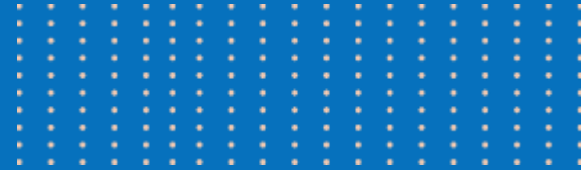PREMIER AI PLATFORM

Digital Transformation of Integrated Planning & Operations

o9 Platform Technology & Architecture

o9

Digital Transformation Platform
for Integrated Planning & Operations

Key Differentiators

1 **One Platform**
No separate modules to purchase, implement and integrate

2 **Cloud / SaaS**
Zero cost software upgrades, Zero additional cost of HW/Infra resources

3 **Enterprise Knowledge Graph**
Represent entire enterprise model as one connected network

4 **Next Gen AI/ML, NLP, Mobile**
AI-Powered Digital Transformation Platform for Integrated Planning & Operations

5 **Open Architecture**
Extensible data model and UI
Ability to leverage best in class R and Python libraries

Current Systems Landscape

Disparate Siloed modules (inc. same vendor)

01 Many disparate Modules, often acquired by Vendor via company acquisitions

02 Data Integration challenges between modules

03 Interoperability challenges (Module1 is being sunset, but new release of Module 1 doesn't work well with Module 2)

04 Increased Cost of Ownership

05 Difficulty in upgrades

