUpcoming news and eventsTo do list and emailOverview of Moodle/Unitu forum activityLibrary space availabilityCareer/placement opportunitiesPersonal Tutor meetings and notesTerm DatesQuick access to relevant staff and student rep contact detailsThe app should have a simle, usable and ideally attractive interfaceAn example of a similar app can be found at https://www.youtube.com/watch?v=mI0gdSCjGQ8 ',NULL,'? Machine Learning and AI ? Mobile, Wearable and Cloud Apps? Systems integration? Interactive Education ','','',NULL,NULL,'2020-03-25'),(6,'IBM and ARROW','','Software and Hardware Vendor','John mcnamara','Senior inventor','Jon_mcnam@uk.ibm.com','07799413848','Educational Game that teaches the fundamentals of coding','The problem relates to the pouring of Tarmac/Concrete at a site remote from where the Tarmac/Concrete was produced.The issue to be addressed is the temperature of the product at the point of tipping. If it is too cold then the product will not be effective. Can we predict this whilst the lorry is on route and advise to return before getting to the delivery point?To prevent the lorry from tipping the product at the wrong temperature we need to be able to predict at what point would the product not be useable when it arrives and be able to communicate with the lorry and advise the driver to return at the earliest possible moment so it can be reheated. We can put a sensor on each lorry so we know where it is.Can we use data science with the appropriate algorithms rather than add a temperature sensor to each load?There are a number of variables:Size and weight of the loadInitial temperatureThermodynamics attributed to the lorryOutside temperature along the route and weather conditionsDistance between production and delivery pointTraffic conditionsAverage lorry speed when fullWait time at delivery point (number of lorries in front x time per load)There are probably others but in proving we can solve this problem without the direct use of sensors within the load may open up other opportunities in logistics.The final solution should include a graphical representation of where the lorries are and maybe a red, green, amber on a map. Perhaps incorporating IBM Weather company input and traffic conditions enabling some forecasting and planning advice for the week ahead. ',NULL,'May need data on typical delivery lorries, density and thermodynamics of liquid concrete and tarmac.','Data Science','We have GPS trackers so we know where the lorries are at 30 second intervals.',NULL,NULL,'2020-03-25'),(7,'','','','','','','','Developing an interactive visualisation aid for current global healthcare group activities across UCL','There are numerous global healthcare groups within UCL, each with its own particular emphasis. As these groups increase there is a need for researchers/stakeholders to understanding the similarities and differences between these groups so that they can easily access the correct advice/information. This project will involve two steps. Step 1- To map the different global healthcare group activities across UCL.2- Design an interactive tool for both visualisation and searching for accessing key information ',NULL,'Visualisations of Data','App design,Data VisualisationProgramming','',NULL,NULL,'2020-03-25'),(8,'IBM & Simpson Associates','','Large software / hardware vendor','John mcnamara','Senior Inventor','Jon_mcnam@uk.ibm.com','07799413848','Intelligent Application Review System','Problem to be solved.HR companies/organisations spend significant time & resource reviewing C.Vs of job applicants. Aside from the time and effort spend doing this activity, often reviewing many C.V’s can lead to the reviewer becoming ‘snow blind’ where they are no longer effectively reviewing the applicants suitability, and the reviewer finds it extremely difficult to compare the value of one applicant objectively against another. Further, it is also hard to gain a perspective into how an applicant might work in a team, this is

