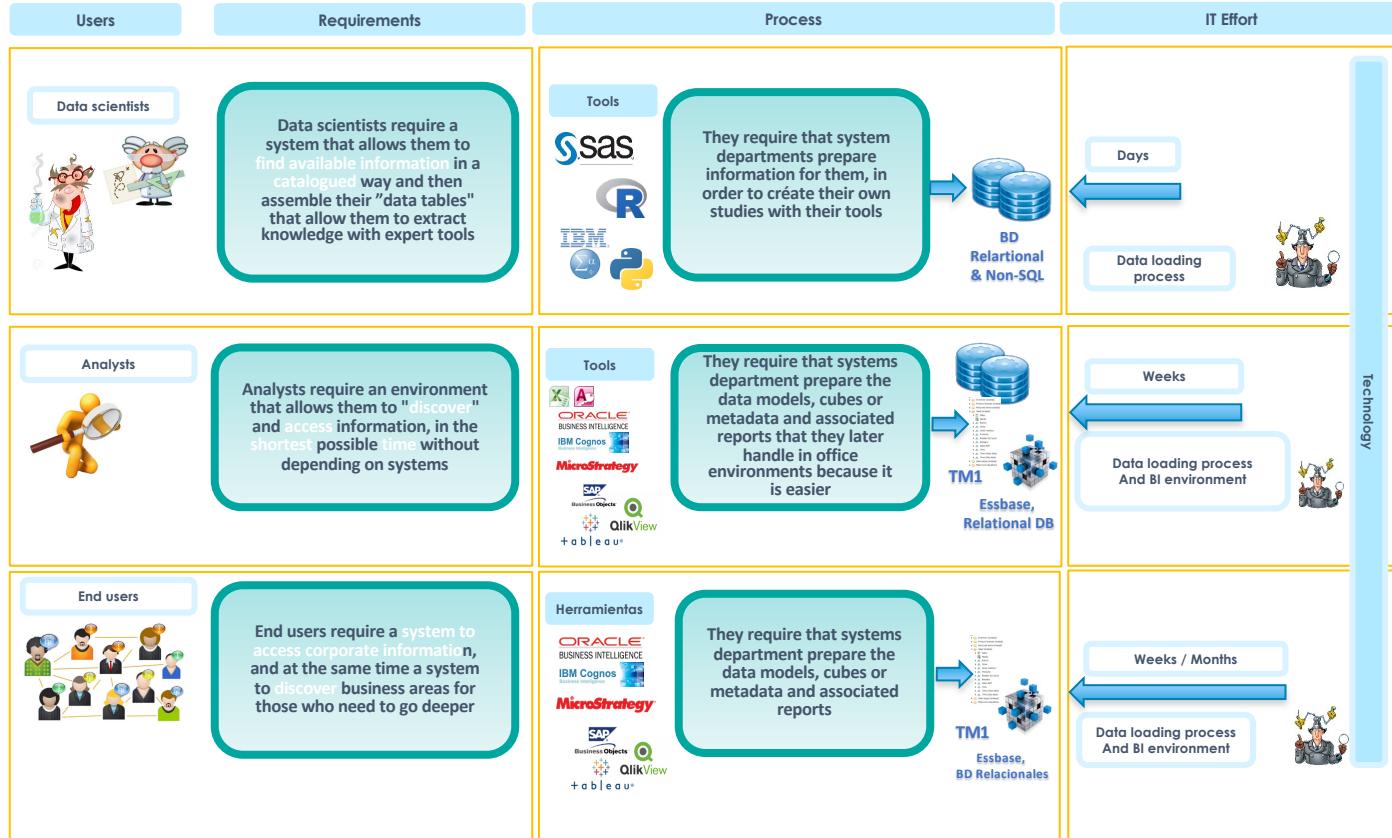


IA al BI: Cognos Analytics

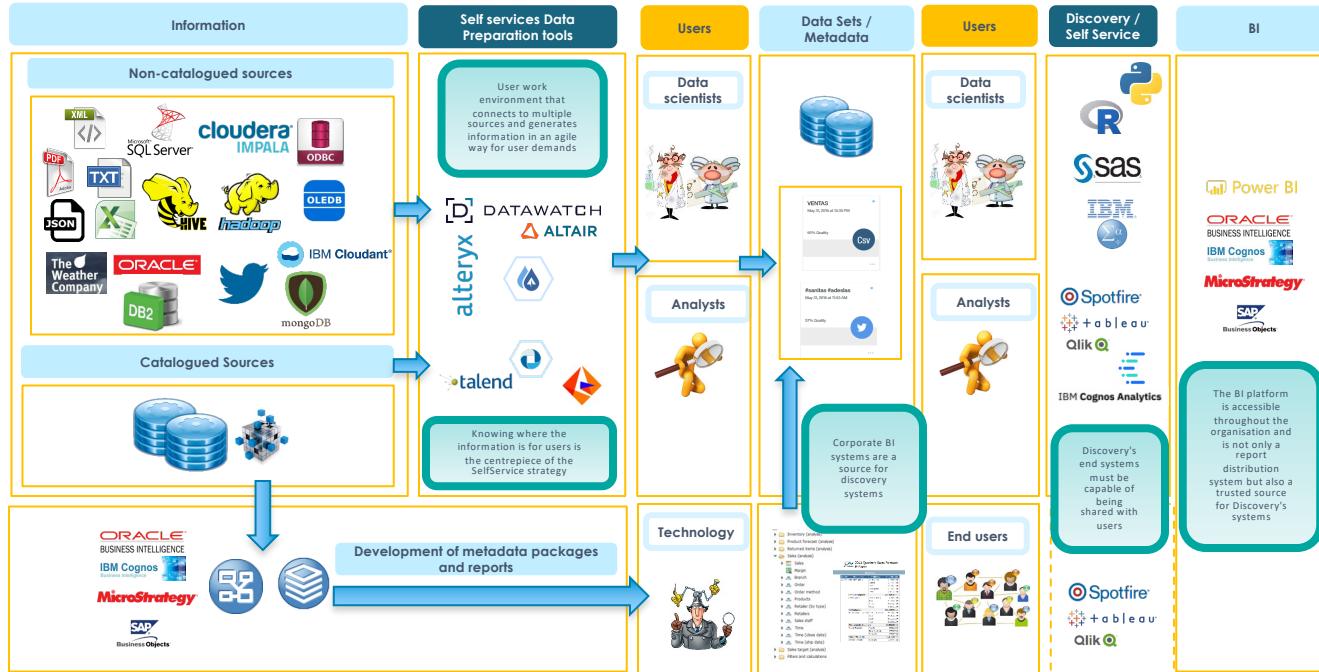
Índice

1. Ciclos de entrega de la información – Estrategia Self Service
2. Antes de empezar, consejos y trucos de la visualización
3. IBM Cognos - Capacidades
4. Práctica Cognos Analytics
 - Dashboard y visualización
 - Explore for Deeper Insights (Forecast)
 - StoryTelling
 - Explore for Deeper Insights
 - Data Exploration
 - Ejercicio no guiado: Ventas
 - Ejercicio no guiado: COVID-19
 - Modulo de datos
 - Reporting

Information delivery cycles



Self Service Strategy



The population of professionals is diverse
It has experienced many changes



Users are not all the same

Self-Service User

Ease of Use
Speed to answer
Data Discovery driven

Business Analyst

IT

Business User

Data Scientist

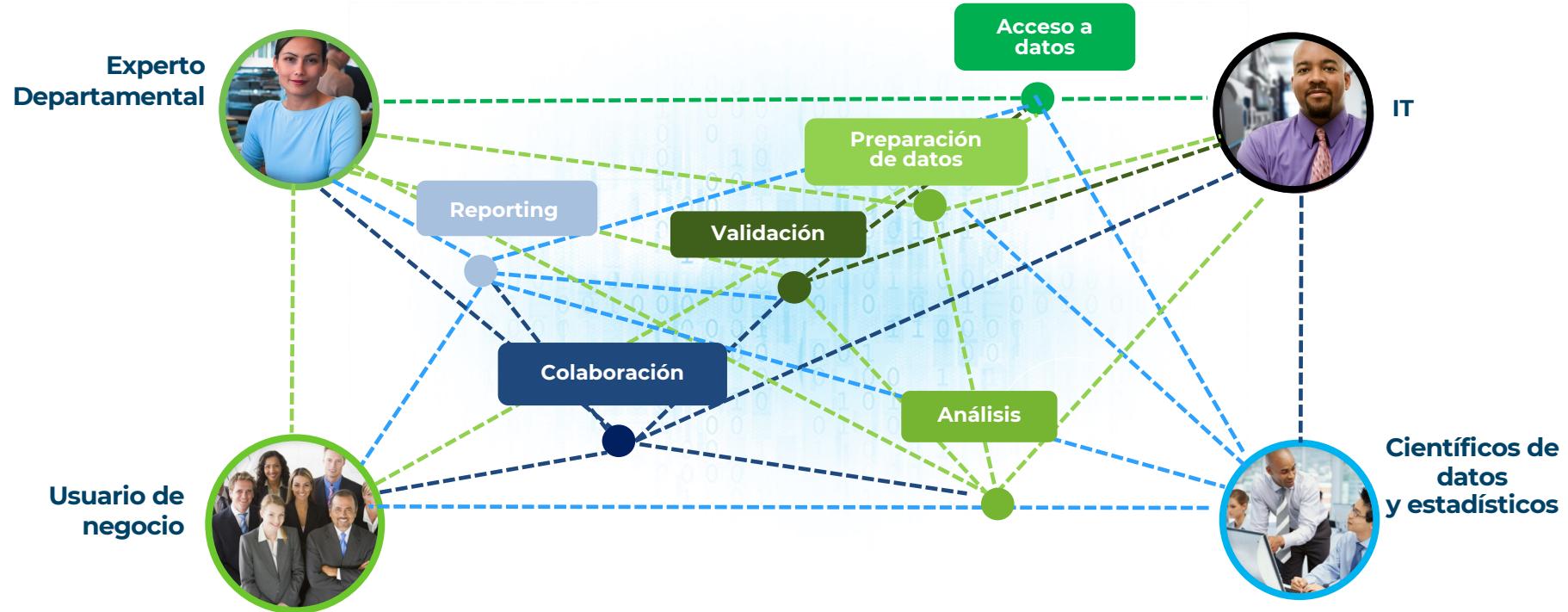
Capability Driven

Architecture modernization
Governance and Agility
Open source technology
Real-time

Self-Sufficient

Analytic composable services
Machine Learning
Leading-edge open source
Try before buying

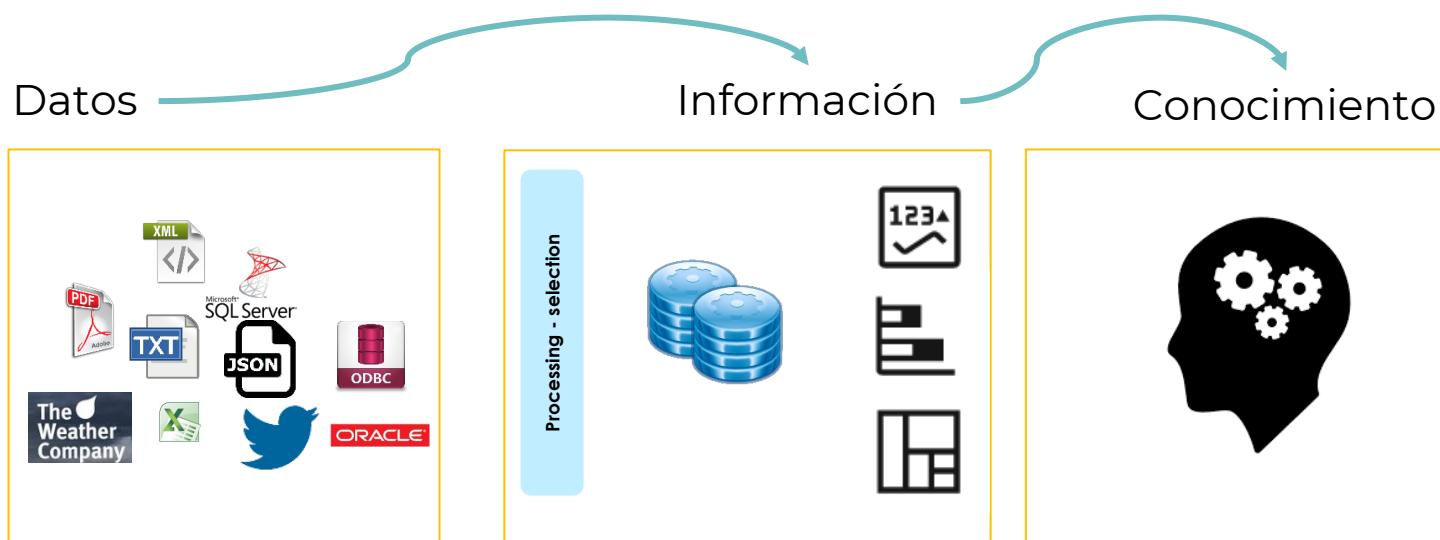
La realidad: Los proyectos de análisis son complejos
Múltiples pasos y múltiples personas



Introducción al Business Intelligence

¿Cómo definirías **Business Intelligence**?

" Técnicas, metodologías, arquitecturas y tecnologías que transforman los datos en conocimiento ".



Capas del Business Intelligence



Day-to-day

Transacciones diarias, Ventas. Sistemas OLTP, Operativos o Transaccionales.

Procesos que son capaces de extraer la información diaria, procesarla y cargarla en el sistema de información.

Sistema de información que contiene **información histórica**, homogeneizada para servir a las distintas necesidades de análisis.

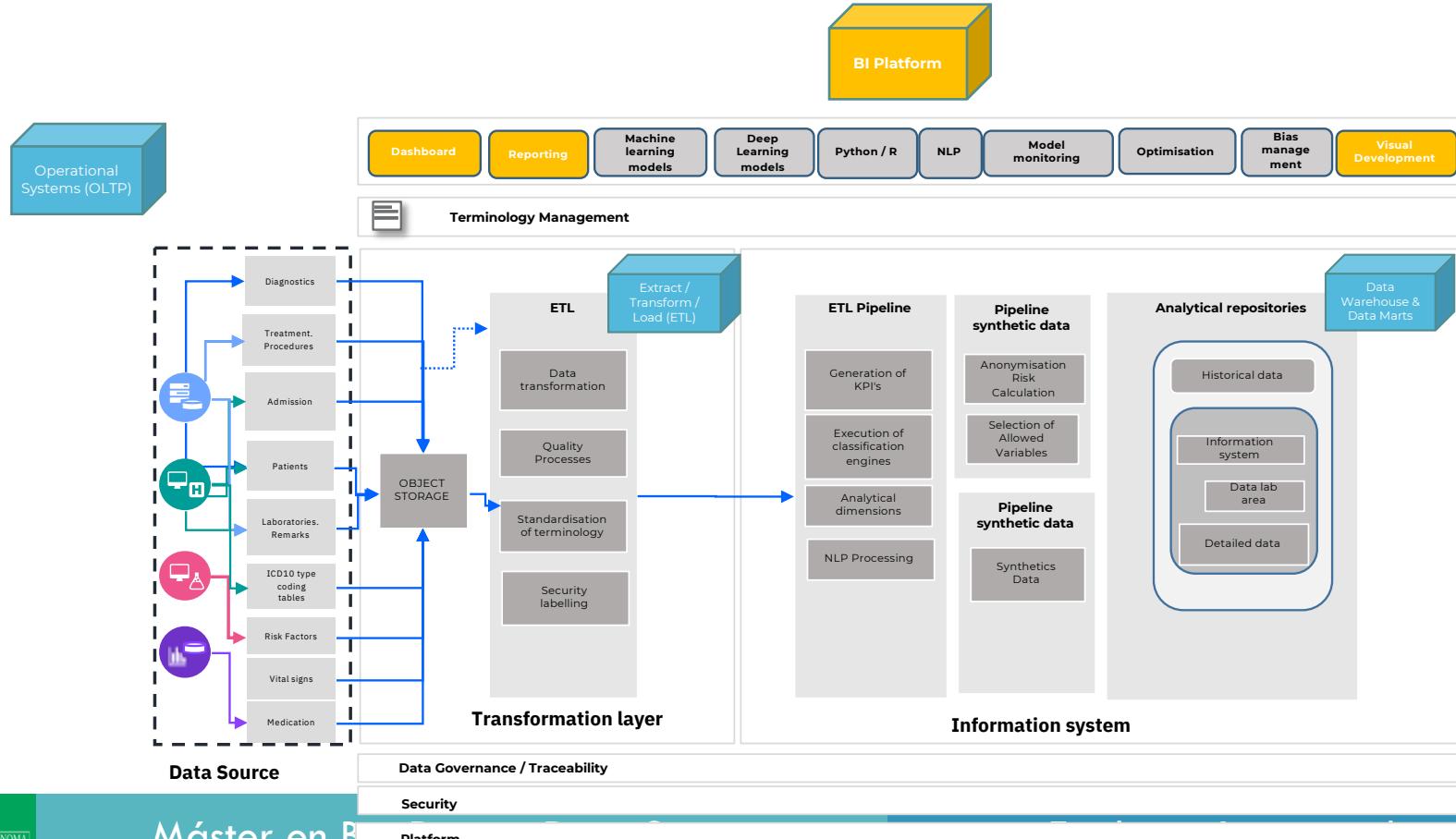
Sistema que permite a los **usuarios de la empresa** realizar análisis sobre los datos, proporcionando independencia de los sistemas tecnológicos y de datos.