06 Difficulty in rolling out innovations
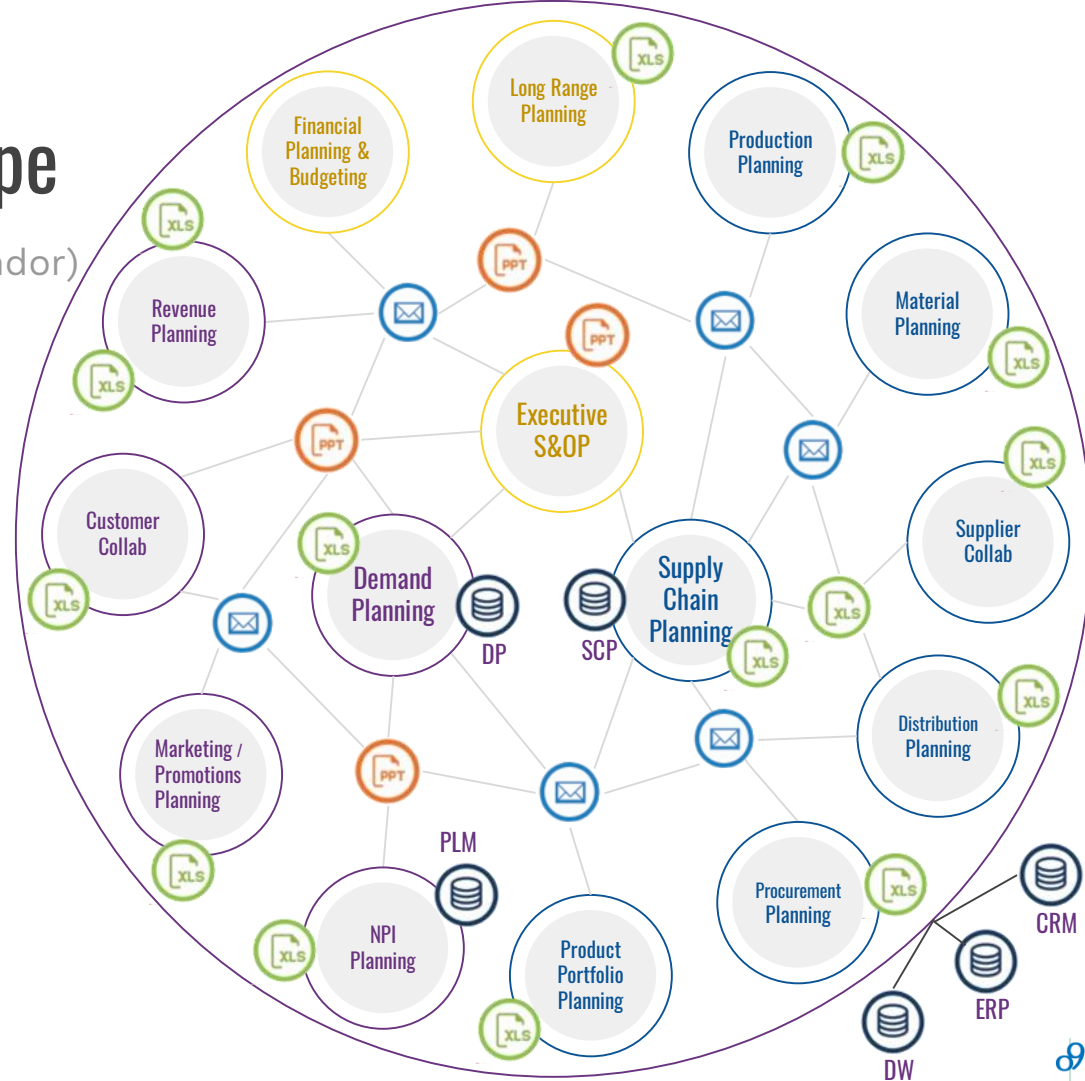
Natively Cloud / SaaS Platform

Disparate Siloed modules (inc. same vendor)

Cloud Benefits

01 No additional hardware cost

02 No inhouse IT resource required for infrastructure maintenance

03 Single codebase (all customers benefit from same fix / enhancement)

SaaS (Software as a Service) Benefits

01 Zero upgrade costs

02 All Releases QA certified by o9 on Customer dataset

03 Backward Compatible

What is Next Gen in Enterprise Software?

Digital Capabilities	New Age Digital Company Example
Fingertip visibility to all information across the world	Google Search
Real-Time Collaboration	Facebook, Twitter
Real-Time Visibility & Prescriptive Systems	Maps
Learning Systems	Amazon, Netflix
Real-Time Demand-Supply Match, Dynamic Pricing	Uber, AirBnb
Digital Assistants	Siri, Cortana, Alexa

Google Search
Facebook, Twitter
Maps
Uber, AirBnB
Amazon, Netflix
Siri, Cortana, Alexa
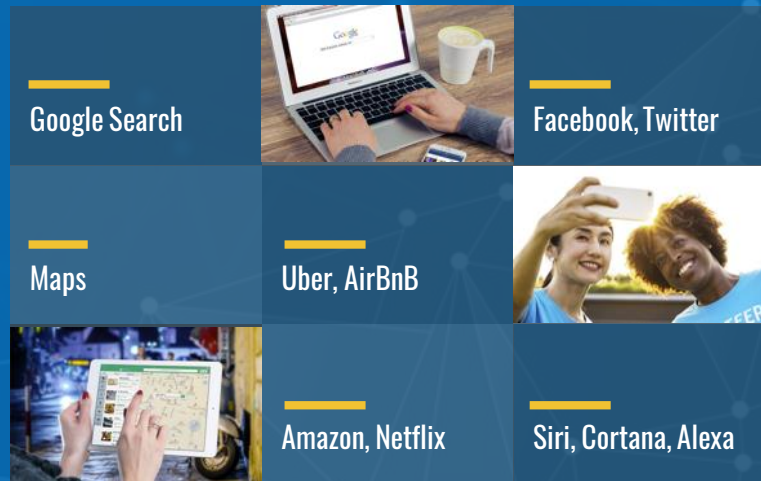
Google Maps

Amazing technology prescribing actions proactively based on forward visibility and constraints

