Introduction to Analytics

LocalTek Healthcare Analytics

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Goals for the class

- Get hands-on experience accessing and manipulating data
- Get an introduction to analysis and visualization in Python
- Get an introduction to querying data in a database using SQL
- Make discoveries and have fun

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Goals for this lesson

- **Define Analytics**
- **Learn about commonly used tools in data analytics and data science**
- **Learn a little *pandas***

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What is Data Analytics?

The process of taking raw data, preparing and cleaning it, extracting insights, and communicating those findings to help drive better decision making.

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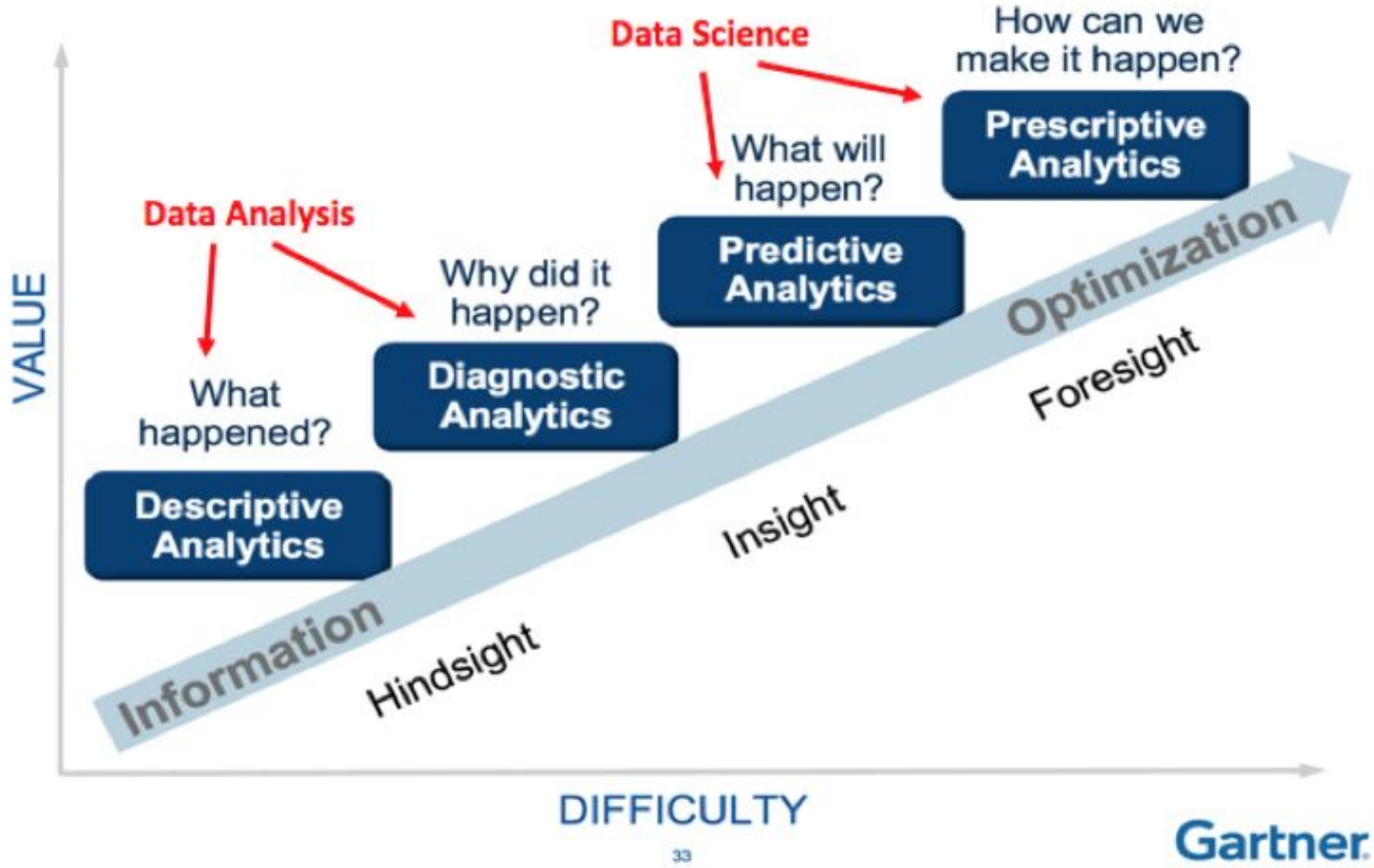
Gartner Analytic Ascendancy Model