"out of the box" Aplicaciones que integran objetos del sistema BI

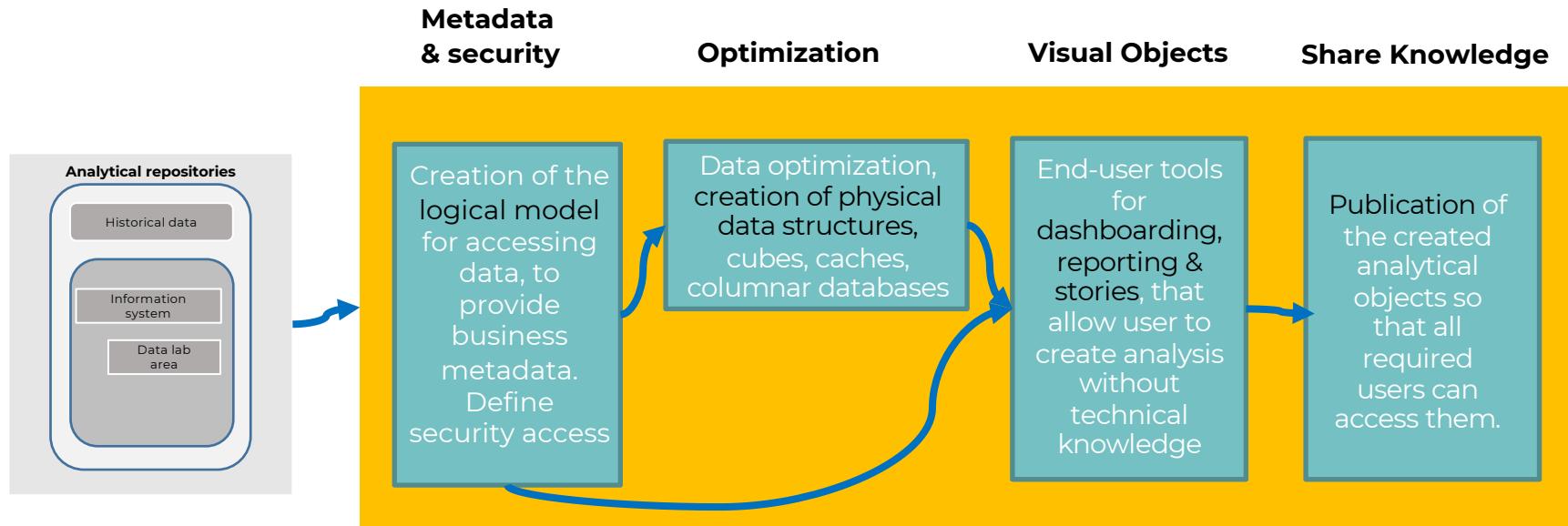
Capas del Business Intelligence



Business Intelligence en la arquitectura de datos



Dentro del Sistema de Business Intelligence



¿Necesitamos todas estas capas?

- Inventory (analysis)
- Product forecast (analysis)
- Returned items (analysis)
- Sales (analysis)
 - Sales
 - Target
 - Sales
 - Order
 - Order method
 - Products
 - Retailer (by type)
 - Retailers
 - Sales staff
 - Time
 - Time (close date)
 - Time (shop date)
 - Sales target (analysis)
 - Filters and calculators

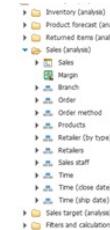


Business Intelligence vs Visualización de datos

¿Qué es la visualización?



el objetivo principal de la visualización de datos es comunicar la información de forma clara y eficaz mediante métodos gráficos



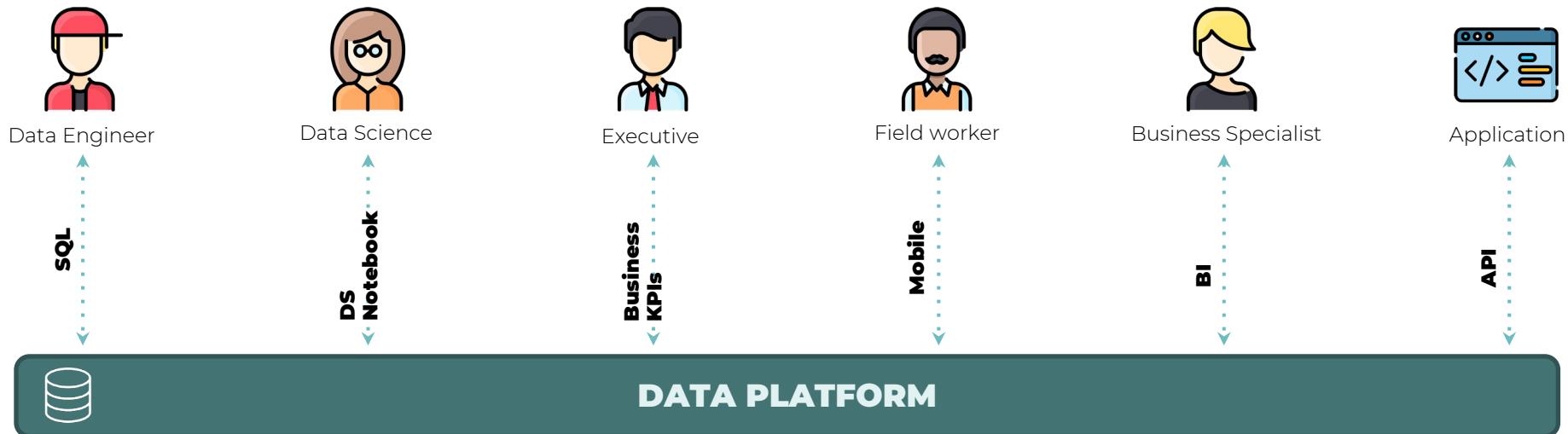
¿Qué es un entorno de BI?

Técnicas, metodologías, arquitecturas y tecnologías que transforman los datos en conocimiento

Diferencias entre el entorno de BI y la visualización de datos

El BI requiere técnicas de visualización para optimizar la comprensión de los datos, la visualización sólo requiere datos y no sistemas de BI, pero no debe utilizar datos no validados, por lo que lo más óptimo es utilizar la visualización de datos sobre un entorno de BI, que es donde entran las soluciones comerciales de visualización.

Democratización de los datos



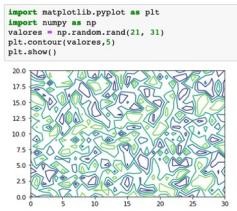
XML



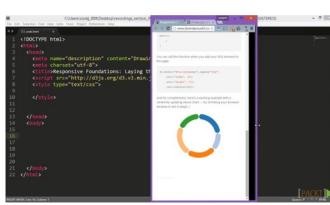
Clasificación de Mercado



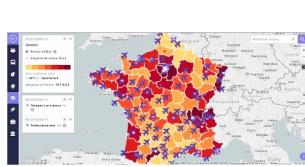
Business
Intelligence



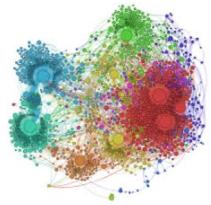
Analytics



Web / Mobile



Mapping / GIS



Networks /
Grafos

- Tableau
- Qlik
- PowerBI
- Cognos
- Analytics
- MicroStrategy
- QuickSight
- ArcGis
- Pentaho
- Kibana
- Sas

- Ggplot2
- Shiny
- Matplotlib
- R
- SAS
- SPSS

- D3.js
- Dc.js
- HighCharts.js
- Angular

- Carto
- Qgis
- ArcGis
- Leaflet
- OpenLayers

- Gephi
- Neo4j

- xxxx : Interfaz de usuario / Programación baja
- xxxx : Programación media
- xxxx : Programación alta



from Data to Viz

'From Data to Viz' is a classification of chart types based on input data format. It will help you find the perfect chart in three simple steps :

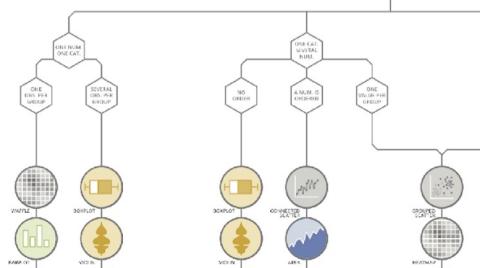
- 1 Identify what type of data you have.
 - 2 Go to the corresponding decision tree and follow it down to a set of possible charts.
 - 3 Choose the chart from the set that will suit your data and your needs best.

Dataviz is a world with endless possibilities and this project does not claim to be exhaustive. However it should provide you with a good starting point. For an interactive version and much more, visit:

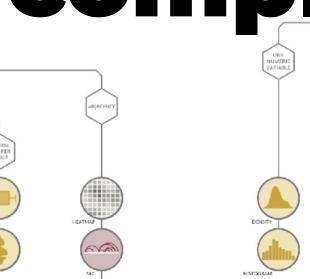
data-to-viz.com



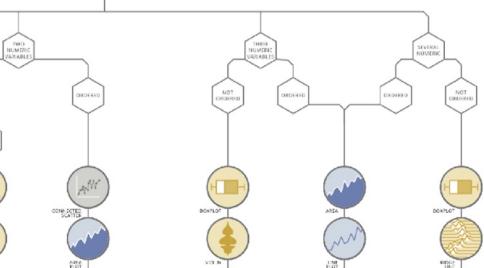
CATEGORIC AND NUMERIC



complejo



NUMERIC



Donde obtener ideas

DATA VIZ CATALOGUE



Arc Diagram

Area Graph

Bar Chart

Box & Whisker Plot

Brainstorm

Bubble Chart



Bubble Map

Bullet Graph

Calendar

Candlestick Chart

Chord Diagram

Choropleth Map



Circle Packing

Connection Map

Density Plot

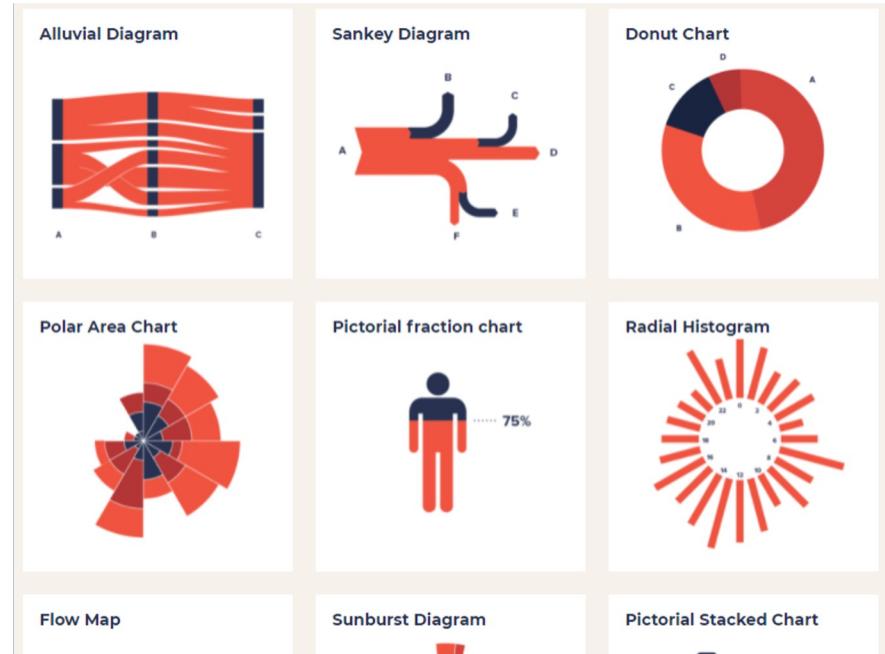
Donut Chart

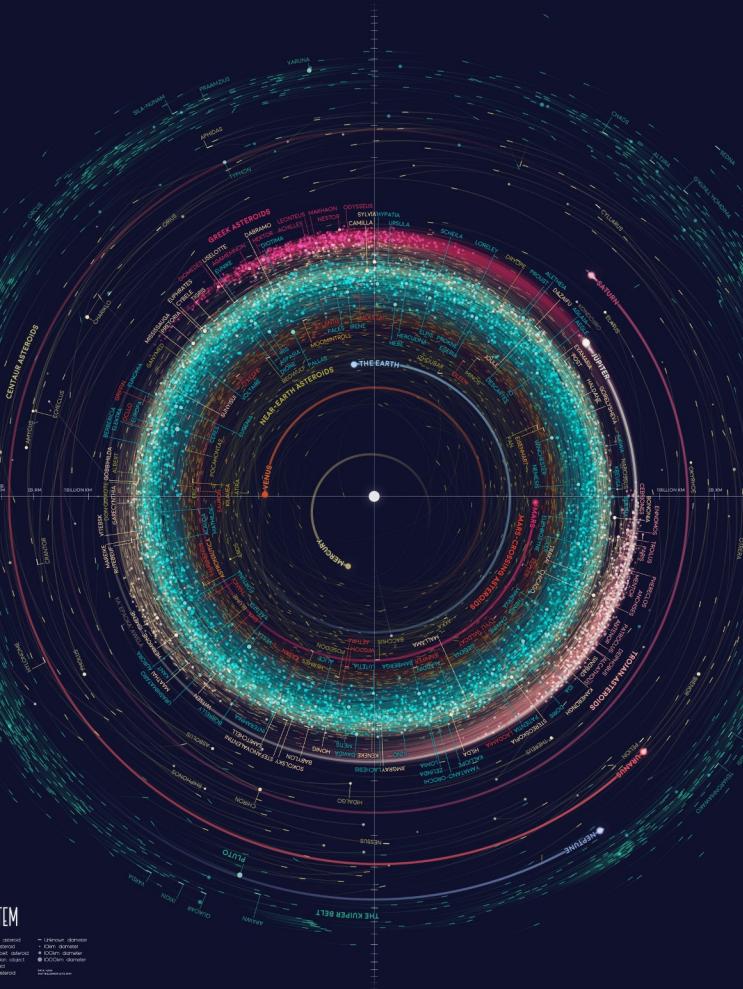
Dot Map

Dot Matrix Chart



DATA VIZ PROJECT

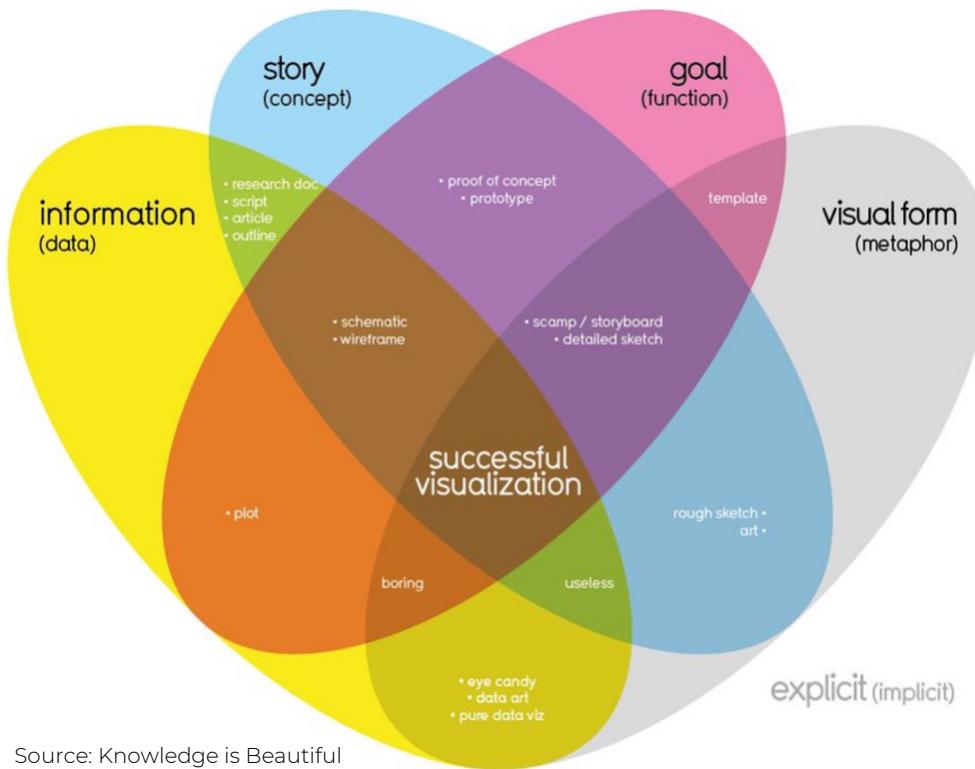




Antes de empezar veamos unos Trucos y Consejos

Source: Information is Beautiful
Awards

Que hace buena una visualización



1) Objetivo.