What is the architecture behind this, and how does it apply to o9's architecture for integrated planning & operations?
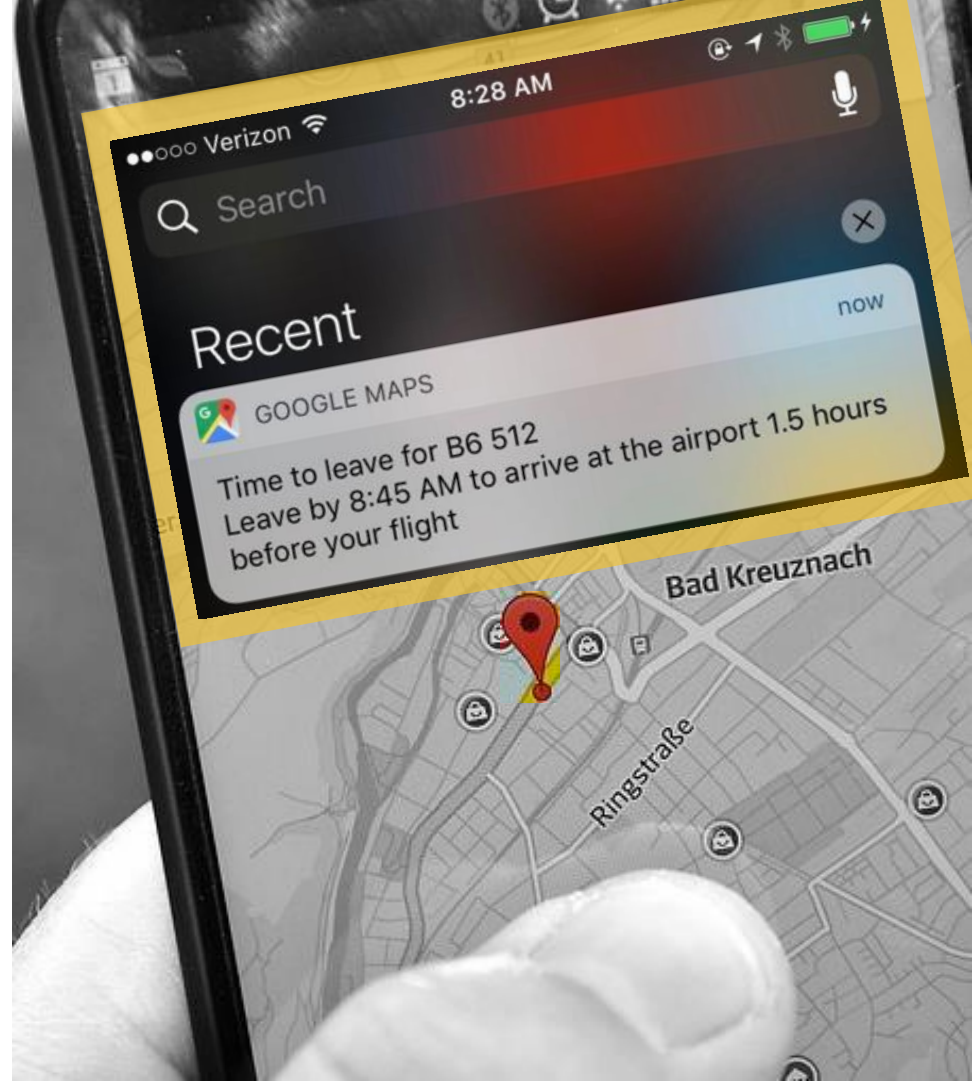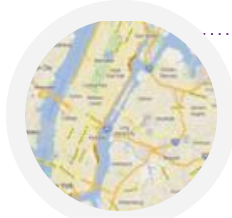
3 Key Capabilities Powering the Maps Use Case

3 Digital Assistants
"Predictive & Prescriptive Insights"

⚠ Predictive Alerts

Prescriptive Actions

1 AI-Powered Knowledge Model
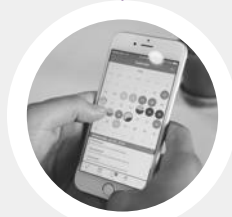"The Brain"

Network Master Data

Algorithms

Big Data Store

2 Real-Time Sensors
"See Further & Deeper Earlier"

Location Tracking

Calendars

Flight Status

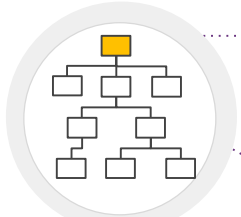# 3 Key Capabilities Powering Integrated Planning & Digital Operations