particularly an issue if, for example there are a number of high performing, but dominant personalities in the current team with the vacancy, so the applicant must be potentially able to deal with conflict.SolutionCan we create an A.I application that allows an applicant to upload a CV for a particular job role. The application should be able to analyse the C.V's for particular job application, and match the skills to the job requirement. Can we also create functionality within the application to gain a perspective on the 'personality' of the applicant?As a stretch goal – once the user has uploaded the C.V can we use Watson Assistant to 'interview' the applicant? The application would utilise standard interview questions, but also utilise the Watson Personality Insight analysis of the CV to ask tailored questions. For example if the analysis of the CV reveals that the applicant scores highly in extroversion and emotional range, the application could ask the question, " Describe the last time you resolved a conflict in the work environment"Once this analysis is done, the applicants C.V's would be prioritised according to the required hard and soft skills, for review by the HR user.',NULL,'Students would need to learn Watson Discovery, Watson Natural Language Processing, Watson Assistant as well as Watson Sentiment and Personality Insight.','Devices, data or tech required i.e. any particular tech that is required for the project',NULL,NULL,NULL,'2020-03-25'),(9,'IBM with Cobalt','','Cobalt is a middleware solution which provides connectivity, matching, credit monitoring and trade compression services to the institutional FX market.','John mcnamara','Senior Inventor','Jon_mcnam@uk.ibm.com','07799413848','Cobalt Ingress Control Centre','Cobalt is a middleware solution which provides connectivity, matching, credit monitoring and trade compression services to the institutional FX market. Cobalt is moving the market away from siloed, duplicative back and middle office systems, to a shared infrastructure, creating a single view of trade data and a core set of standards. On the Ingress side, clients stream their trading activities into our platform via the widely used Financial Information eXchange (FIX) protocol, each providing their perspective of a given transaction. These transactions get executed either directly between two parties or on other 3rd party providers, including Venues (also known as ECNs). Cobalt receives the trade drops from all parties involved, processes and matches them, hence achieving the single view of trades. In addition to storing these information, we also send back the enriched trades to our clients on our outbound sessions with them to allow them achieve a more automated and API based reconciliation (AKA Egress). One of the biggest challenges Cobalt faces is the on-boarding of clients and their corresponding static data. Banks have a vast number of client identifiers which will need to be mapped to the globally unique Legal Entity Identifiers (LEI) and branch codes. This is a manual process today and there is an opportunity to use better statistical models such as pattern recognition or decision trees to generate mappings. This would involve the use of trade data, reconciliations and string matching on identity details such as names, addresses and tax IDs. For this project, Cobalt would like the prospective students to work on an Ingress control centre to improve the current normalization and processing. Possible deliverables could include but are not limited to:· Mapping to LEI – Using Cobalt configuration and a machine learning model to identify mappings from static data. We could also have a proposed mapping for mapping alerts based on near matches.· Filtering – excluding messages (store them) based on duplication checks, party vs cpty values, products, currencies· Message Replay – Control to batch replay selected messages for given times frame / trade IDs.· Message Enrichment – implementing conventions, populating missing data inferred or hard coded if required, adding/removing tags e.g. PB on non PB trades.· JSON out Any non-functional requirements such as we would need to own the code application, must be in Java. Further work could then include a smart matching engine! ',NULL,'','Devices, data or tech required i.e. any particular tech that is required for the project',NULL,NULL,NULL,'2020-03-25'),(10,'IBM & Simpson Associates','','Large software / hardware vendor','John mcnamara','Senior Inventor','Jon_mcnam@uk.ibm.com','07799413848','Course completion and attendance aid','IBM Business Partner Simpson Associates work to create applications for higher education/colleges/universities. They would like to work with UCL IXN to create an application to support students and university staff, that builds upon their data on student usage of resources such as WiFi, library, IT, attendance, course grades at university – to identify patterns that would indicate when students may be disengaging from the course, and therefore at risk of leaving, so help & support can be offered in a discrete manner.Beyond this Simpson