El resultado debe ser útil en cuanto a los conocimientos presentados, las conclusiones a las que se puede llegar, etc.

2) Información.

Garantiza la precisión, la honestidad y la coherencia de los resultados visuales.

3) Forma.

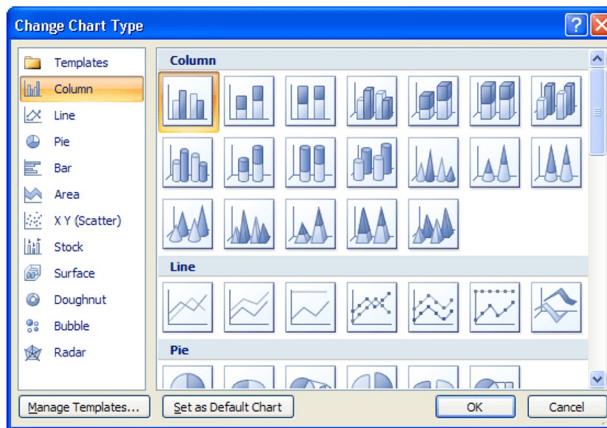
Estética de la presentación, diseño estructural, aspecto general, etc.

4) Historia.

Crea un vínculo con los lectores, les hace sentir que el gráfico es significativo para ellos.

Objetivo

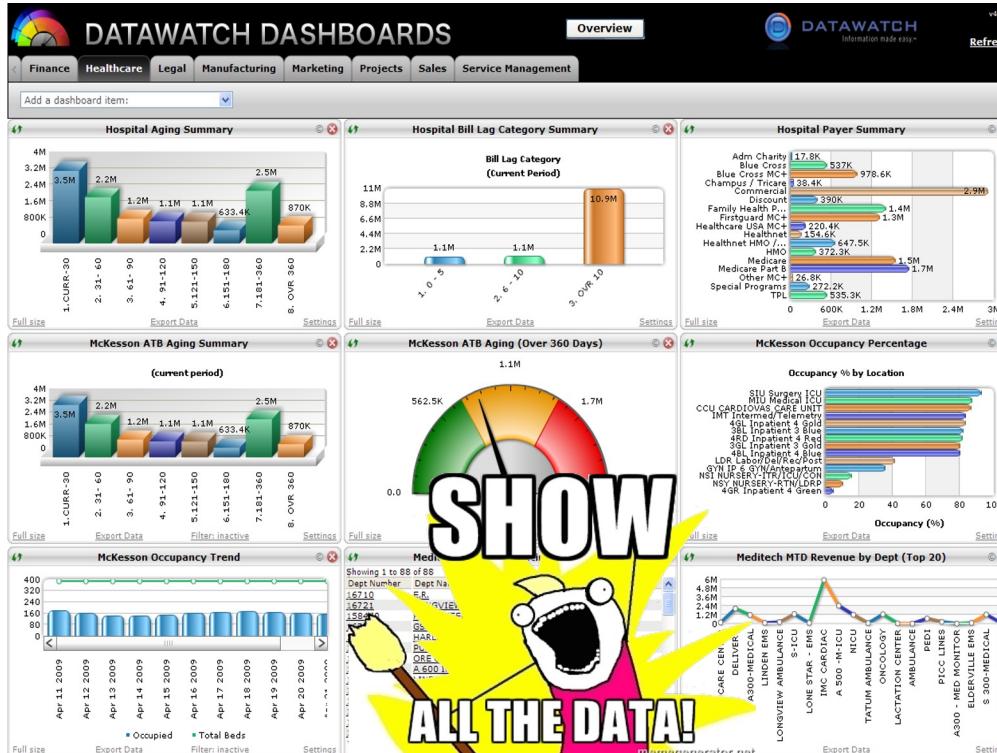
Empezar aqui...



...no aqui

- ¿Por qué estoy creando esta visualización?
- ¿Quién es el público?
- ¿Qué necesitan entender?
- ¿Cómo se va a consumir?
- ¿Cuál es el mensaje clave?
- ¿Qué acciones espero de ellos?

Información



Para nuestro objetivo

- ¿Qué datos importan?
- ¿Qué relaciones importan?
- Lo que se excluye es tan importante como lo que se incluye

Información

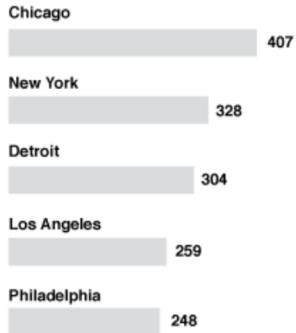


Información

Most dangerous cities

Total murders in 2014

WRONG

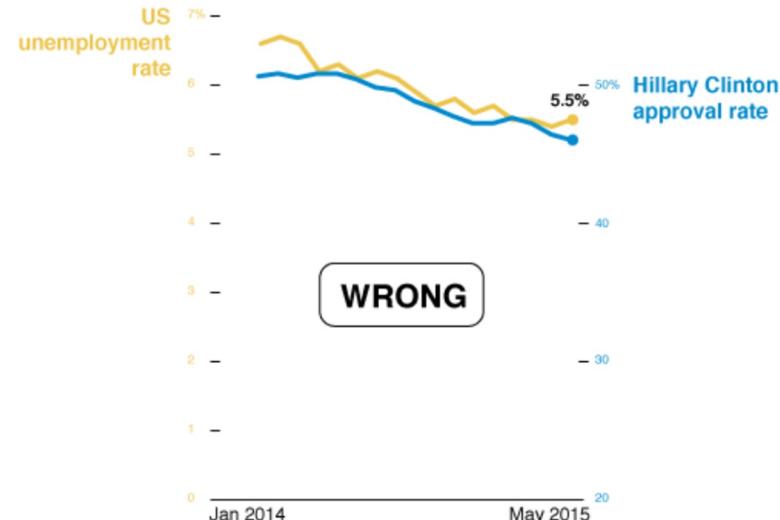
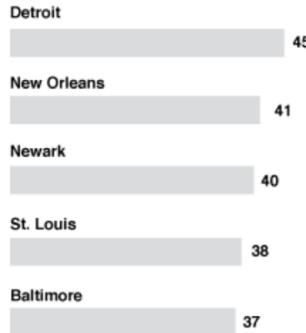


Source: National Geographic

Most dangerous cities

Murder rate in major US cities in 2014,
per 100,000 people

RIGHT



WRONG

Source: National Geographic

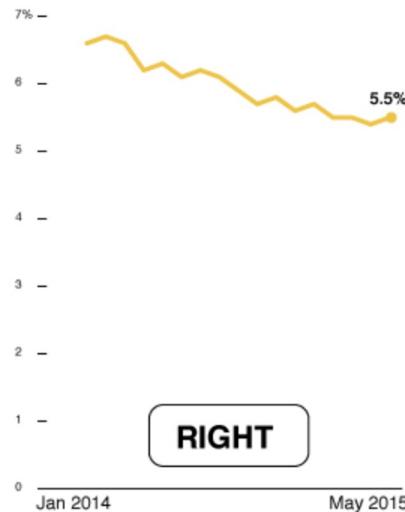
Spurious correlations

Información

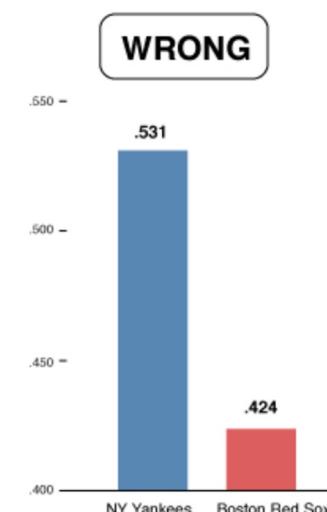
US GDP



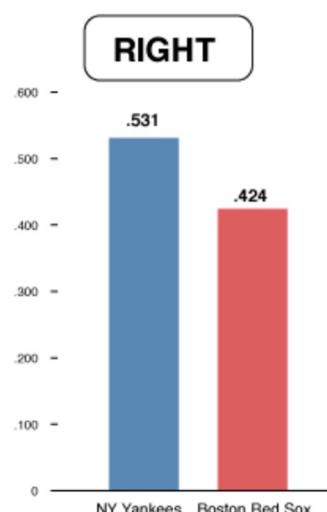
US GDP



Percentage of victories



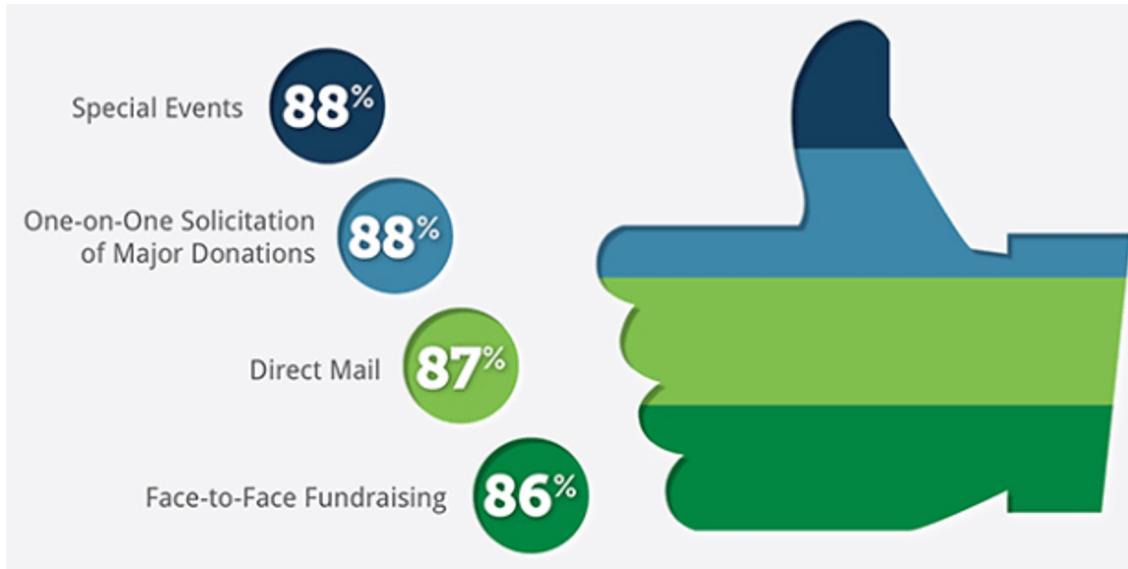
Percentage of victories



Source: National Geographic

Source: National Geographic

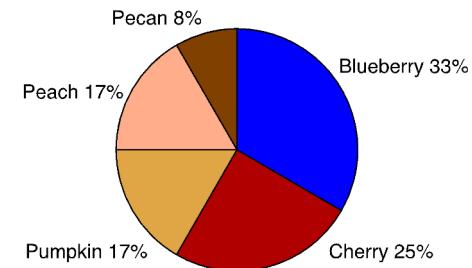
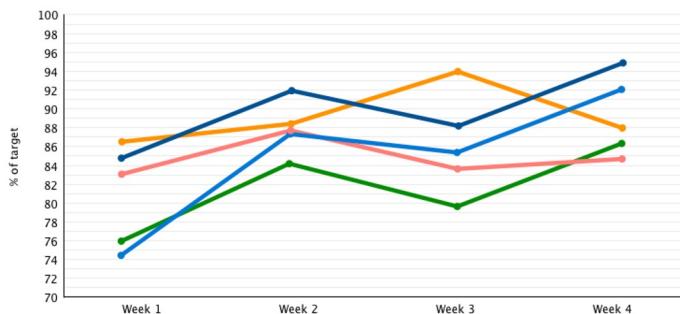
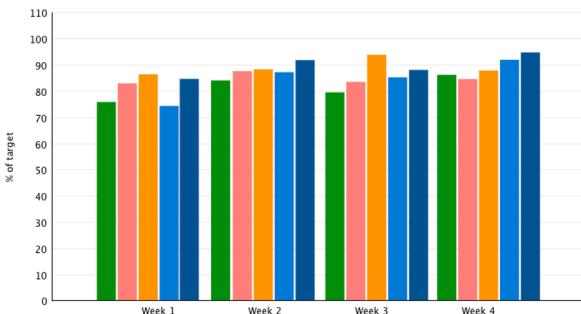
Información



Formas Visuales

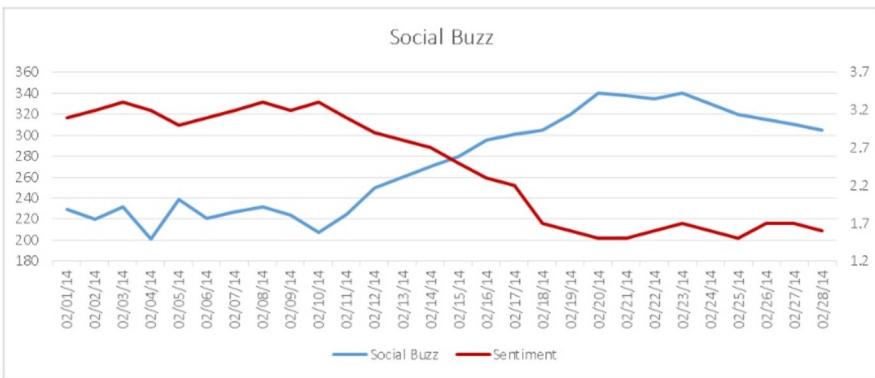
Elija el gráfico adecuado:

Diferentes estructuras revelan diferentes datos, sirven para diferentes propósitos
¿Qué tipo de gráfico mostrará sus datos de forma eficiente?