3 Digital Experience
"Excel, HTML5, Mobile"

1 AI-Powered Knowledge Model
"The Brain"

Flexible Enterprise Master Data Management

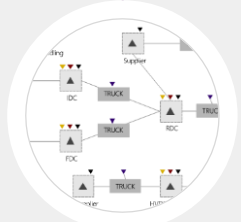Auxiliary Big Data Storage

APACHE hadoop
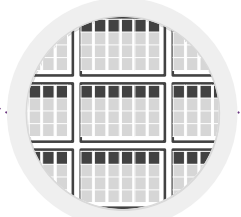
Fast In-memory Storage Engine

2 Intelligent Algorithms
"See Further & Deeper Earlier"

Supply Chain Solver

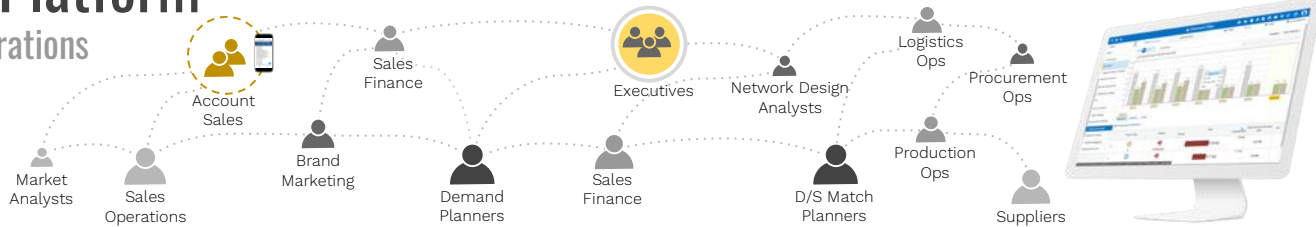Rules Engine

$$\sum_{i} \sum_{j \in C_{d_{i}}, d_{i}(Dealers)}$$
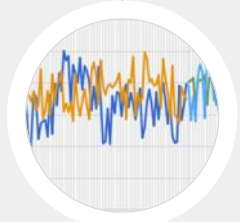
Algorithms: Stats, AI/ML Packages

Digital Transformation Platform
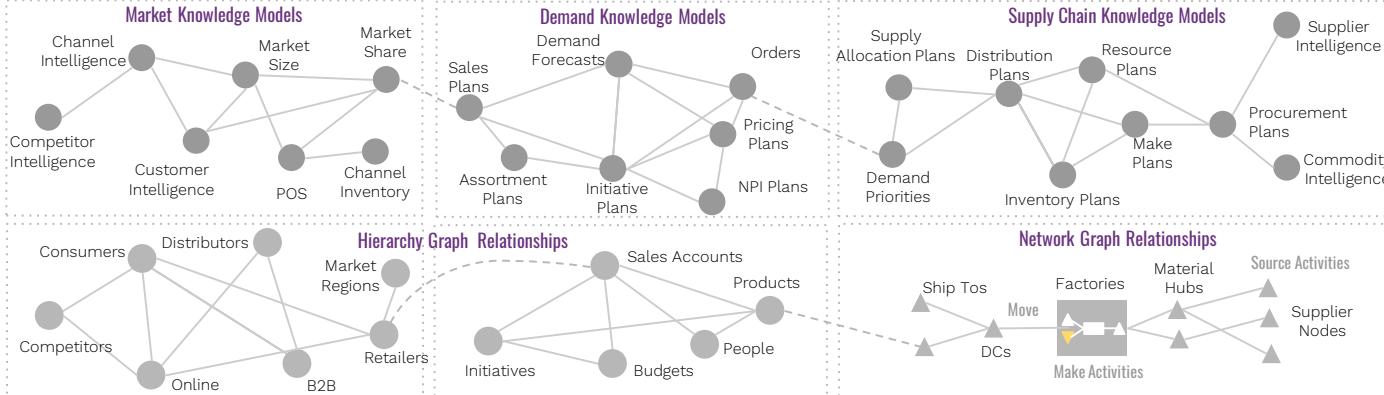## for Integrated Planning & Business Operations