would like to explore the potential of an attendance registration system. In this solution a tutor would give out a code during the lecture which would then be submitted by the student via their mobile device into an ‘Organiser application’ to register their attendance. This would be required to be done within a certain time of the lecture/seminar starting, to reduce the risk of the code being distributed to non attending students. Potentially if there were no ethical barriers, GPS/Wifi location could be used to show grouping of the students who entered the code (grouping would be expected to be uniform, rather than dispersed). Should a student suddenly develop a pattern of non attendance, the application could also provide suggestions/recommendation for university counselling and support.Finally, as a stretch goal, as part of this solution, we would also like to create a calendar/organiser application for the student, that runs on a mobile device, which provides logistics for lectures, seminars, recommended society study groups, upcoming deadlines for assignments, (along with supporting material such as ppts, labs, recommended reading). The application would not only give timely reminders and notifications, but also give a morning briefing on what their day would entail.Simpson Associates are aware of attendance recording systems using Bluetooth and Wifi – but feel that this solution would be simpler, more cost effective, less invasive and actually helpful to the student.',NULL,'DataScience skills would be needed here.Web development skillsMobile application skills','Devices, data or tech required i.e. any particular tech that is required for the project',NULL,NULL,NULL,'2020-03-25'),(11,'IBM - proposed by IBM industry professionals as being highly valuable functionality.','','Large software / hardware vendor','John mcnamara','Senior Inventor','Jon_mcnam@uk.ibm.com','07799413848','“Tenet” – your online media journalist','Problem to be solved.Fake news is a big problem and users are losing the ability to trust pieces of content they read online or in the media. Users can often be influenced by articles that play on emotional triggers or portray certain entities/characters in a certain way. For an end user, It can be difficult to see a balanced view of the news surrounding a particular topic and news platforms such as Facebook wish to remain impartial on the content they display. Solution‘Tenet’: create a cross publisher, cross platform view of news content related to a specific topic. This system would be able to provide balanced selection of articles around a particular topic, by using Watson Sentiment Analysis, to give the reader informed articles providing a ‘for/against’ view.In terms of how to apply Sentiment analysis to provide a balanced selection of articles, if we were to take the topic of ‘Brexit’, we may see an article in favour of Brexit containing sentiment of joy, happiness etc. Using this data, it is possible to find articles against Brexit, as this would contain sentiment of disgust and anger. The system will provide a feed of articles around a given topic, that are marked ‘For’ and ‘Against’ with sentiment score given to each article. These articles will be online, from news articles to blog posts.Stretch goal: can we also give a ‘Bias’ score to each news platform that has been analysed for content, to indicate if they are ‘left’ or ‘right’ leaning media platforms.',NULL,'The developers will need to understand NodeRED Watson Discovery News, Watson Natural language understanding, Natural Language Processing and Watson Sentiment analysis in order to create a system that will provide a feed of balanced articles around a specific topic','Devices, data or tech required i.e. any particular tech that is required for the project',NULL,NULL,NULL,'2020-03-25'),(12,'','','','','','','','Developing an interactive visualisation aid for current global healthcare group activities across UCL','There are numerous global healthcare groups within UCL, each with its own particular emphasis. As these groups increase there is a need for researchers/stakeholders to understanding the similarities and differences between these groups so that they can easily access the correct advice/information. This project will involve two steps. Step 1- To map the different global healthcare group activities across UCL.2- Design an interactive tool for both visualisation and searching for accessing key information ',NULL,'Visualisations of Data','App design,Data VisualisationProgramming','',NULL,NULL,'2020-03-25'),(13,'IBM and ARROW','','Software and Hardware Vendor','John mcnamara','Senior inventor','Jon_mcnam@uk.ibm.com','07799413848','Educational Game that teaches the fundamentals of coding','The problem relates to the pouring of Tarmac/Concrete at a site remote from where the Tarmac/Concrete was produced.The issue to be addressed is the temperature of the product at the point of tipping. If it is too cold then the product will not be effective. Can we predict this whilst the lorry is on route and advise to return before getting to the delivery point?To prevent the lorry from tipping the product at the wrong temperature we need to be able to predict at what point would