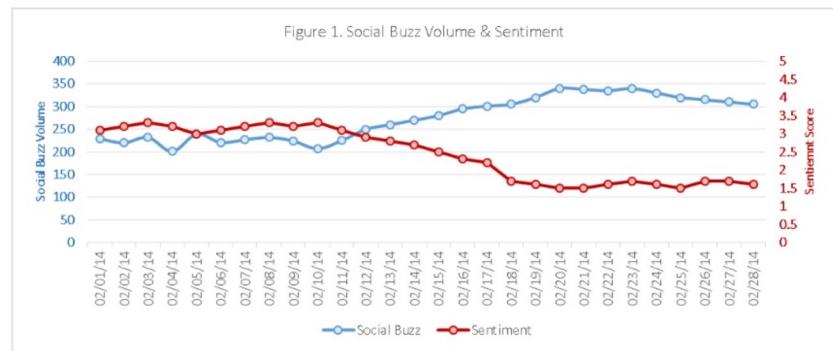


Formas Visuales

Añadir anotaciones



bad



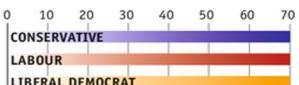
good

Formas Visuales

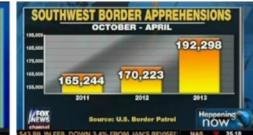
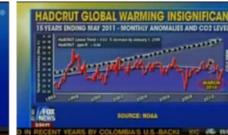
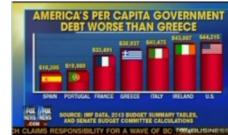
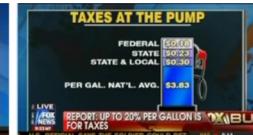
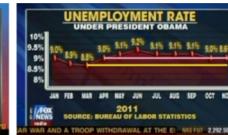
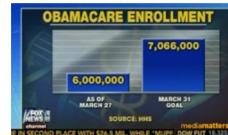
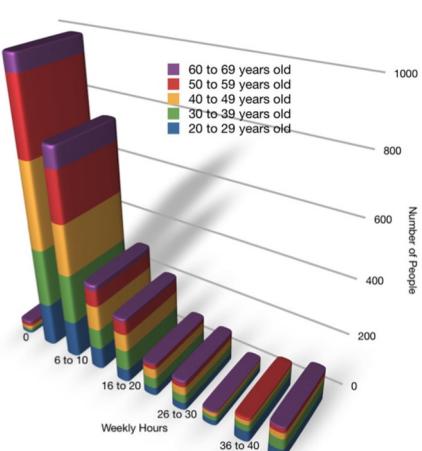
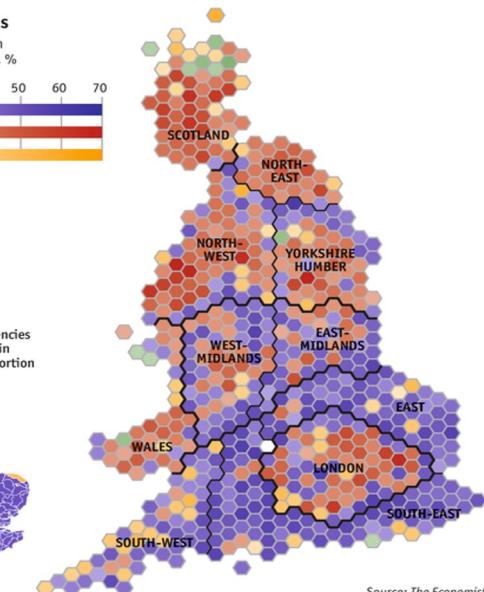
Keep it simple:

Britain's electoral maps

Equal-area constituencies with turnout for the winning party, %

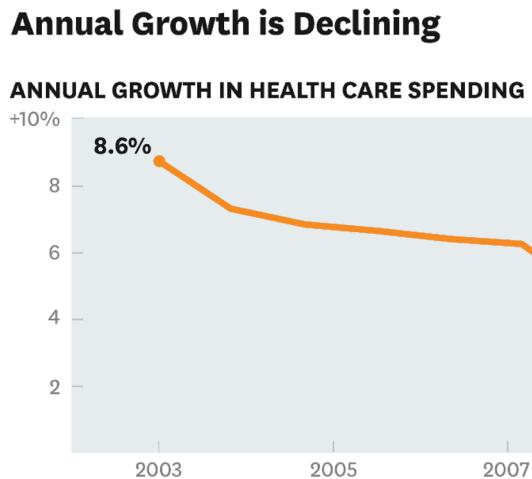


Source: Economist

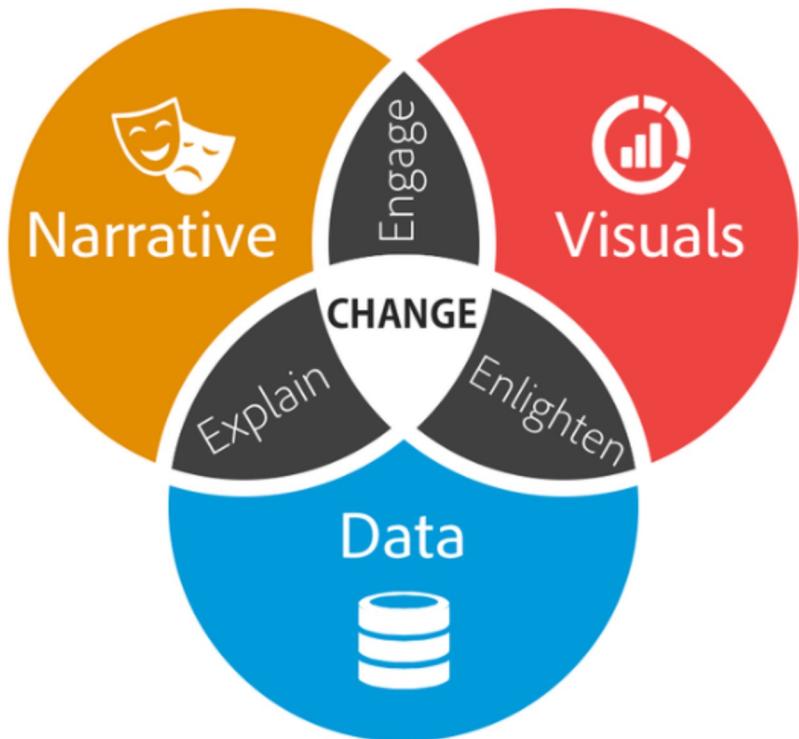


Formas Visuales

“Keep it simple”



Data Storytelling



Explicar.

Ayudar a la audiencia a interpretar y comprender sus ideas

Ilustrar.

Utilizar la visualización de datos para revelar las ideas ocultas en los datos

Enganchar.

Combinar la narrativa con lo visual para conectar con el público

Data Storytelling

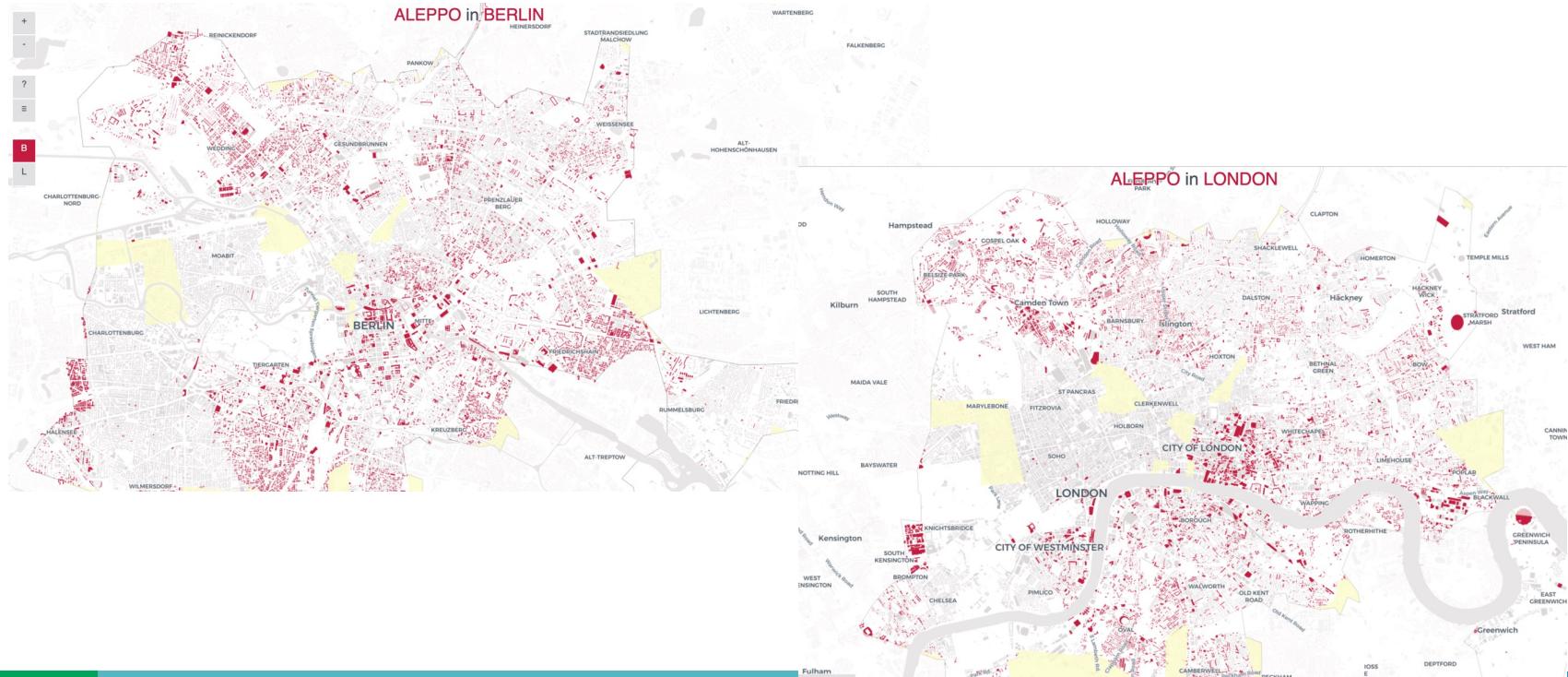
The best stats you've ever seen
Hans Rosling | TED2006



Making data mean more through
storytelling
Ben Wellington | TEDxBroadway2015



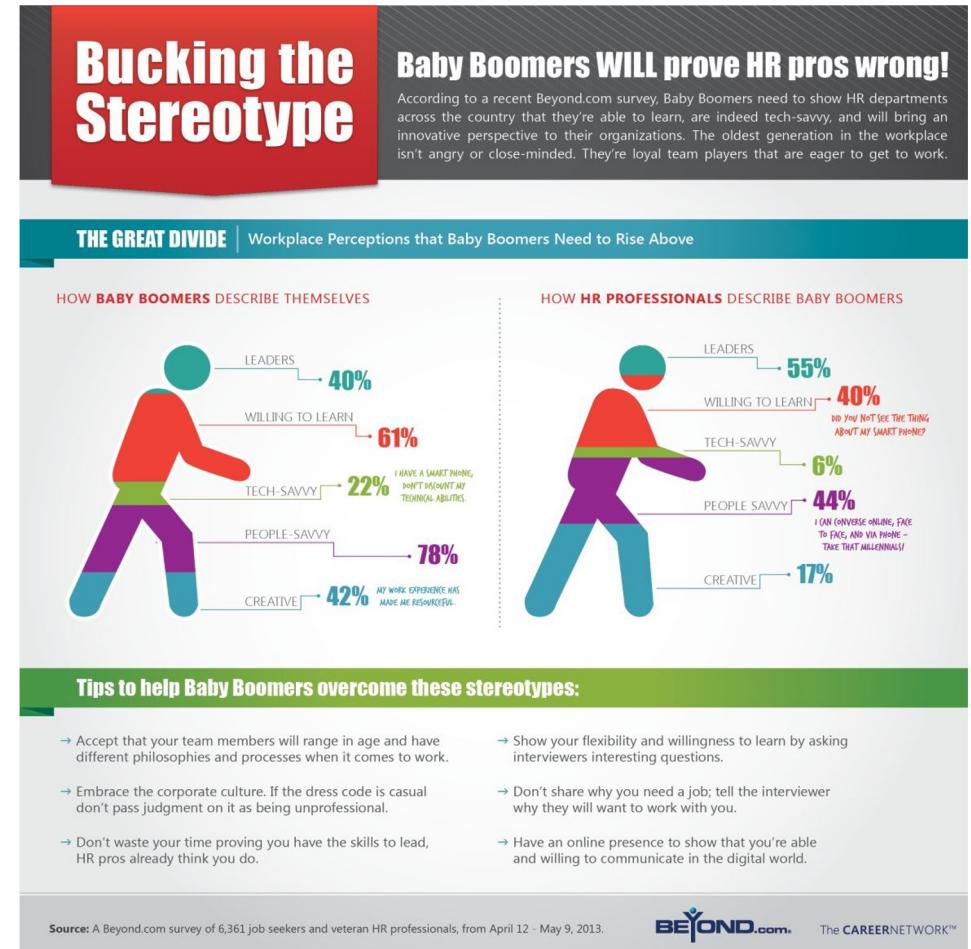
Data Storytelling



Baby Boomers visualization

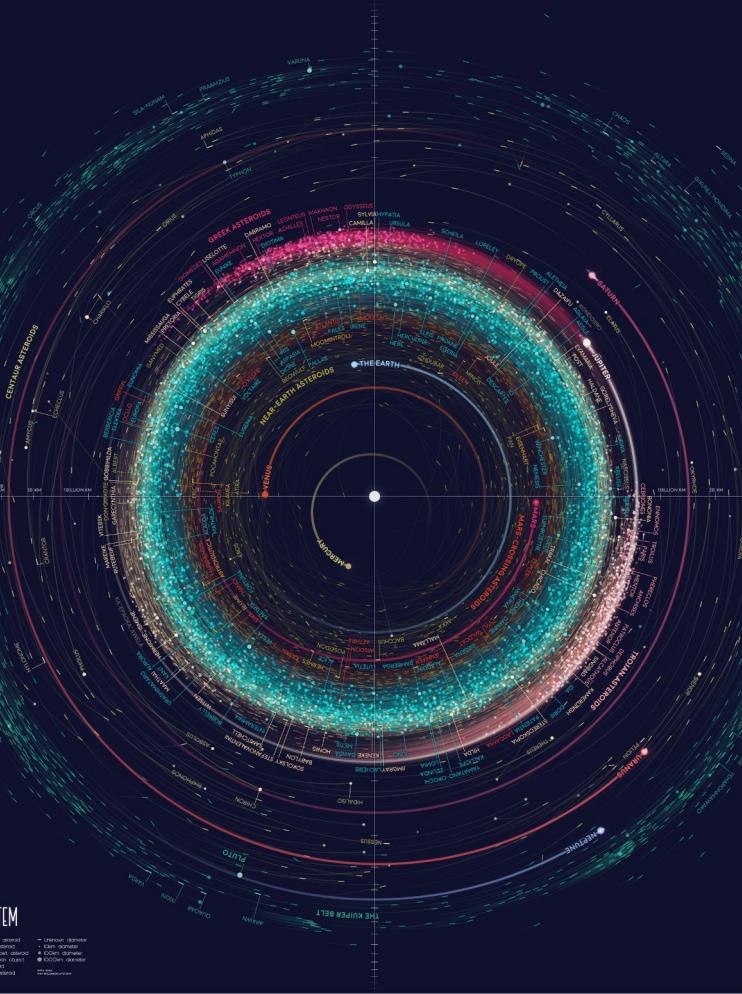
Tomar 5' para discutir con tu compañero

- Cual es el objetivo de esta infografía
- Que información se ha utilizado como imput
- ¿son intuitivas las visualizaciones?
- ¿Cómo cambiarías los dibujos?



IBM Cognos

Plataforma Analítica de descubrimiento de la información



Cognos Analytics: Un poco de historia

Impromptu,
PowerPlay &
ReportNet Cognos 8 Cognos 10 Cognos Analytics

Build on a proven platform

Dashboard

Reporting

Bursting & Scheduling

Search

Collaboration

Metadata Modeling

Content Administration

Office Integration

Alerts & Notification

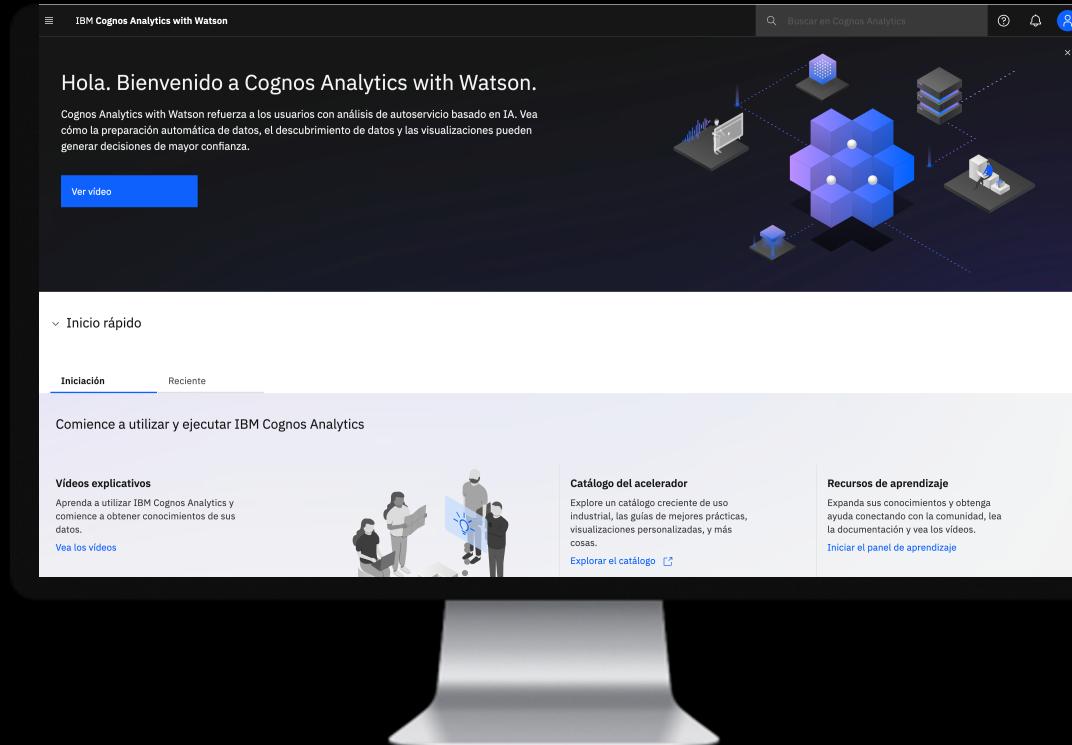
Governance and Security

Cognos Analytics: Functionalities



Cognos Analytics: Functionalities

- Web based
- Desktop and mobile
- Search makes it easy to find content
- capabilities depend on role
 - Manage data sources, users etc.
- Customize to suit your individual, dept. or business needs



Automated Data Preparation

Prepare

Natural language search

Built-in intelligence to understand your search terms and return a prioritized list of relevant data sources

Auto-joins

Start faster with suggested ways to blend and join data

In-tool data preparation

Saves time, effort & enhances accuracy
Not a desktop tool. No need for copy paste or extracts of your data



Data Exploration

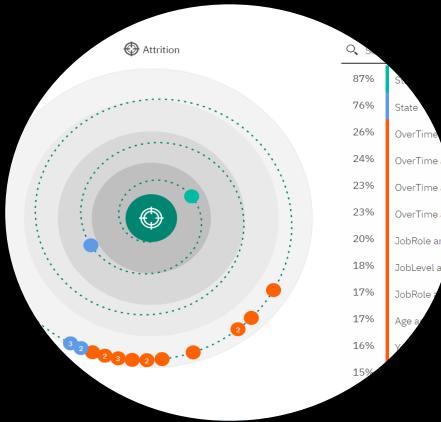
Analyze

AI Assistant

Ask questions and get answers, naturally

Advanced pattern detection

Unearth hidden insight other BI Tools would miss

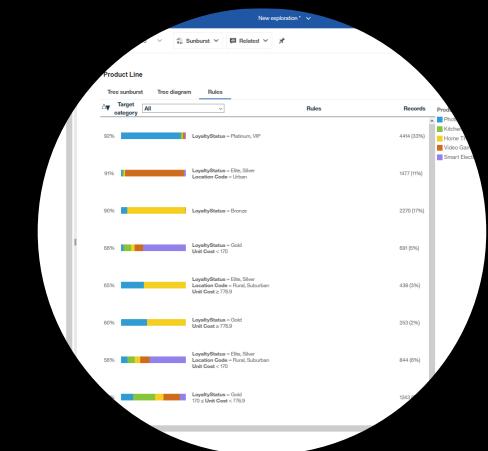


Predictive capabilities

Highlight relationship strengths & key drivers.