Gartner

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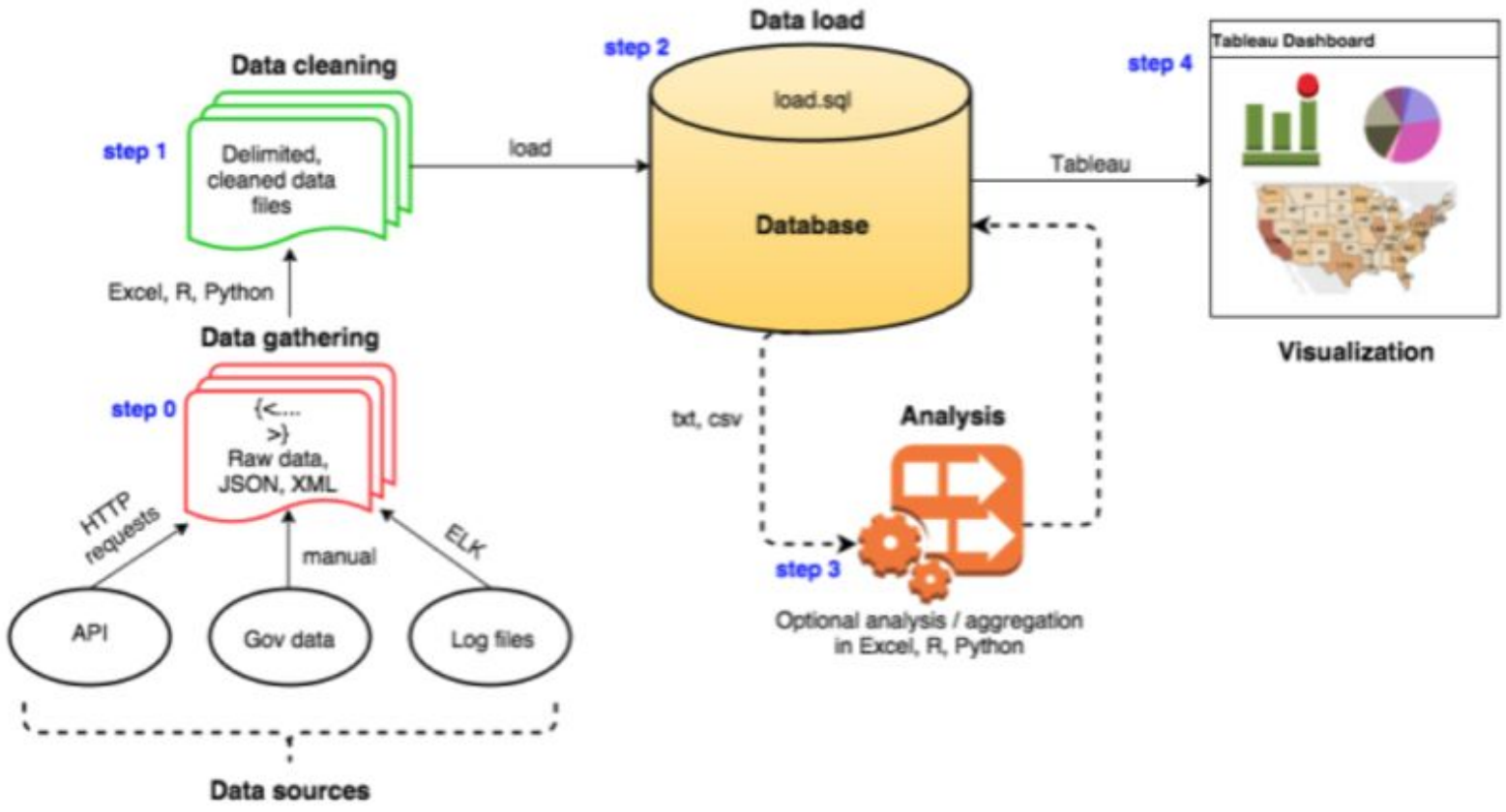
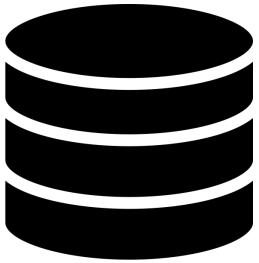
Analytics Workflow *- Ketaki Kekatpure*