03 Integrated Planning & Operations
Digital Assistants

10x Agility
Autonomous Planning
10x Productivity, Expertise
Digital Assistants for Key Roles
Enterprise Grade Siri / Alexa

Account Sales · Sales Finance · Executives · Network Design Analysts · Logistics Ops · Procurement Ops
Market Analysts · Sales Operations · Brand Marketing · Demand Planners · Sales Finance · D/S Match Planners · Production Ops · Suppliers

DEMAND SENSING	REVENUE PLANNING			DEMAND PLANNING	LONG RANGE PLANNING	ANNUAL OPERATING PLAN	SUPPLY CHAIN ANALYTICS	DEMAND / SUPPLY MATCH	+
	ACCOUNT PLANNING	INITIATIVE MANAGEMENT	NPI		SALES & OPERATIONS PLANNING		LOGISTICS	PROCUREMENT	SUPPLIER COLLABORATION	
INTEGRATED DEMAND MANAGEMENT				INTEGRATED BUSINESS PLANNING			INTEGRATED SUPPLY MANAGEMENT		

01 AI-Powered Enterprise Knowledge Graph

Big Data Store

Graph Data Model

Intelligent Algorithms
- ❏ M/L Analytics
- ❏ D/S Match Algorithms
- ❏ Aggregation & Disaggregation
- ❏ Bi-Directional Propagation
- ❏ Scenario Planning
- ❏ Post Game Analysis

Market Knowledge Models
Channel Intelligence · Market Size · Market Share · Competitor Intelligence · Customer Intelligence · POS · Channel Inventory

Demand Knowledge Models
Sales Plans · Demand Forecasts · Orders · Pricing Plans · Assortment Plans · Initiative Plans · NPI Plans

Supply Chain Knowledge Models
Supply Allocation Plans · Distribution Plans · Resource Plans · Supplier Intelligence · Demand Priorities · Make Plans · Procurement Plans · Inventory Plans · Commodity Intelligence

Hierarchy Graph Relationships
Consumers · Distributors · Market Regions · Competitors · Online · B2B · Retailers · Sales Accounts · Products · Initiatives · Budgets · People

Network Graph Relationships
Ship Tos · Move · Factories · Material Hubs · Source Activities · DCs · Supplier Nodes · Make Activities

02 Data Sensors

Enterprise & Market Data
Structured & Unstructured Data
Real Time & Batch Data

Web Scraping
Websites · Social Media

Natural Language and Image Processing
Email

Connected Excel
Excel

IOT / Edge APIs
Sensors · IOT

Realtime & Batch APIs
DW · ERP · CRM · PLM

Leaders across industries are using o9's platform for digital transformation of integrated planning & operations

Transformational Architecture
for Planning & Digital Operations

o9 Platform - Key Elements

Intelligent Analytics, Planning, Collaboration

- ❑ R-analytics
- ❑ Scenario Planning
- ❑ Plan versions
- ❑ Plan Comparison
- ❑ Demand/Supply match solvers
- ❑ Problem Root Cause Analysis
- ❑ Playbooks – Recommendations
- ❑ Initiative Management
- ❑ Assumption Management
- ❑ Context aware collaboration on every object
- ❑ Task management

GraphCube modeling

- ❑ Nodes, hierarchies, network relations, atomic models – superior to OLAP and RDBMS
- ❑ Business rules language (IBPL)
- ❑ Easy extensibility

Data & Knowledge Management

- ❑ Synchronized to Systems of Record
- ❑ System of record capability for orphan data
- ❑ Planning policies and other master data
- ❑ Unstructured data, tribal data
- ❑ Integration – Real time to batch, push/pull

User Experience - Systems of Engagement

- ❑ Connected Excel, Integrated Email
- ❑ HTML5, Mobile
- ❑ Smart NLP Search
- ❑ Management Digests
- ❑ ODBC connectivity – Power BI, Tableau