AI-detected

Makes sense of it faster with related insights



Times Series Forecasting

Managed Reporting

Create &
Share

Guided layouts empower all users
Simplifies creating pixel perfect content so
even novice users can be impactful quickly

Reuse existing components & styles
quickly assemble new content by re-using
components from other dashboards and
reports



Visualizations and Dashboards

Create &
Share

Automated visualizations

System recommends optimum way to visualize based on the selected data

Natural language generation

Ask questions in everyday language

Accurate storytelling

Simple creation of interactive narratives .
Connectivity to the underlying data ensures up-to-date results.

Collaborate through Slack

Push annotated visuals and links to where your users are

Deliver your results

Email directly to your user's inboxes



Going Beyond BI

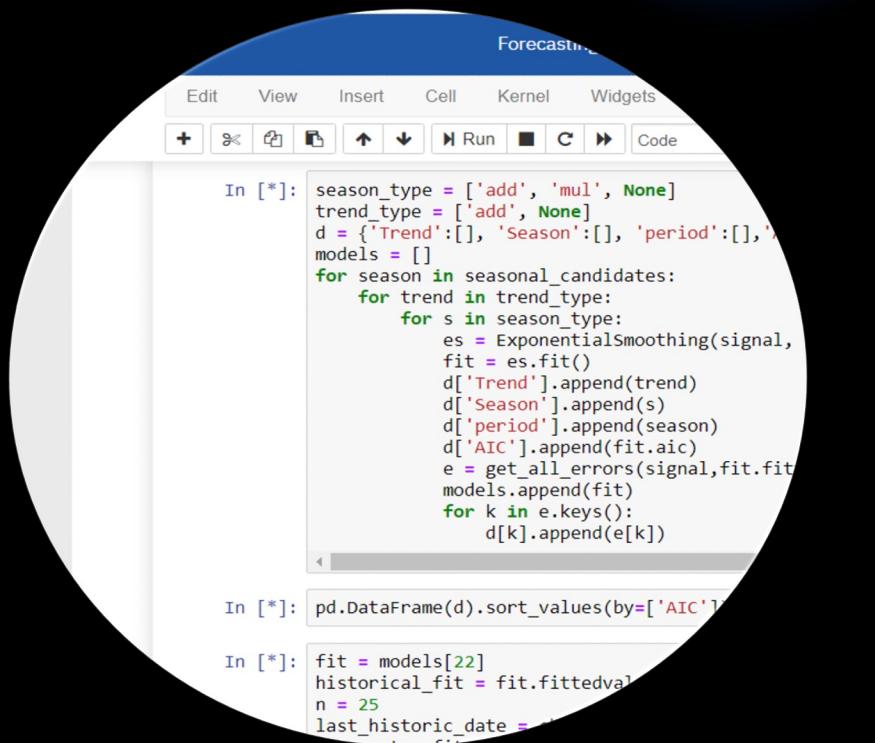
Infuse

Features in Cognos Analytics

Jupyter Notebooks & Python Support
Open Source Visualizations

Integrate with Other IBM Technology

IBM Planning Analytics
IBM Decision Optimization
Data Science w/ Watson Studio and Watson M/L
Watson Applications



The image shows a Jupyter Notebook interface with a Python script for time series forecasting. The code uses the ExponentialSmoothing model from the statsmodels library to fit trends and seasonal components, then selects the best model based on AIC.

```
season_type = ['add', 'mul', None]
trend_type = ['add', None]
d = {'Trend':[], 'Season':[], 'period':[], 'models':[]}
for season in seasonal_candidates:
    for trend in trend_type:
        for s in season_type:
            es = ExponentialSmoothing(signal, fit = es.fit())
            d['Trend'].append(trend)
            d['Season'].append(s)
            d['period'].append(season)
            d['AIC'].append(es.aic)
            e = get_all_errors(signal, es)
            models.append(es)
            for k in e.keys():
                d[k].append(e[k])

pd.DataFrame(d).sort_values(by=['AIC'])

fit = models[22]
historical_fit = fit.fittedvalues
n = 25
last_historic_date = historical_fit[-n]
```



IBM Cognos Analytics

Prepare

AI-assisted and automated to easily cleanse and combine your data in minutes

Analyze

Guided exploration infused with augmented intelligence and machine learning to uncover hidden patterns and insights

Create & Share

Interactive dashboards, storytelling and pixel-perfect reporting to collaborate and share across your organization

INFUSE

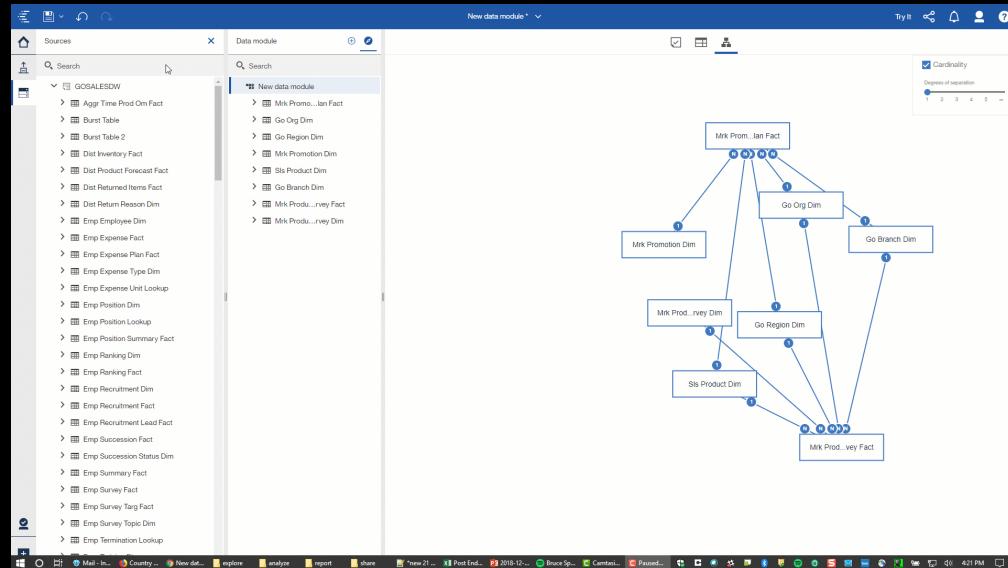
Technology integration that allows you to infuse analytics into your business process

Data Quality and Security

Security

Direct connection to your data helps ensure accuracy, timeliness and security of essential data

An **integrated solution** enables data preparation to be done within your data module, including defining data security, creating custom SQLs and accessing multigrain value.



Governance

Governance

Nearly
60 percent
of organizations
don't measure the
annual financial
cost of poor quality
data.¹

But they should:

Poor data quality is
also hitting
organizations where
it hurts—to the tune
of
\$15 M
as the average annual
financial cost in 2017.²

Data governance

- Availability and accuracy
- Data preparation
- Data quality, data integration, auditability, security

Analytics governance

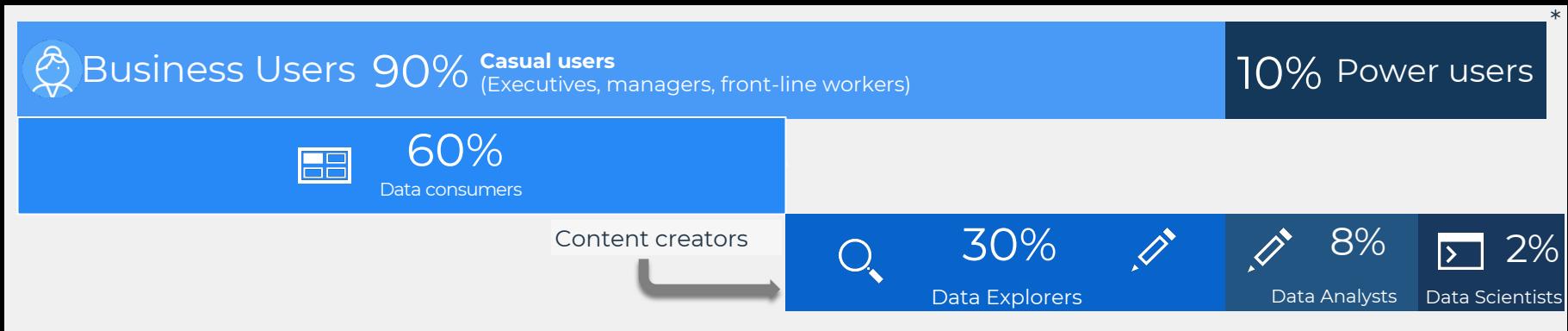
- Authorization
- Access control
- Auditing

Governance requires more than technology— it's also about people and process.

Governance requires that IT and the business agree on a set of business rules, policies and terms to guide governance.

^{1,2}Gartner, "Smarter with Gartner," "How to Stop Data Quality Undermining Your Business," <http://www.gartner.com/smarterwithgartner/how-to-stop-data-quality-undermining-your-business/>

Needs of a spectrum of users



Business users progress from consuming to augmenting and creating (become a data explorer)



Static Reports

Data
Consumer

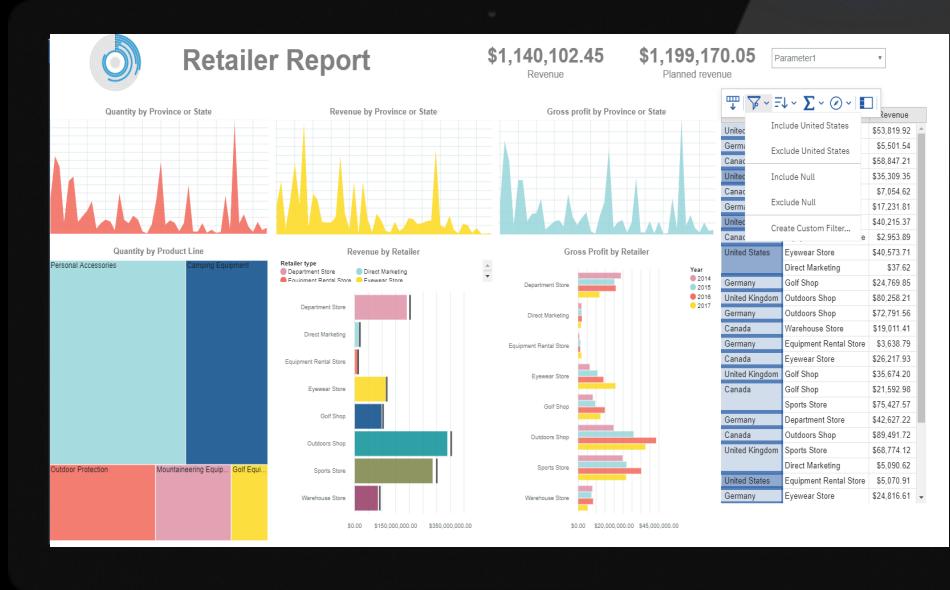
- Ideal for fixed format reports where users cannot alter the data or the format
- Presentation guides user understanding
- Usually professional authored pixel perfect reports
- Burst out to an unlimited number of consumers via email or saved output – captures a point in time view
- Can be embedded in URL or other apps or as reporting on demand
- Both online and offline consumption

BALANCE SHEET as at Dec 31, 2012				
	(with prior year comparative data)		2012	Variance
	2011		2012	Variance %
Assets (total)	9,459,048	10,717,093	▲ 1,258,045	● 13.30%
Current assets (total)	5,709,903	5,960,900	▲ 250,996	● 4.40%
Operating assets (total)	3,319,279	4,301,658	▲ 982,378	● 29.60%
Other assets (total)	429,865	454,536	▲ 24,671	● 5.74%
Liabilities (total)	-4,255,662	-3,856,126	▲ 399,536	■ -9.39%
Current liabilities (total)	-3,364,742	-3,059,376	▲ 305,366	■ -9.08%
Long-term and other liabilities (total)	-890,920	-796,749	▲ 94,171	■ -10.57%
Equity (total)	-5,203,386	-6,860,968	▼ -1,657,582	● 31.86%
Common stock	-1,871,226	-1,780,558	▲ 90,668	■ -4.85%
Other capital	-991,916	-615,202	▲ 376,714	■ -37.98%
Retained earnings - net	-2,327,374	-4,450,170	▼ -2,122,797	● 91.21%
Currency translation gain (or loss)	-12,870	-15,038	▼ -2,168	● 16.84%
Declared dividends	0	0	0	/0
Balance	0	0	0	

Notes: Balance sheet as of Dec 31, 2012, with prior year comparative data

Interactive Reports

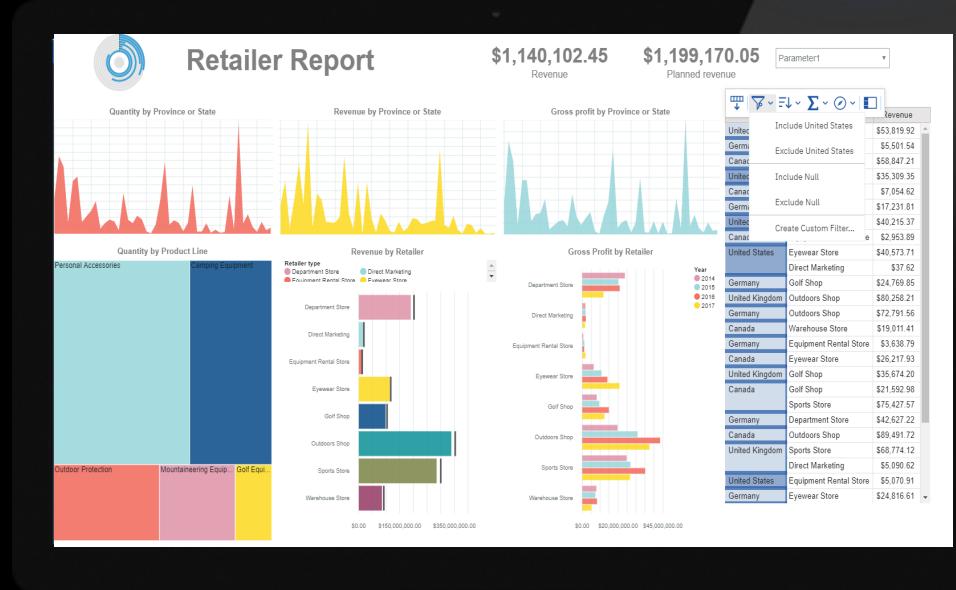
- Ideal for fixed format reports where users cannot alter the data or the format
- Presentation guides user understanding
- Usually professional authored pixel perfect reports
- Burst out to an unlimited number of consumers via email or saved output – captures a point in time view
- Can be embedded in URL or other apps or as reporting on demand
- Both online and offline consumption