Commonly Used Data Science and Analytics Tools



Microsoft® SQL Server®

python™

APACHE Spark™

tableau

Power BI

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Data Overview - COVID-19 Cases and Vaccinations

During this class, you will learn how to combine data from a number of different sources to explore where in the Metro Nashville area people have contracted the virus and where people are getting vaccinated.

Tools that you will use:

- Python
    - *pandas* for manipulating data read in from csv files, and databases
    - *matplotlib* for visualizations
- SQL
    - SQLite

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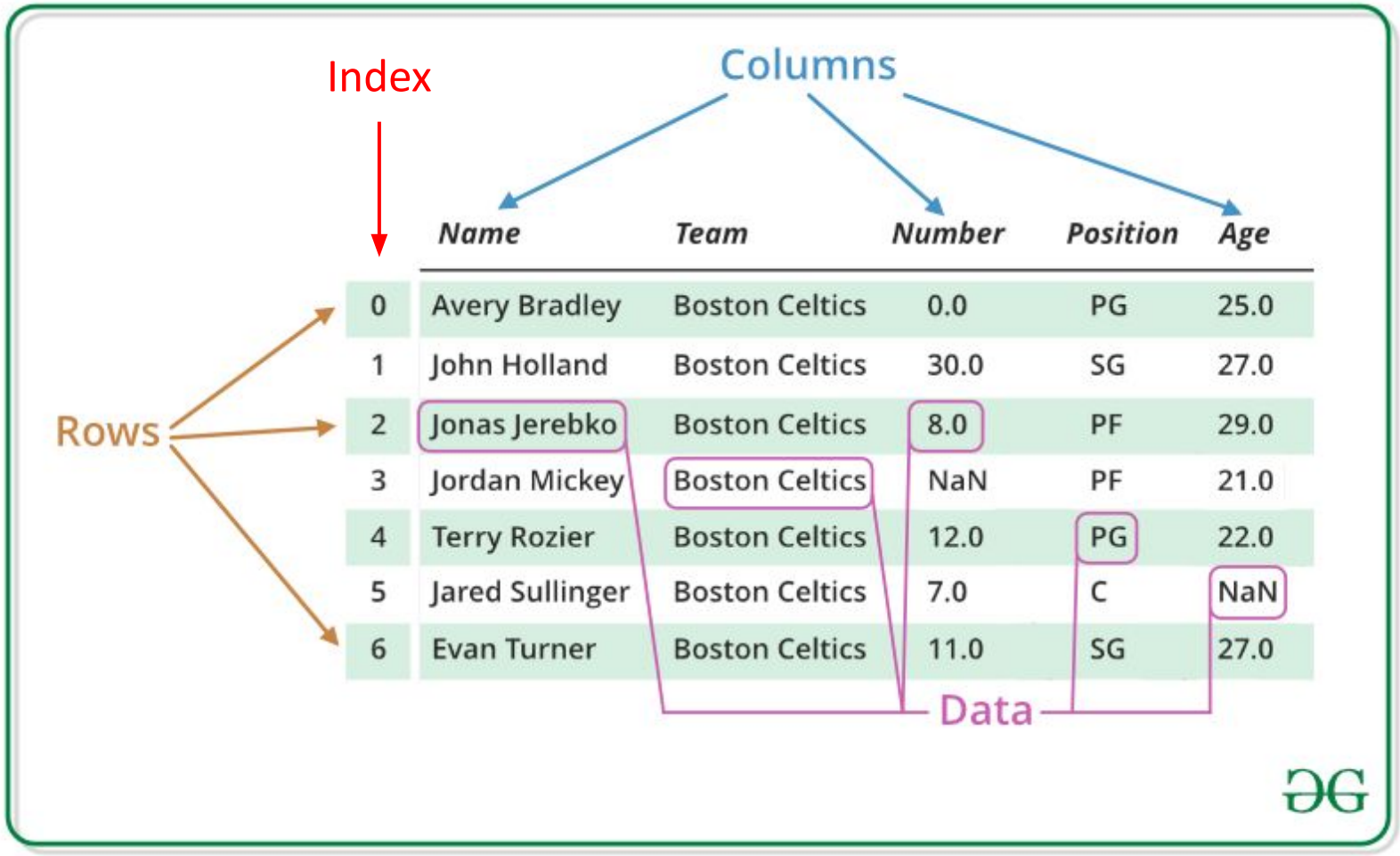
We will work a lot with Python's *pandas* library, which provides methods for working with ***DataFrames*** and ***Series***.