Reference Models

- ❑ Reference models from Industry experience
- ❑ Easy extensibility/configuration for customer specific variations
- ❑ Self-service for IT/Business users

In-memory Fast Computing Server

- ❑ High Performance, Compressed Columnar Storage
- ❑ B-Tree for efficient storage
- ❑ Smart partitioning for performance

o9 Server-Side Architecture

REST API

In-memory columnar + LSM / Btree storage engine

GraphCube Storage Engine

Real-Time Computation Engine

Specialized o9 solvers

Domain-specific solvers that are part of o9 platform, e.g. supply chain solver

AI/ML ecosystem connected with the Hadoop/Hive subsystem for Big data storage & distributed computations

Big Data Storage

Standard R Math / Stat Packages or Custom R scripts

Standard AI/ML packages or custom Python scripts

Tightly coupled hi-performance real-time computation engine for computations expressed via business rules language

(like Excel formulas)

In-memory integration with R for supporting complex math and stat computations

Solvers / Plug-Ins

R & Python Plugins

Direct integration w o9 Server

Specialized o9 Solvers

Constraint-based solver for any Flow model

Nodes

Distribution lanes

Operational processes at the DC

Resources

Other Solvers

Runs outside of o9 platform and interacts w o9 Server via exposed o9 APIs

01 Extensible to any Depth and Process

Evolves as business evolves to integrate more processes, eliminating silos

04
Digital Assistants for Key Roles

03
Digital Integrated Planning Solutions
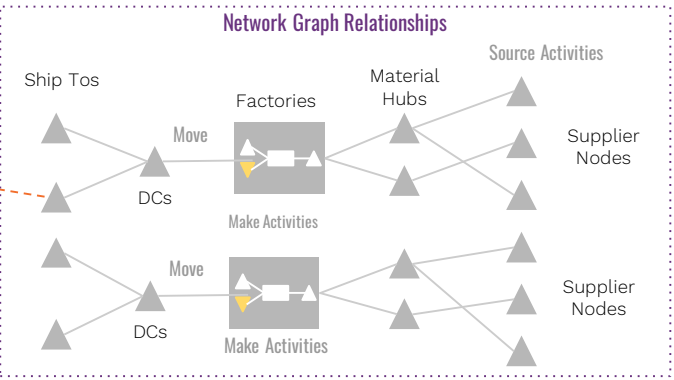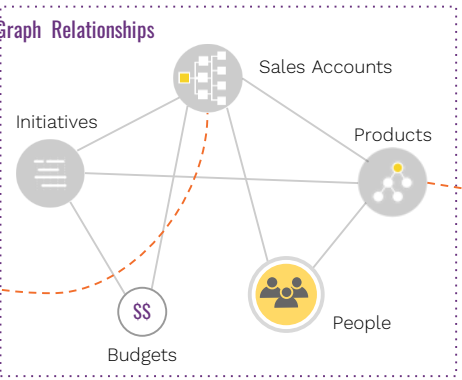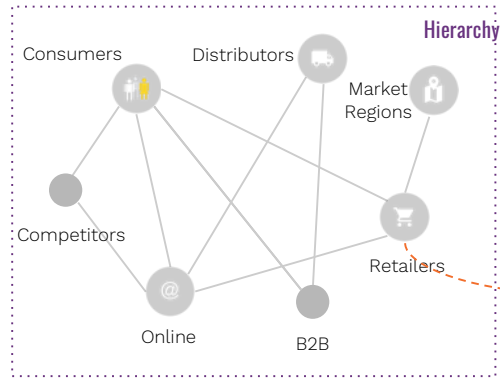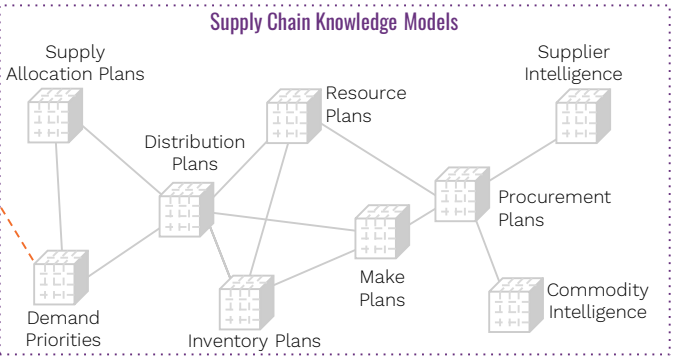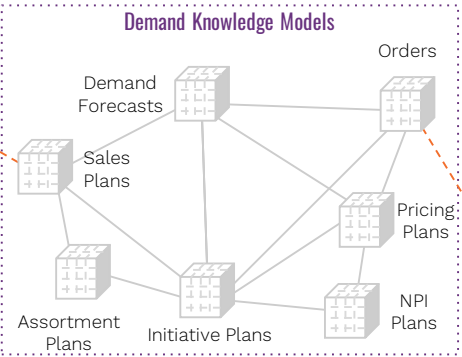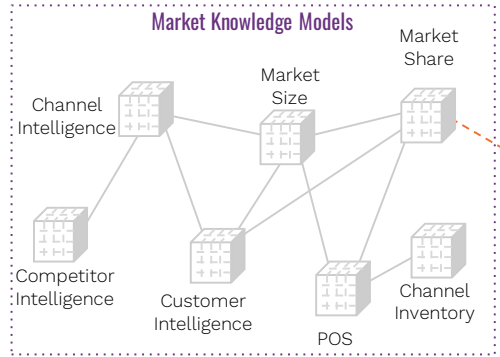
02
AI-Powered Enterprise Knowledge Graph