Interactive Reports



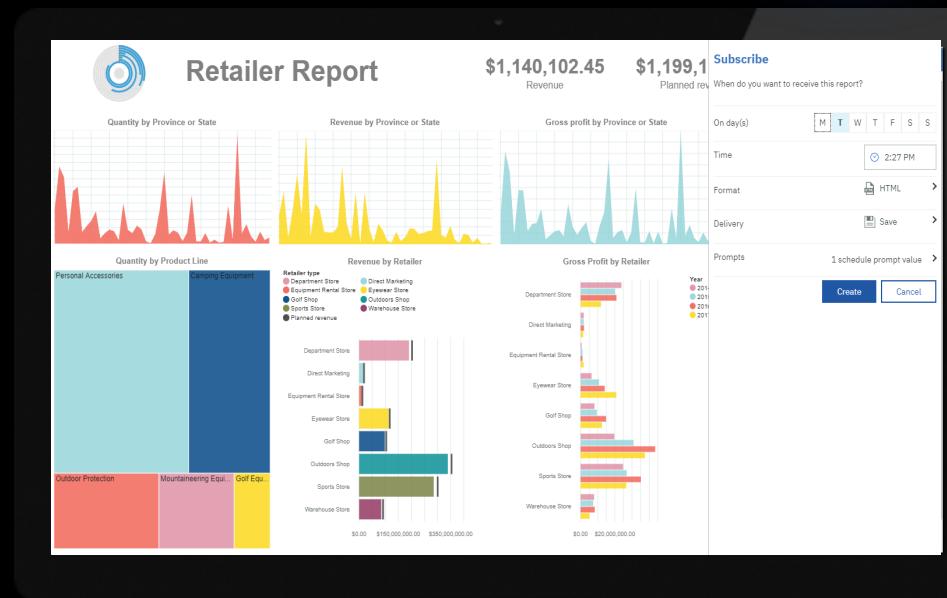
- Provides users with a starting point from which to explore
- Users work with authored and governed data only
- Similar capabilities to static reports, but built for full interactivity
- Wide range of prompts, both custom and global filters to slice and dice information





Personalized Reports

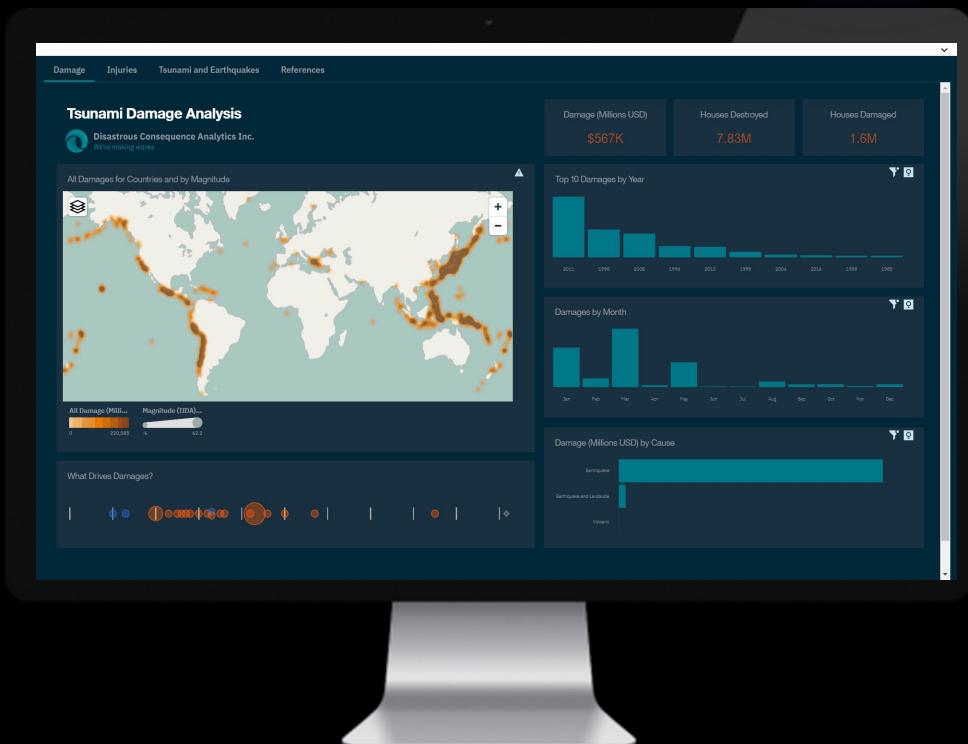
- Version of an interactive report made by me
- Two degrees of personalization:
 - Save your view – Apply filters to slice and dice information to suit your needs – include/exclude data, group, summarize, sort
 - Pick up the pencil and make edits such as adding additional calculations
- Subscribe to static, interactive or personalized reports at the frequency you want and in the format you want



Dashboards

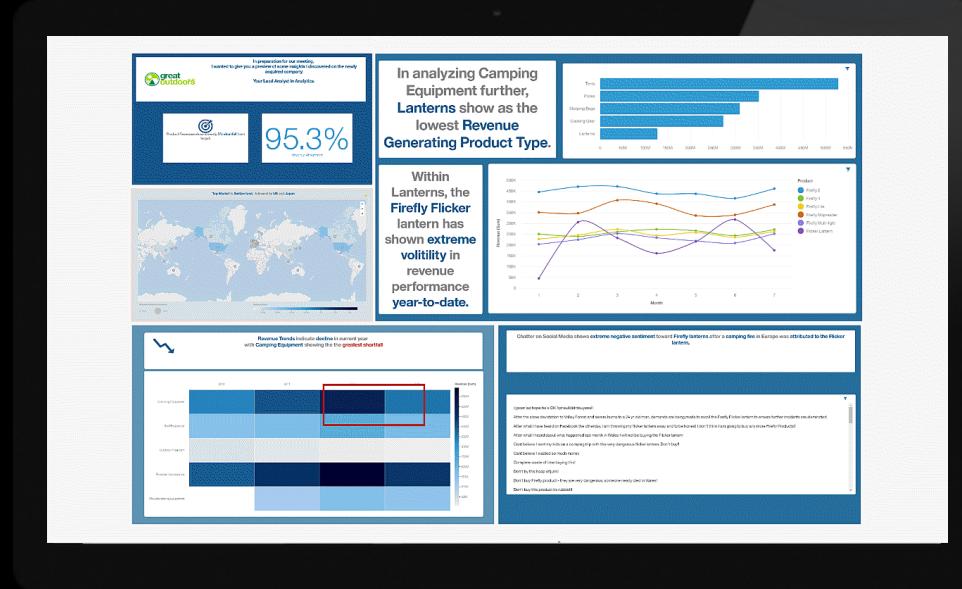
Data Explorer

- Create fully interactive dashboards
- Simple drag and drop interface
- Best visualizations automatically generated – and easily changed – eg. location data & maps
- World class maps and polygons in box
- Custom visualizations
- Answer questions, explore and communicate ideas/theories, prototype and validate information for sharing
- Useful features – templates, conditional formatting, top/bottom, pinning, refresh timer, data player, embedding



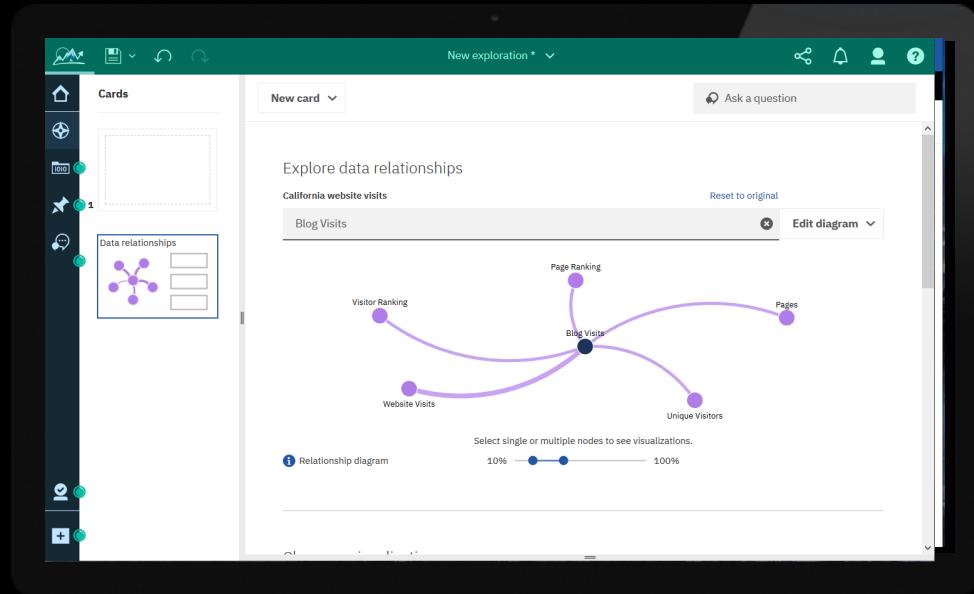
Storytelling

- Easy presentation of findings in a focused and interactive manner
- Created without leaving interface
- Simpler than a tabbed dashboard
- Choose from a selection of guided journey arcs / templates
- Drag and drop data for instant visualizations or select pinned ones from other dashboards / stories
- Useful features - instant infographics and text animations, smart naming in pins and timeline, animation options



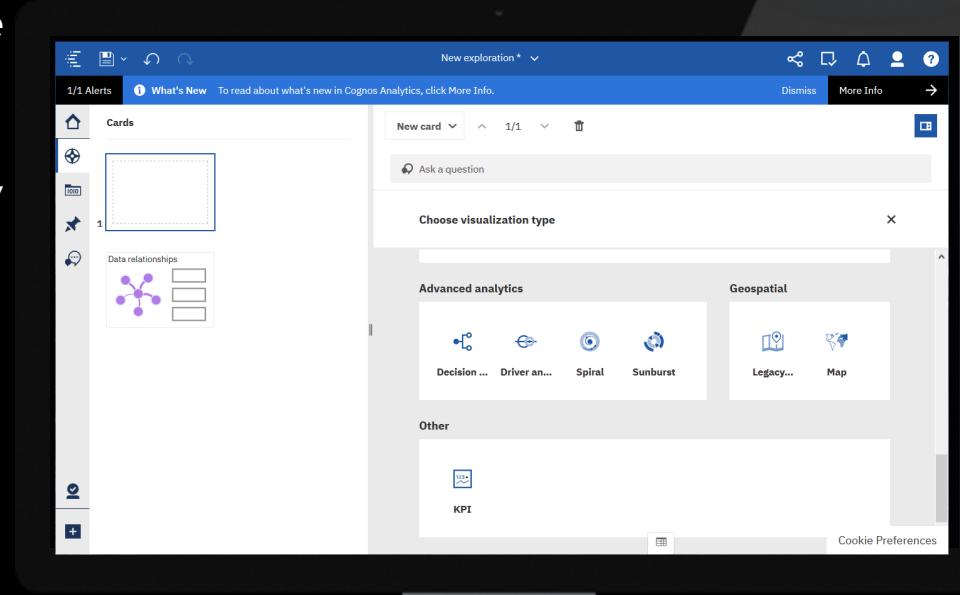
Exploration

- Explore your data
- Start from a column you want to explore more or let us tell you more about your data
- No formatting needed
- Created visualizations can then be used in dashboards and reporting



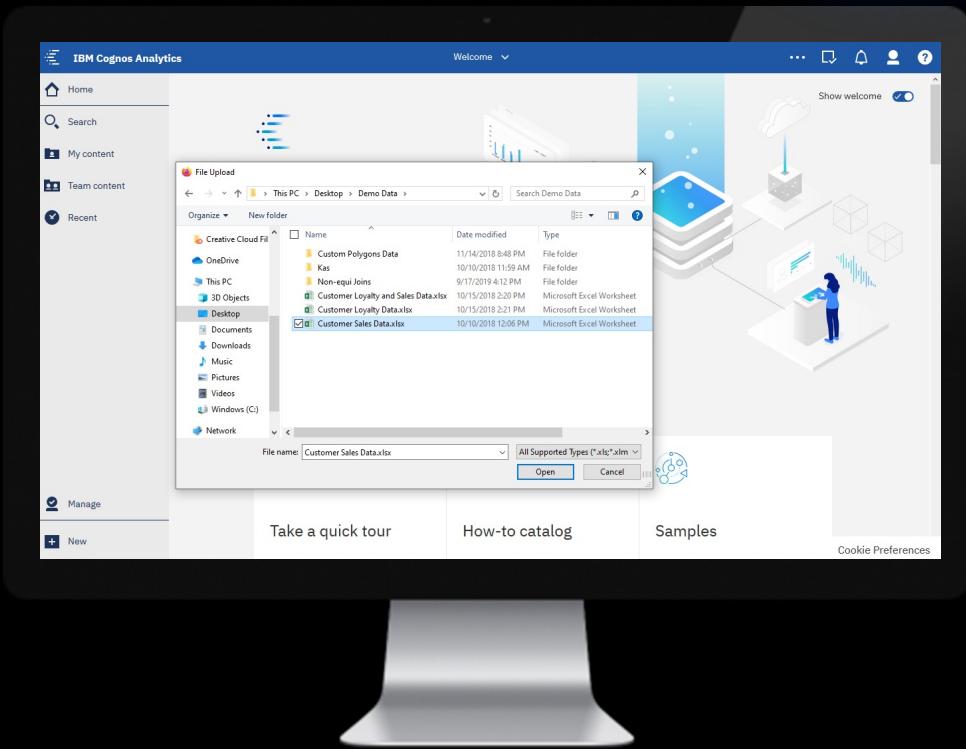
Advanced analytics

- Use one of our visualizations for more advanced analytics on your data
- The IBM patented Spiral visualization can tell you more about what the key drivers are for your data
- Other visualizations you can use for advanced analytics include a Decision tree, Driver Analysis and a Sunburst chart



Self Service Data Preparation – Uploaded files

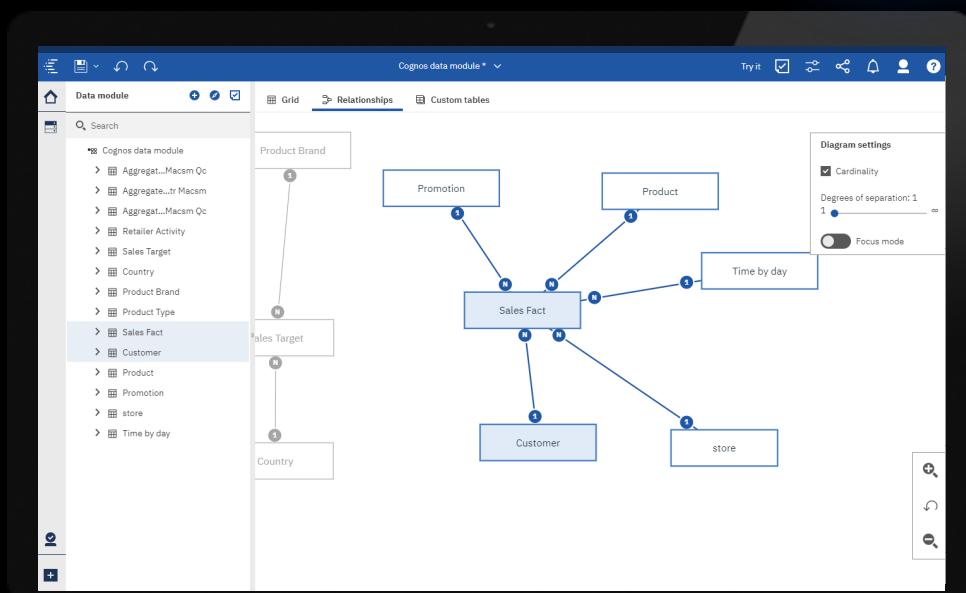
- Designed for the business user
- Accessible from main menu
- Data presented in a grid format
- Data cleansing actions available
- Ready for immediate use in dashboards, stories, explorations



Self-service Data Preparation – Build your own module



- Business users can easily join and model metadata with data modules
- Models can be proposed from keywords
- Drag & drop interaction of visual model
- Build from any combination of:
 - governed data sources directly (eg: databases)
 - governed pre-modeled data sources
 - uploaded files and other ungoverned sources
- Build on models from others and benefit from their updates or take your own path
- Ease of use features: cleansing, create calculations, relink to a new source, formatting options, enhanced diagram interactions, enhanced Expression Editon