the product not be useable when it arrives and be able to communicate with the lorry and advise the driver to return at the earliest possible moment so it can be reheated. We can put a sensor on each lorry so we know where it is.Can we use data science with the appropriate algorithms rather than add a temperature sensor to each load?There are a number of variables:Size and weight of the loadInitial temperatureThermodynamics attributed to the lorryOutside temperature along the route and weather conditionsDistance between production and delivery pointTraffic conditionsAverage lorry speed when fullWait time at delivery point (number of lorries in front x time per load)There are probably others but in proving we can solve this problem without the direct use of sensors within the load may open up other opportunities in logistics.The final solution should include a graphical representation of where the lorries are and maybe a red, green, amber on a map. Perhaps incorporating IBM Weather company input and traffic conditions enabling some forecasting and planning advice for the week ahead. ',NULL,'May need data on typical delivery lorries, density and thermodynamics of liquid concrete and tarmac.','Data Science','We have GPS trackers so we know where the lorries are at 30 second intervals.',NULL,NULL,'2020-03-25'),(14,'','','','','','','','Developing an interactive visualisation aid for current global healthcare group activities across UCL','There are numerous global healthcare groups within UCL, each with its own particular emphasis. As these groups increase there is a need for researchers/stakeholders to understanding the similarities and differences between these groups so that they can easily access the correct advice/information. This project will involve two steps. 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Step 1- To map the different global healthcare group activities across UCL.2- Design an interactive tool for both visualisation and searching for accessing key information ',NULL,'Visualisations of Data','App design,Data VisualisationProgramming','',NULL,NULL,'2020-03-25'),(19,'IBM & Simpson Associates','','Large software / hardware vendor','John mcnamara','Senior Inventor','Jon_mcnam@uk.ibm.com','07799413848','Course completion and attendance aid','IBM Business Partner Simpson Associates work to create applications for higher education/colleges/universities. They would like to work with UCL IXN to create an application to support students and university staff, that builds upon their data on student usage of resources such as WiFi, library, IT, attendance, course grades at university – to identify patterns that would indicate when students may be disengaging from the course, and therefore at risk of leaving, so help & support can be offered in a discrete manner.Beyond this Simpson would like to explore the potential of an attendance registration system. In this solution a tutor would give out a code during the lecture which would then be submitted by the student via their mobile device into an 'Organiser application' to register their attendance. This would be required to be done within a certain time of the lecture/seminar starting, to reduce the risk of the code being distributed to non attending students. Potentially if there were no ethical barriers, GPS/Wifi location could be used to show grouping of the students who entered the code (grouping would be expected to be uniform, rather than dispersed). Should a student suddenly develop a pattern of non attendance, the application could also provide suggestions/recommendation for university counselling and support.Finally, as a stretch goal, as part of this solution, we would also like to create a calendar/organiser application for the student, that runs on a mobile device, which provides logistics for lectures, seminars, recommended society study groups, upcoming deadlines for assignments, (along with supporting material such as ppts, labs, recommended reading). 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Engineering DIU','c.neil@ucl.ac.uk','x51005','Student Assistant Mobile App','Design and build a mobile app that acts as a personal assistant for students. The app should be voice responsive and able to provide personalised information on a wide range of activities and events, for example:A daily overview of upcoming lectures and deadlinesUpcoming news and eventsTo do list and emailOverview of Moodle/Unitu forum activityLibrary space availabilityCareer/placement opportunitiesPersonal Tutor meetings and notesTerm DatesQuick access to relevant staff and student rep contact detailsThe app should have a simle, usable and ideally attractive interfaceAn example of a similar app can be found at https://www.youtube.com/watch?v=mI0gdSCjGQ8 ',NULL,'? Machine Learning and AI ? Mobile, Wearable and Cloud Apps? Systems integration? Interactive Education ','','',NULL,NULL,'2020-03-25'),(21,'IBM and ARROW','','Software and Hardware Vendor','John mcnamara','Senior inventor','Jon_mcnam@uk.ibm.com','07799413848','Educational Game that teaches the fundamentals of coding','The problem relates to the pouring of Tarmac/Concrete at a site remote from where the Tarmac/Concrete was produced.The issue to be addressed is the temperature of the product at the point of tipping. If it is too cold then the product will not be effective. Can we predict this whilst the lorry is on route and advise to return before getting to the delivery point?To prevent the lorry from tipping the product at the wrong temperature we need to be able to predict at what point would the product not be useable when it arrives and be able to communicate with the lorry and advise the driver to return at the earliest possible moment so it can be reheated. We can put a sensor on each lorry so we know where it is.Can we use data science with the appropriate algorithms rather than add a temperature sensor to each load?There are a number of variables:Size and weight of the loadInitial temperatureThermodynamics attributed to the lorryOutside temperature along the route and weather conditionsDistance between production and delivery pointTraffic conditionsAverage lorry speed when fullWait time at delivery point (number of lorries in front x time per load)There are probably others but in proving we can solve this problem without the direct use of sensors within the load may open up other opportunities in logistics.The final solution should include a graphical representation of where the lorries are and maybe a red, green, amber on a map. Perhaps incorporating IBM Weather company input and traffic conditions enabling some forecasting and planning advice for the week ahead. ',NULL,'May need data on typical delivery lorries, density and thermodynamics of liquid concrete and tarmac.','Data Science','We have GPS trackers so we know where the lorries are at 30 second intervals.',NULL,NULL,'2020-03-25');
/*!40000 ALTER TABLE `projects` ENABLE KEYS */;
UNLOCK TABLES;

Regardless, please run this code at the end
/*!40103 SET TIME_ZONE=@OLD_TIME_ZONE */;
/*!40101 SET SQL_MODE=@OLD_SQL_MODE */;
/*!40014 SET FOREIGN_KEY_CHECKS=@OLD_FOREIGN_KEY_CHECKS */;
/*!40014 SET UNIQUE_CHECKS=@OLD_UNIQUE_CHECKS */;
/*!40101 SET CHARACTER_SET_CLIENT=@OLD_CHARACTER_SET_CLIENT */;
/*!40101 SET CHARACTER_SET_RESULTS=@OLD_CHARACTER_SET_RESULTS */;
/*!40101 SET COLLATION_CONNECTION=@OLD_COLLATION_CONNECTION */;
/*!40111 SET SQL_NOTES=@OLD_SQL_NOTES */;