01
Data Sensors

Market Knowledge Models
- Channel Intelligence
- Market Size
- Market Share
- Competitor Intelligence
- Customer Intelligence
- POS
- Channel Inventory

Demand Knowledge Models
- Demand Forecasts
- Orders
- Sales Plans
- Pricing Plans
- Assortment Plans
- Initiative Plans
- NPI Plans

Supply Chain Knowledge Models
- Supply Allocation Plans
- Resource Plans
- Supplier Intelligence
- Distribution Plans
- Procurement Plans
- Demand Priorities
- Inventory Plans
- Make Plans
- Commodity Intelligence

Hierarchy Graph Relationships
- Consumers
- Distributors
- Market Regions
- Competitors
- Online
- B2B
- Retailers

- Initiatives
- Sales Accounts
- Products
- Budgets
- SS
- People

Network Graph Relationships
- Ship Tos
- Material Hubs
- Source Activities
- Factories
- Move
- DCs
- Make Activities
- Supplier Nodes
- Move
- DCs
- Make Activities
- Supplier Nodes

01 Graph Modeling 101

What is a graph?

Graph is a set of nodes and edges. Nodes model a universe of different types of **objects** and edges model different types of **relationships** between them

Node   Edge   Graph

What does a graph allow?

❏ Business friendly modeling of any object / relations
❏ Traversal using simple business rules
❏ Information propagation