Join a package and a spreadsheet View module references/links

Self-service Data Preparation

Data Views & Snapshots

Data Explorer

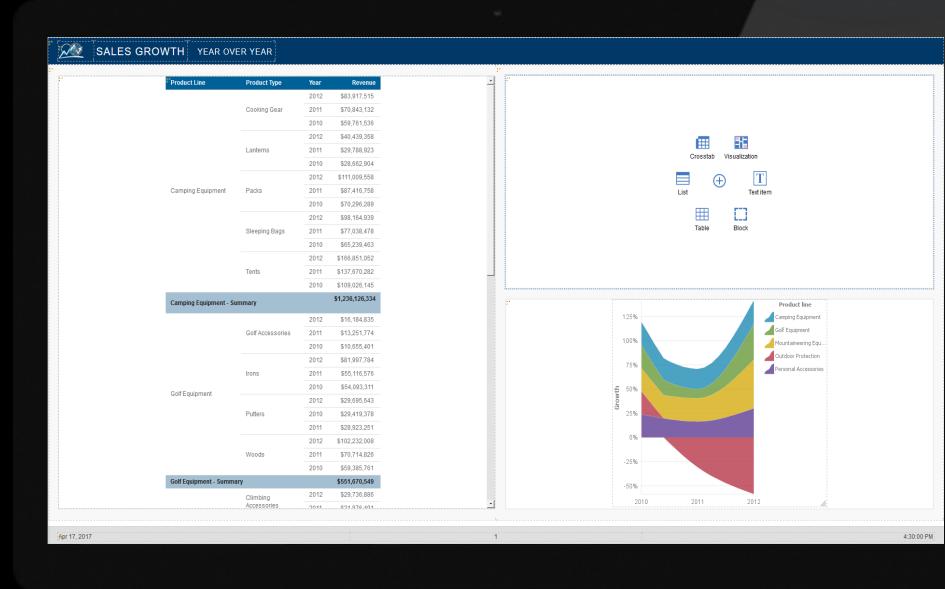
- Generates a performant rectangle of cached data, serving
 - Business users who want to work with a subset preview of a given source
 - IT who wants to reduce stress on a database
- Datasets can be a source for a data module
- Build dashboards and stories off a dataset or a data module

The screenshot shows the Cognos Data Module interface. On the left, there's a sidebar with a tree view of datasets: Cognos data module, Aggregat...Macsm Qc, Aggregate...tr Macsm, Aggregate...Macsm Qc (selected), Sales Target, Country, Product Brand, Product Type, Sales Fact, Customer (selected), Product, Promotion, store, and Time by day. The main area is a grid titled "Cognos data module *". The grid has columns: customer_id, account_num, lname, fname, mi, address1, and address2. The data consists of 16 rows, each containing a customer's ID, name, and address details. The interface includes standard navigation buttons (back, forward, search) and a toolbar at the top.

customer_id	account_num	lname	fname	mi	address1	address2
1	87462024688	Nowmer	Sheri	A.	2433 Bailey Road	N
2	87470586299	Wheely	Derrick	I.	2219 Dewing Avenue	N
3	87475757600	Derry	Jeanne	Null	7640 First Ave.	N
4	87500482201	Spence	Michael	J.	337 Tosca Way	N
5	87514054179	Gutierrez	Maya	Null	8668 Via Neruda	N
6	87517782449	Damstra	Robert	F.	1619 Stillman Court	N
7	87521172800	Kanagaki	Rebecca	Null	2860 D Mt. Hood Circle	N
8	87539744377	Brunner	Kim	H.	6064 Brodia Court	N
9	87544797658	Blumberg	Brenda	C.	7560 Trees Drive	N
10	87566712234	Stanz	Darren	M.	1019 Kenwal Rd.	N
11	87572821378	Murrain	Jonathan	V.	5423 Camby Rd.	N
12	87579237222	Greek	Jewel	C.	1792 Belmont Rd.	N
13	87587122917	Medina	Peggy	A.	3795 Keller Ridge	N
14	87592626810	Rutledge	Bryan	K.	3074 Ardith Drive	N
15	87597749829	Cavestany	Walter	G.	7987 Seawind Dr.	N
16	87603285908	Planck	Peggy	M.	4864 San Carlos	N

Ad hoc reports

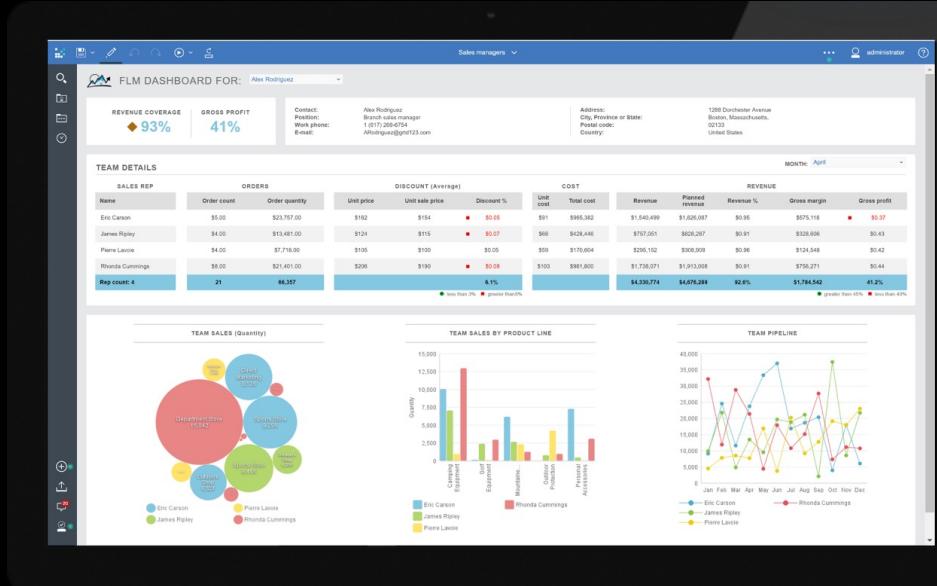
- Ad hoc reports can be built from the + or CREATE menu as a “report” or “dashboard” depending on user skill level
- Graphical UI and on demand menus for report authoring appear only when you need them
- User can prototype what they want and hand off to a power user to polish and operationalize report



Data Models and Professional Reports

Data Analysts

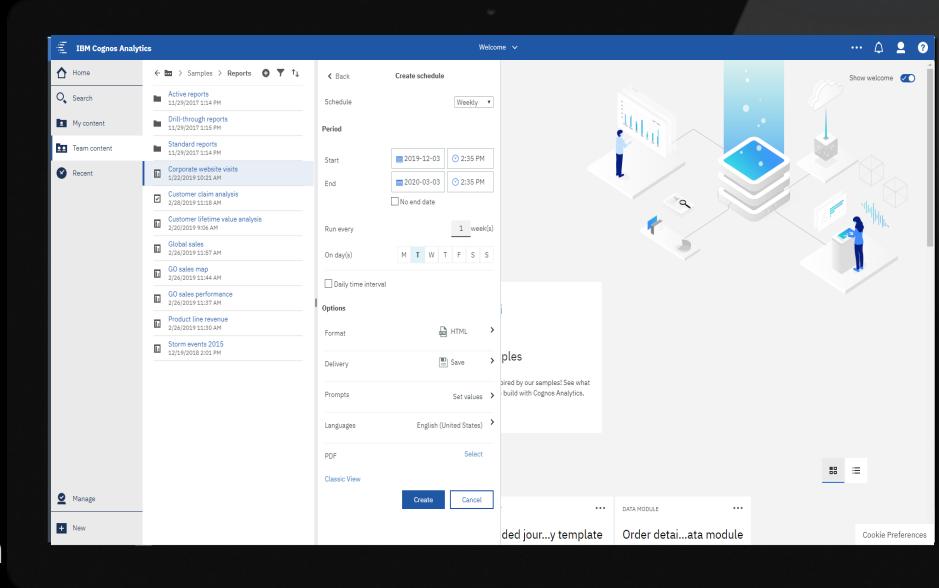
- Certain data must be tightly governed
- Data Modules lets IT or power users pre-model metadata with row level security
- Full range of bursting and scheduling options, alerting and notifications, formats options
- Generally power users or IT are the authors of official corporate reports that consumers use on a regular basis for decision making or that are provided to regulators or stakeholders



Scheduled Reports

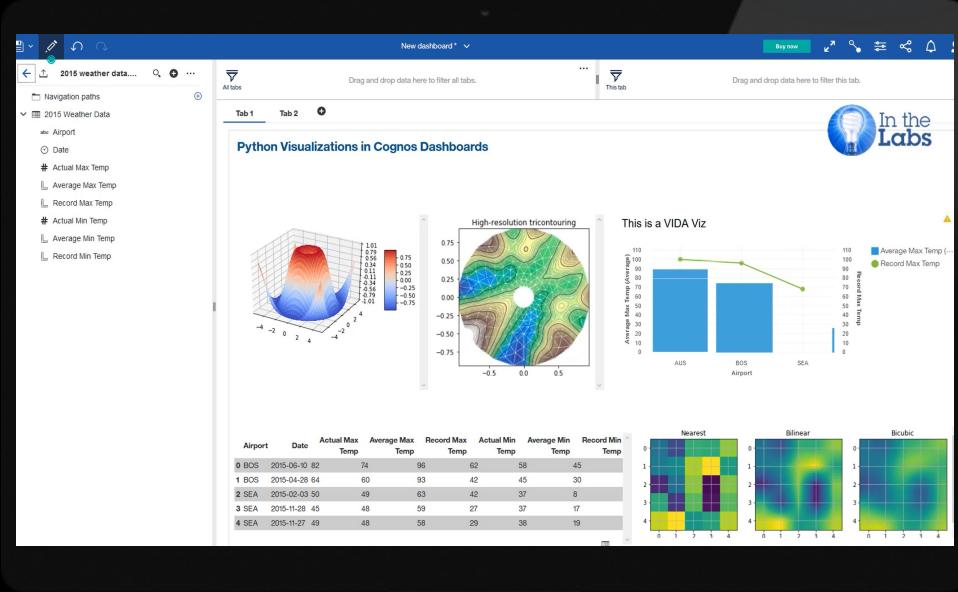
Data Analysts

- Full flexibility to burst reports to small groups or scale to thousands of users
- Scheduling options include
 - Date and time, recurring frequency
 - Format
 - Delivery options
 - Prompts
 - Language
- Multiple schedules inside of a job
- Enables automation of insights to run the business



Jupyter Notebooks

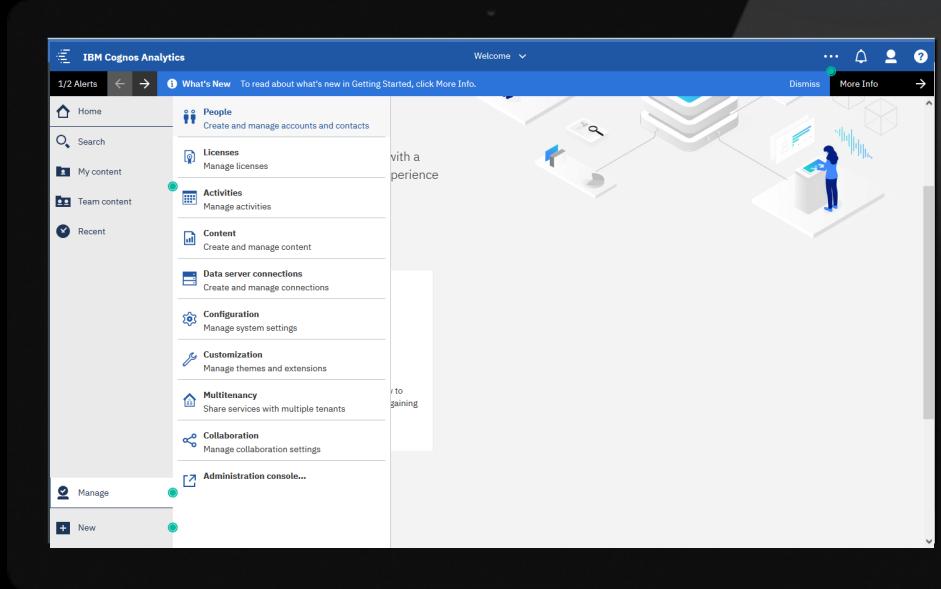
- Jupyter notebook support on Cognos Analytics is the bridge that connects business users to data analysts
- It gives data analysts easy access to a wide range of curated data and enables them to prepare the data in one unified environment
- Data scientists can create content (models, functions, visualizations) that business users can embed in their dashboards and reports
- Business users and data scientists can collaborate on the creation of assets, thereby shortening the time to results.



Managing your analytics system

Administrator

- Easily connect to a wide range of data sources – on cloud or on premises
- Assign user roles, grant permission / access to data sources and content
- Restrict access to content – everything has an access control list (ACL)
- Ability to audit who has access and when data and content were accessed
- Set authentication rules
- Advanced routing rules for uploaded files and data modules to manage system performance



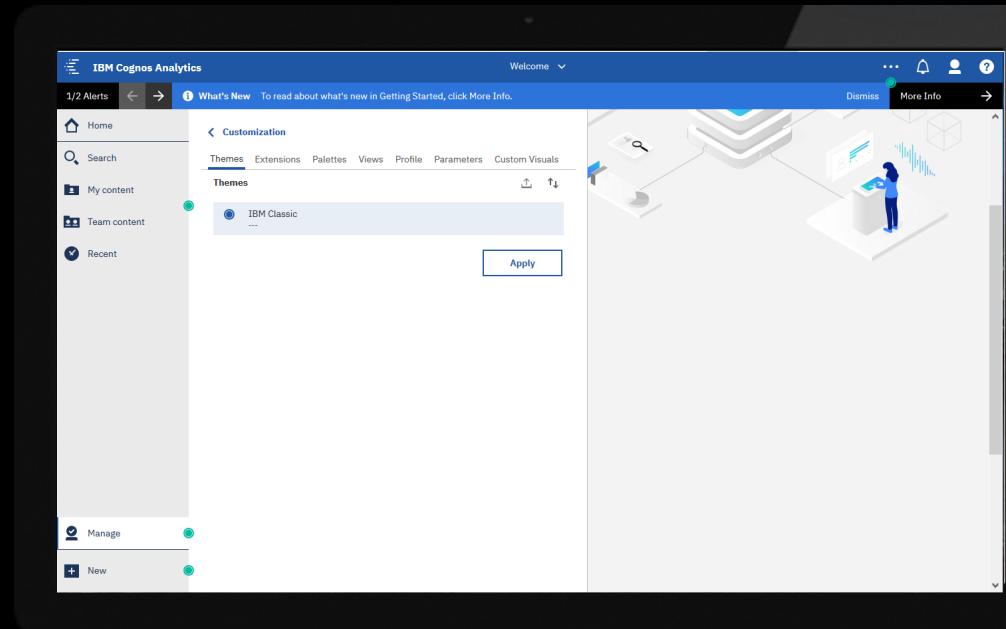
Make it your own

Administrator

Theming allows for custom sign-on pages, welcome pages, backgrounds, navigation list items and quick pick lists

Add extensions to the UI such as links to websites or key content

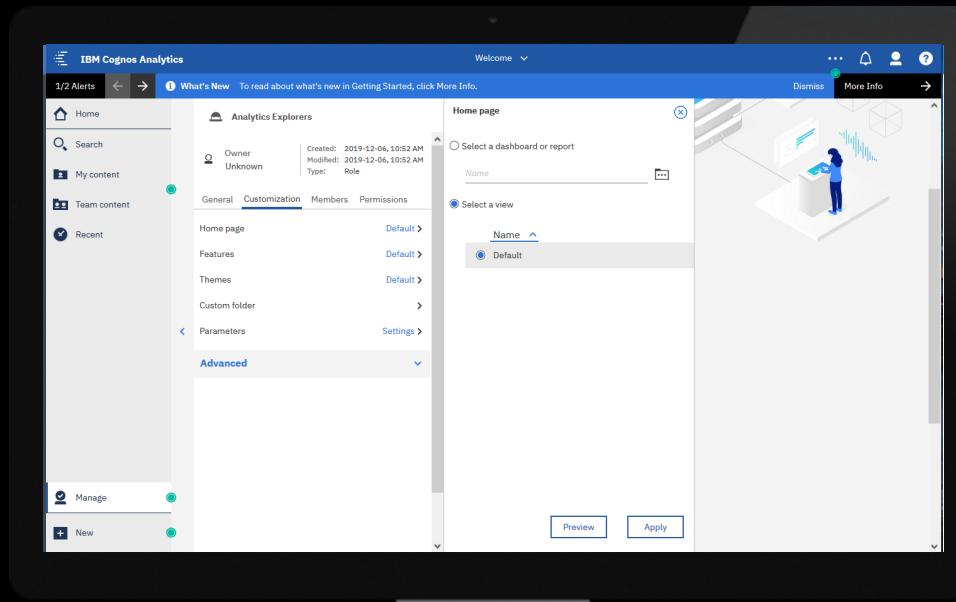
Custom Folders



Managing customization

Theme / brand the interface at the organization, group or role level
(Home page, Features, Theme)