IXN Miner

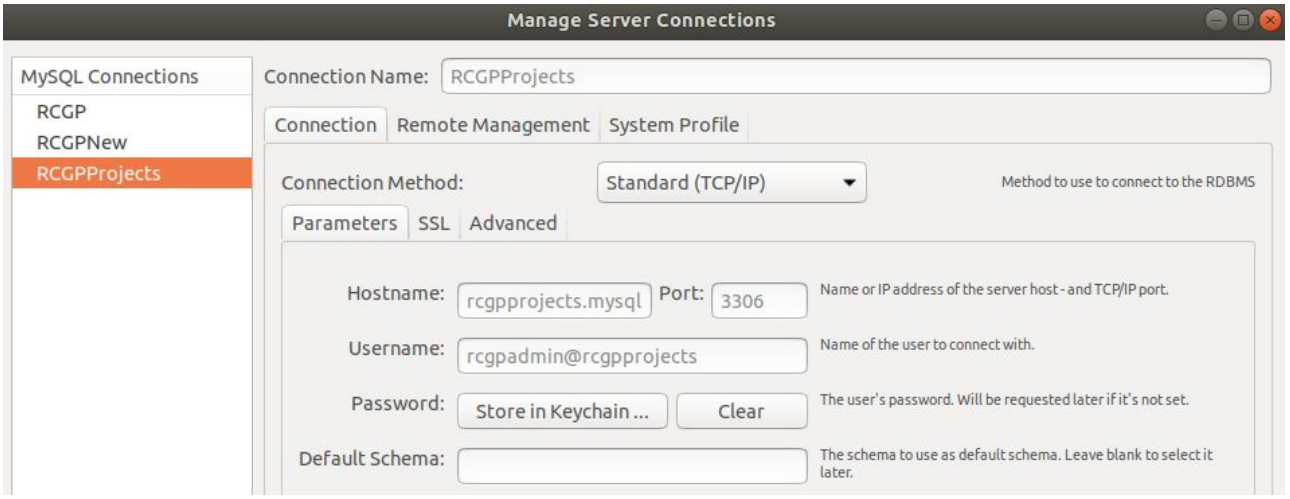
Alternatively you can use our ixn miner in order to parse new IXN forms and add additional information to the database, the code can be found by cloning the repository "https://github.com/addybongo/ixnMiner.git" (if you do not yet have access, please email "adnan.ahmad.18@ucl.ac.uk" for the necessary permissions

Now, navigate to the directory 'ixnMiner/config.json' and once again, enter the database information. The only information that should be required is the server (hostname), database, username and password. The server and username should already be filled out for a local server.
DO NOT TOUCH entrytable, projectstable, contractstable or academicstable. These are fixed table names that cannot change.

The administration panel should also be setup to work now. Run the miner.py file and the GUI interface should open. Any IXN forms can then be pushed to the project database. A sample projects folder named 'projects' has been included in this submission to test this with.

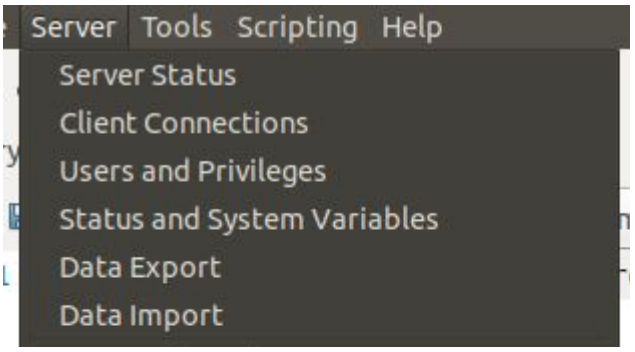
Exporting database for offline access:

In order to export the database to reconstruct it for your own use, we will need to use MySQL Workbench to export the data. Configure a new connection



Hostname: [serverName].mysql.database.azure.com
Port: 3306
Username: [adminLogin]@[serverName]
Password: [password]

After the connection has been established, enter the database. Go to Server > Data export



Select the “rcgp_projects” schema, configure the dump to include both the structure and data, export to a self-contained file, and then press “start export”. You will have now generated the SQL code to recreate the database on any MySQL database.

