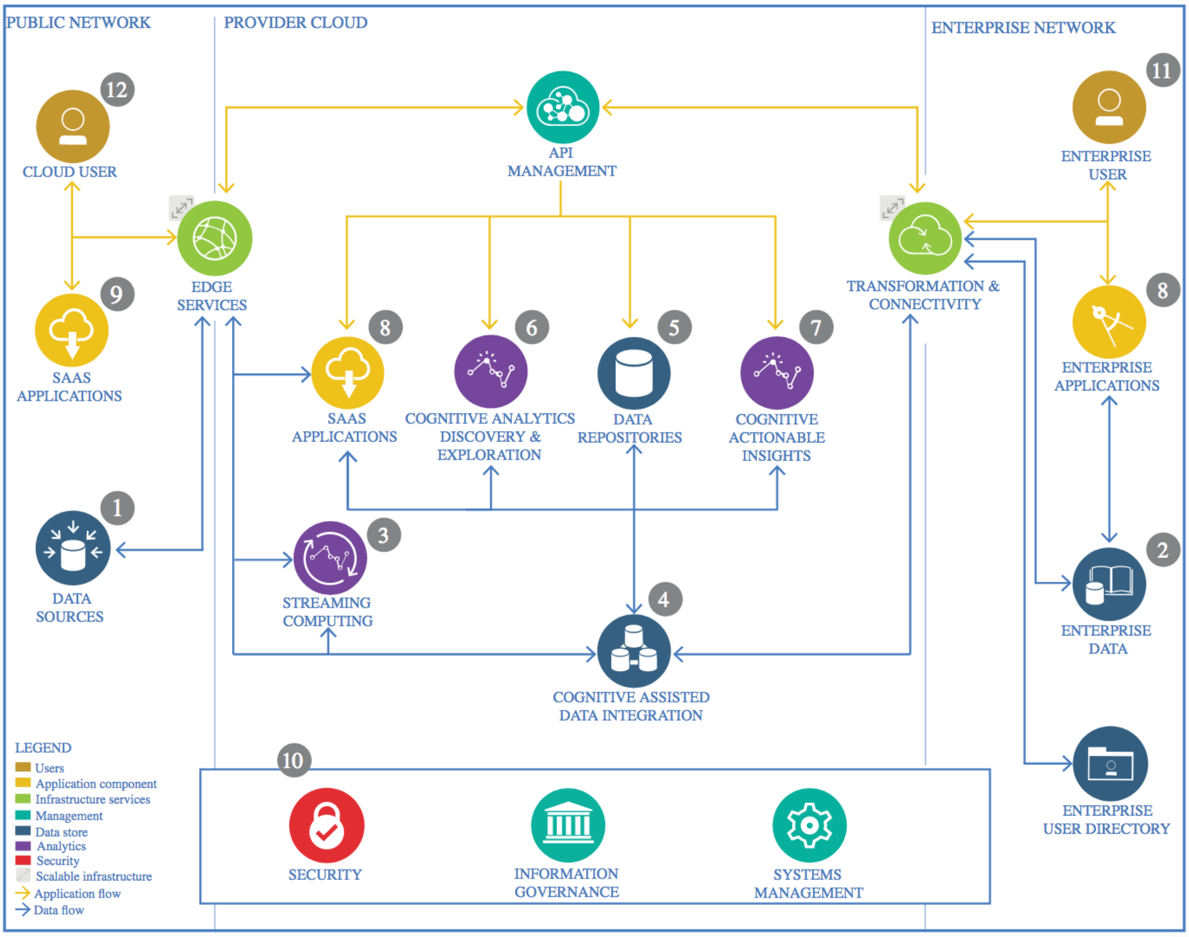
The Lightweight IBM Cloud Garage Method for Data Science

Architectural Decisions Document for project ‘Suggesting Affordable yet Safe Housing in Seattle, WA’

1 Architectural Components Overview



IBM Data and Analytics Reference Architecture. Source: IBM Corporation

1.1 Data Source

1.1.1 Technology Choice

For the data acquisition part, we use the following data sources: Wikipedia to find out Seattle's district names and coordinates https://en.wikipedia.org/wiki/Category:Neighborhoods_in_Seattle

Crime data is available from official sources of City of Seattle: https://data.seattle.gov/Public-Safety/Crime-Data/4fs7-3vj5

For prices of flats we use data set provided by Airbnb on Kaggle portal: https://www.kaggle.com/airbnb/seattle/version/2#_=_

To locate parks nearby flats, we access FourSquare API.

1.2 Data Repository

1.2.1 Technology Choice

All the information we retrieve is saved into CSV files on IBM cloud for ease of use.

1.2.2 Justification

Files aren't that big, and shall they grow in size, they can be naturally split 'horizontally' by the names of the districts of Seattle they belong to, ZIP codes etc.
The information in files has to be prepared and normalized first (for instance, names of the districts should be the same), so there is no point in, say, interesting this raw data into an RDBMS.

1.3 Discovery and Exploration

1.3.1 Technology Choice

We use Python, pandas, matplotlib, seaborn and Folium to visualize all the data we have gathered and understand them better.

1.3.2 Justification

Python is great for data analysis and quick ideas prototyping. There are many powerful third-party libraries for statistical analysis which are free of charge. There are also many Python programmers available on the market.

1.4 Actionable Insights

1.4.1 Technology Choice

Looking deeper at the data provided by data.seattle.gov we've understood that we'd need additional data, because the number of crimes has to be normalized by the population size. Since we couldn't find population size on Wikipedia pages for Seattle's district, we had to search for an additional source of data. We get the population information from the portal 'Find My Seattle' https://findmyseattle.com/home and enter them by hand, because the website is hard to crawl automatically (some JavaScript most likely).

1.5 Applications / Data Products

1.5.1 Technology Choice

We use Keras to build models for the prediction of good flats.

1.5.2 Justification

Keras library is flexible, extensible and allows for model serialization. It is also high-level enough to explain the details of our model to the stakeholders.

1.6 Security, Information Governance and Systems Management

1.6.1 Technology Choice

Once we integrate user profiles with their preferences, such sensitive information has to be protected.

1.6.2 Justification

Due to GDPR, we will strip away all relevant customer information and anonymize their preferences and choices.