- Embed/Share directly from report, saved output and dashboard



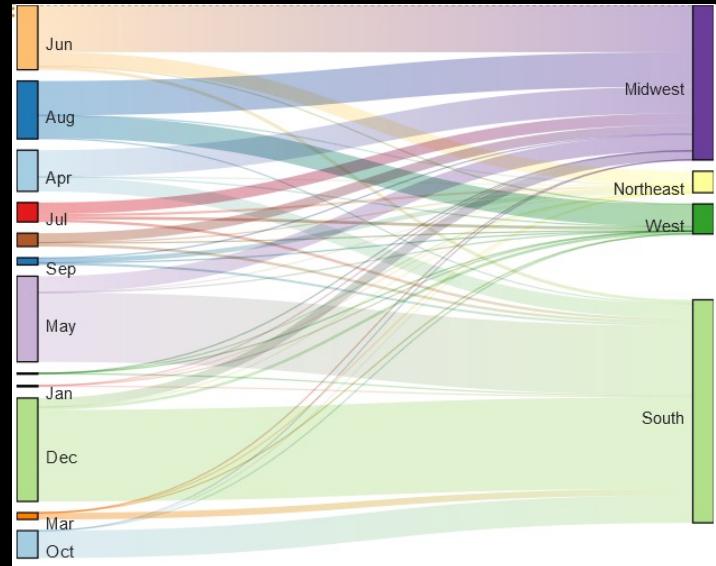
Custom Visualizations

Custom visualizations can be uploaded directly from Reporting and Dashboarding for reuse

Developers can preview and test custom visualizations live within Cognos Analytics before uploading

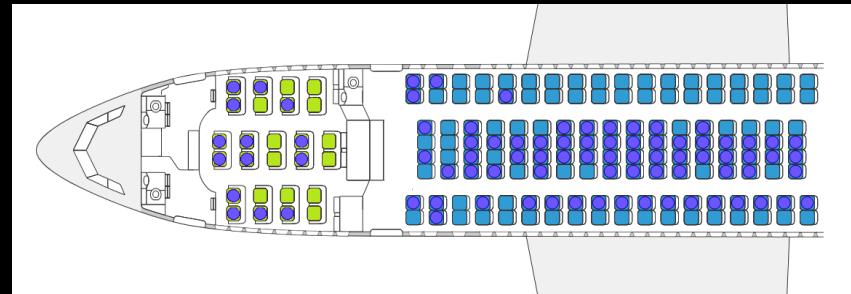
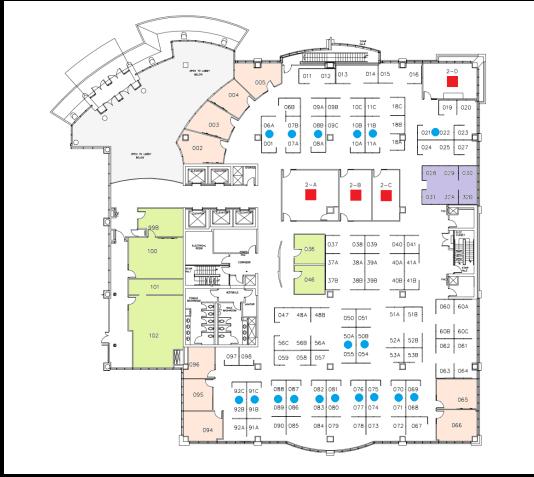
Additional properties can be included as part of the custom visualization

Administrators can set permission on custom visualizations for access control



Schematics

- Schematics are implemented in Cognos Analytics using tagged shapes/polygons in an SVG file.
- A diagram showing a collection of shapes used to represent a spatial relationship.
- Examples: Airplane seat maps, stadium maps, manufacture parts, floor plans.



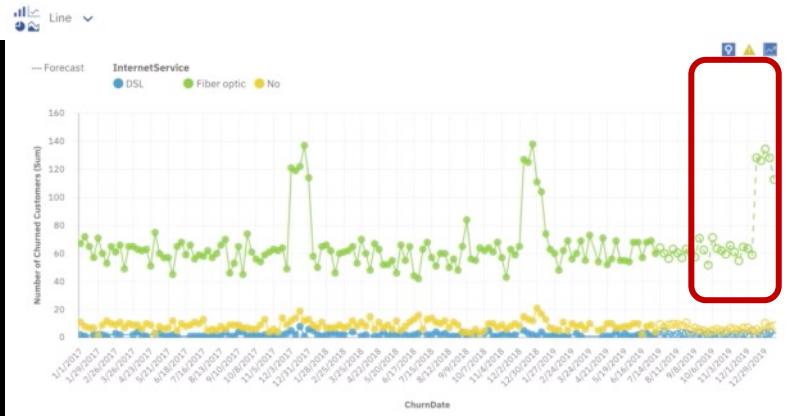
Time Series Forecasting

Automated forecasting for line and columns charts

Optimized to be 10-20x faster than R or Python

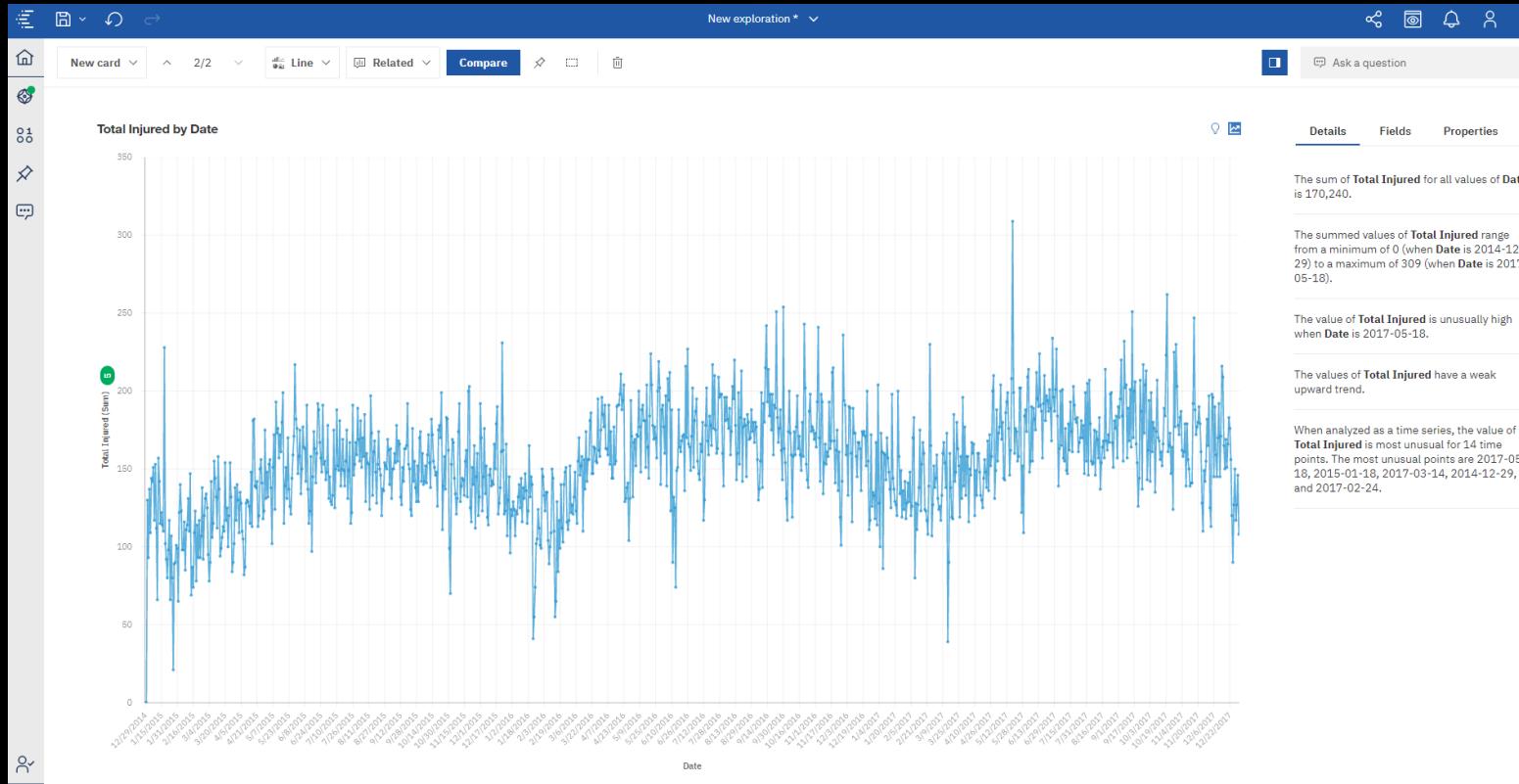
Supports multiple categories

Far superior to competitors' forecasting solution (PowerBI, etc.)



Time Series Forecasting

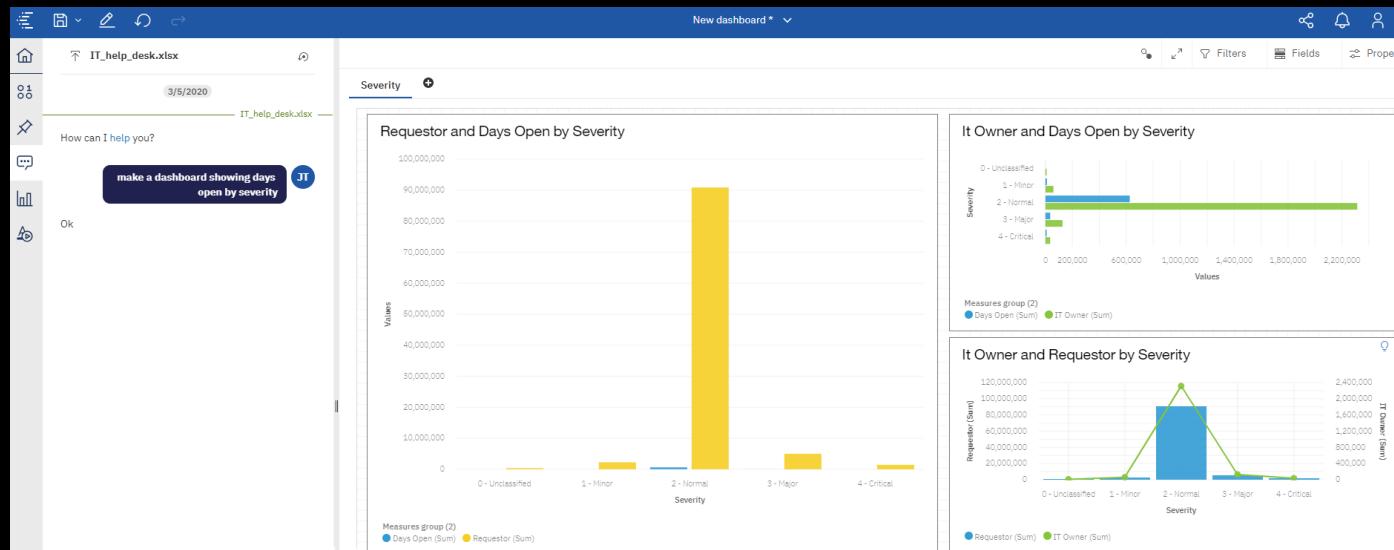
The Details tab of a visualization in Explore now displays time-series insights



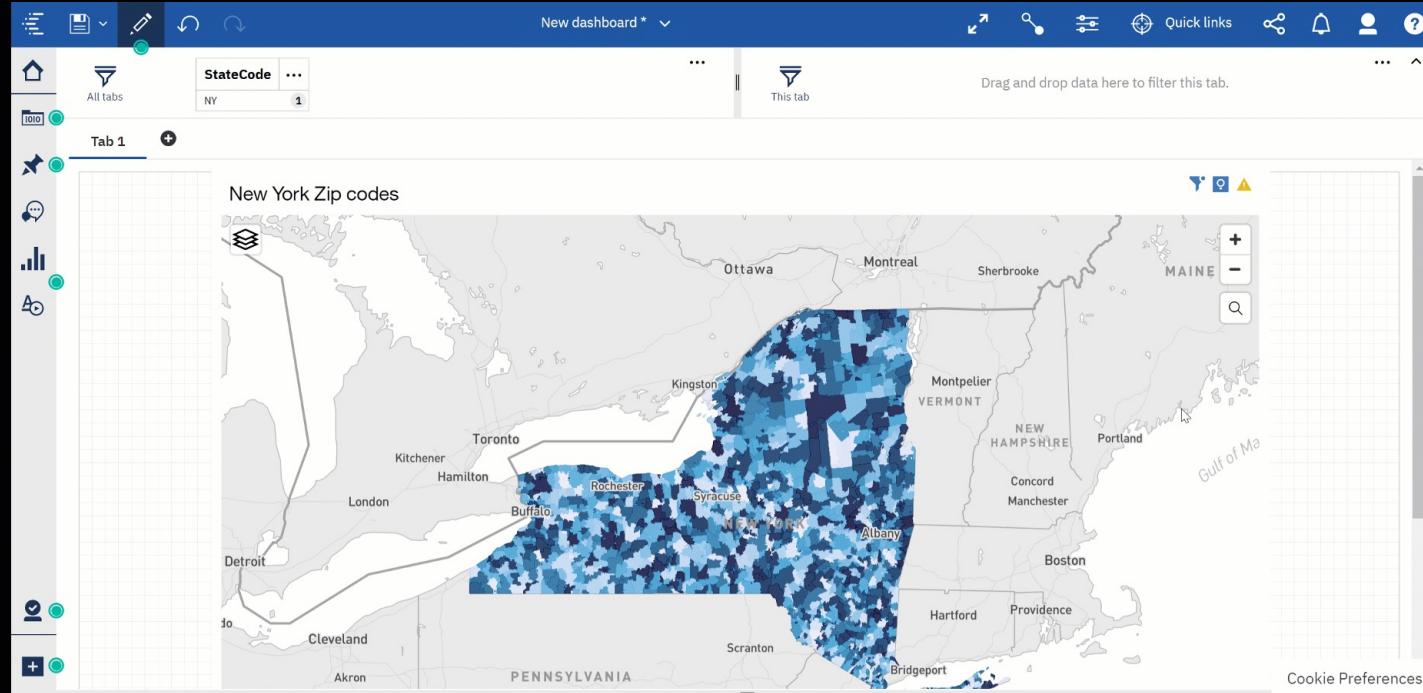
Guided dashboard creation

From the AI Assistant, you can now generate a dashboard based on specified fields of interest. For example:

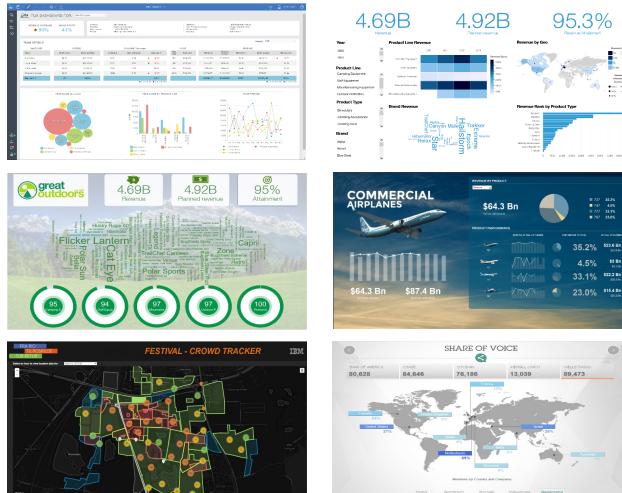
- create dashboard for profit in 2019
- generate dashboard for top 10 products by profit
- create dashboard for products by profit in Florida



Maps



¿Qué le pedimos al BI en 2022?



AUTOSERVICIO

Uso fácil y guiado
Conversar con los datos
en lenguaje natural

GOBIERNO

Capacidades de Gobierno y
seguridad necesarias en un
entorno empresarial

IA - ML

Explora tus datos y descubre
patrones ocultos a través de
la inteligencia aumentada.

WHAT IF

Simulación y
escenarios para
conocer el impacto
de las decisiones



Pero las barreras
aún existen.



Datos incorrectos



Complejos set de datos que
hay que enlazar



Expectativas sobre
visualizaciones atractivas