Setting up the chatbot

It is crucial to have the .NET Core setup as a prerequisite, please follow this guide on the installation of ".NET Core SDK", "ASP.NET Core runtime" and ".NET Core runtime"

After this, you can clone the repository
"https://github.com/addybongo/Projects-Chatbot.git"
You will need to create your own private repository, and then use the following command while within our cloned repo
git remote set-url origin [yourOwnRepo]
git push

You can configure the file "dbconfig.json" located in /ixnChatbot/Database, the required details are as follows:
Server: [serverName].mysql.database.azure.com
Database: "rcgp_projects"
Username: [adminLogin]@[serverName]
Password: [password]

Next we need to create the bot registration

az ad app create --display-name "[displayName]" --password "[atLeastSixteenCharacterPassword]" --available-to-other-tenants

Display-name : the display name of the application, will be listed in the general resource list in the relevant resource group
Password: also known as the client secret, must be atleast 16 characters long, contain at least 1 upper or lower case alphabetical character, and contain at least 1 special character

This will output a JSON with the key "appID" which is important for the next step

cd ixnChatbot/DeploymentTemplates

az deployment sub create --template-file "template-with-new-rg.json" --location "UK South" --parameters appId="[appID]" appSecret="[atLeastSixteenCharacterPassword]" botId="[GloballyUniqueBotId]" botSku=F0 newAppServicePlanName="[NewAppServiceName]" newWebAppName="[newWebAppName]" groupName="[newResourceGroup]" groupLocation="UK South" newAppServicePlanLocation="UK South" --name "[displayName]"

cd ../

az bot prepare-deploy --lang Csharp --code-dir "." --proj-file-path "ixnChatbot.csproj"

zip -r deployment.zip .

az webapp deployment source config-zip --resource-group "[newResourceGroup]" --name "[newWebAppName]" --src deployment.zip

The deployment may take a few minutes to execute and will return a JSON once finished. You can now see your newly created resources in azure. You will have a Web App Bot (An Azure Bot Service that is deployed

to an Azure App Service), App service (Enables you to build and host web applications) and an App Service plan (Defines a set of compute resources for a web app to run)

Within the azure portal, if you access the app service that was created (should have the name of [newWebAppName]), you will see a section for “Deployment” and within that, “Deployment Center”. Here you can connect your github repository, authorise azure continuous deployment, select the repository and branch to automatically deploy from. It will take a few minutes for the continuous deployment to successfully fetch from your repository.

After this, you can go back to view your resources, and access the resource with the name of your botId [GloballyUniqueBotId] which should be of type “Bot Channels Registration”. Within this, there is a section for “Bot management”, there is a further setting for “Channels”. Click the edit button next to “Direct Line”, reveal the secret key and copy it.

Open Visual Studio Code, install the “Azure storage” extension. Create a new folder called “Website”, within it create an index.html page and paste the following code into it:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
  <title>Chatbot</title>
  <link href="https://cdn.botframework.com/botframework-webchat/latest/botchat.css" rel="stylesheet"
/>
</head>
<!DOCTYPE html>
<html>
<head>
  <script
       crossorigin="anonymous"
       src="https://cdn.botframework.com/botframework-webchat/latest/webchat.js"
  ></script>
  <style>
    html,
    body {
      height: 100%;
    }

    body {
      margin: 0;
    }

    #webchat {
      height: 100%;
      width: 100%;
    }
  </style>
</head>
<body>
<div id="webchat" role="main"></div>
<script>
```

```
  window.WebChat.renderWebChat(
    {
      directLine: window.WebChat.createDirectLine({
        token: '[secretKey]'
      }),
      locale: 'en-US',
      botAvatarInitials: 'BOT',
      userAvatarInitials: 'USER'
    },
    document.getElementById('webchat')
  );
</script>
</body>
</html>
```

Be sure to replace line 37 with the secret key you've acquired from the channel. You may also create another file called "404.html" containing the following code:

```
<h1>404</h1>
```

After this has been completed. Right click the index.html file and select "Upload to Azure Storage". Then select the sponsorship that you wish to upload with, and then create a new storage unit, the name of which must be globally unique. After you've created the storage account, view it in the Azure portal. In the section "Settings" click on "Static website", enable the static website, with the index document name as "index.html" and the error document path as "404.html". Once this is saved, go back to Visual Studio Code, right click the "Website" folder, click "Deploy to Static Website", select the subscription once again, then select the storage account, and it will deploy the website. You can now preview this at the endpoint shown in the Static Website settings. (It should also appear as a notification within Visual Studio Code too)