A **DataFrame** is a two-dimensional (tabular) data structure.

A **Series** is a one-dimensional data structure – could be a row or a column of data, but usually when we work with a Series, it is a column.



	Name	Team	Number	Position	Age
0	Avery Bradley	Boston Celtics	0.0	PG	25.0
1	John Holland	Boston Celtics	30.0	SG	27.0
2	Jonas Jerebko	Boston Celtics	8.0	PF	29.0
3	Jordan Mickey	Boston Celtics	NaN	PF	21.0
4	Terry Rozier	Boston Celtics	12.0	PG	22.0
5	Jared Sullinger	Boston Celtics	7.0	C	NaN
6	Evan Turner	Boston Celtics	11.0	SG	27.0

https://www.geeksforgeeks.org/python-pandas-dataframe/

pandas – https://pandas.pydata.org/pandas-docs/stable/api.html

Importing Data

- **pd.read_csv()** – read a comma delimited file; good practice is to look at the raw file in a text editor (like Visual Studio Code, not Excel); additional arguments may be needed to handle extra rows at the top and extra data (footnotes) at the bottom.

Inspecting

- **df.info()** – method to get information about the DataFrame
- **df.head()** – looks at the top of the DataFrame; 5 rows by default
- **df.tail()** - looks at the bottom of the DataFrame; 5 rows by default
- **df.shape** – returns a tuple with the number of rows and number of columns

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pandas – https://pandas.pydata.org/pandas-docs/stable/api.html

Modifying

- **df.columns** – column labels attribute
- **df.rename()** – rename values (can pass in a dictionary with existing columns as the key and new ones as the values)
- **df.drop()** – drop the specified labels (either rows or columns) from the DataFrame

Summarizing

- **.unique()** – returns the unique values in a column
- **.nunique()** - returns the *number* of unique elements in a column
- **.value_counts()** - returns the unique elements in a column and the number of appearances of each

Slicing/Filtering

- **df.loc[]** – pass in row name and column name to access data at that location
- **df[[ ]]** - creates a slice (subset) of the DataFrame including just the columns passed in

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Get Data / Process + Clean Data / Exploratory Data Analysis

CSV Workflow

Open the file in text editor to determine:

- is there a header? **pandas default is *header = 'infer'***
- are there notes (non-data) at the top? **pandas default is *skiprows = None***
- are there footnotes or other (non-data) at the bottom? **pandas default is *nrows = None***

Read the file into a pandas DataFrame ***pd.read_csv()***

Check the top and the bottom to ensure all data was read ***df.head()*** and ***df.tail()***

Look at the dimensions ***df.shape***

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