Ex: Who are the people working at Google that I went to high school with?
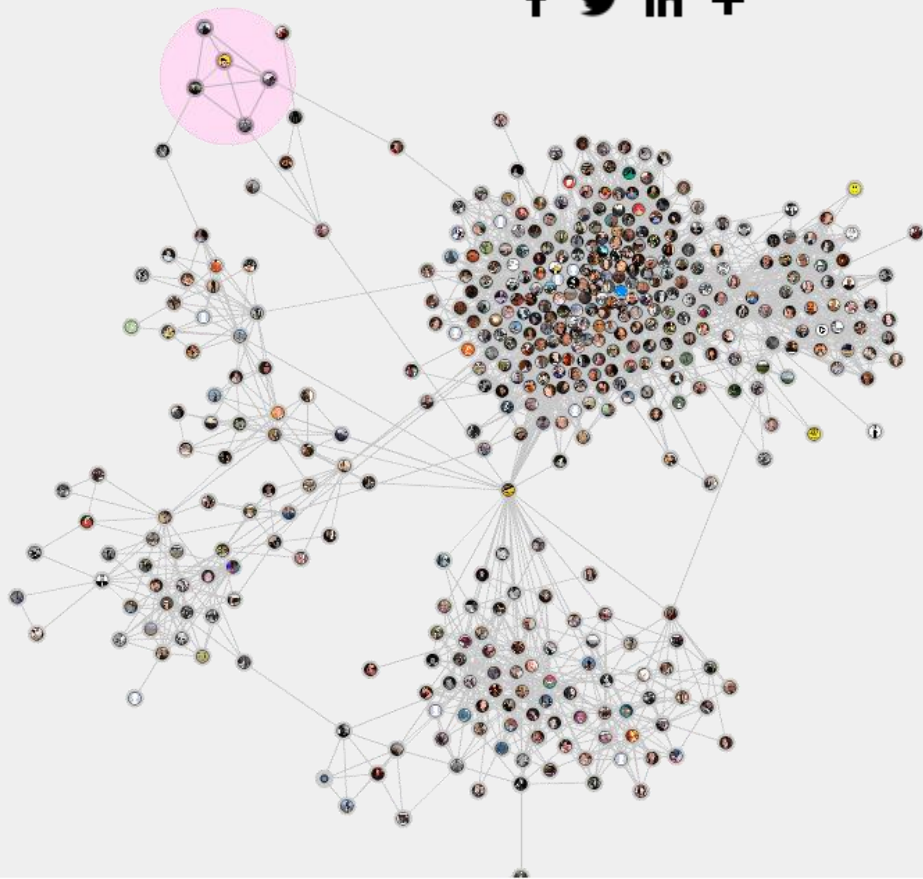
01 o9's Graph Modeling Framework

01 | NODES

Unlimited Objects
Attributes & Properties
Member Specific Attributes

PRODUCT

Category — Brand — Collection — SKU

SALES DOMAIN

Country — Channel — Accounts

TIME

Year — Quarter — Week

+ ADD NEW
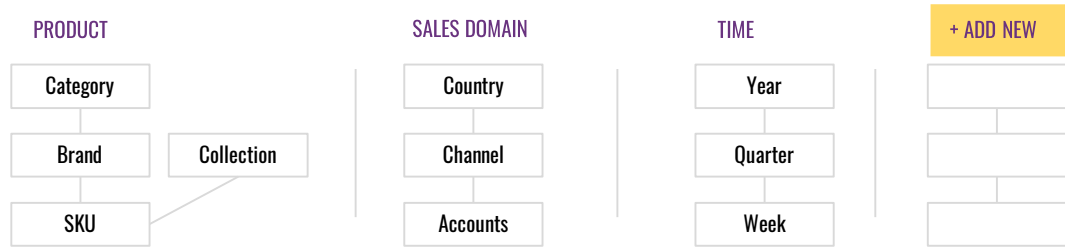
02 | RELATIONSHIPS

Hierarchies
Parent-Child
Bill-of-Materials
Product Cannibalization

Cannibalization

Affinity

Product Relationships

Make Activity

Move Activity

Bill of Materials

Supply Chain Network Relationships
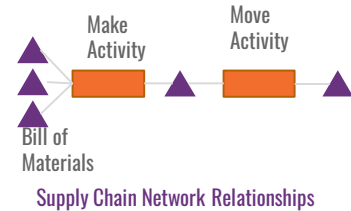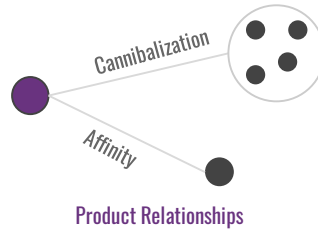
03 | COMPUTATIONAL MODELS

Multi-dimensional models at appropriate
levels of detail
Model linking to propagate changes
IBPL Rules language to define the models

Time.**Month**
Product.Category
Region.Country

Market Size

Time.**Month**
Product.Brand
Sales
Domain.Account

Revenue Plan

Time.**Week**
Product.SKU
Sales Domain.Account

Demand Forecast

Time.**Week**
Item.SKU
Location.Ship to

Shipment Forecast
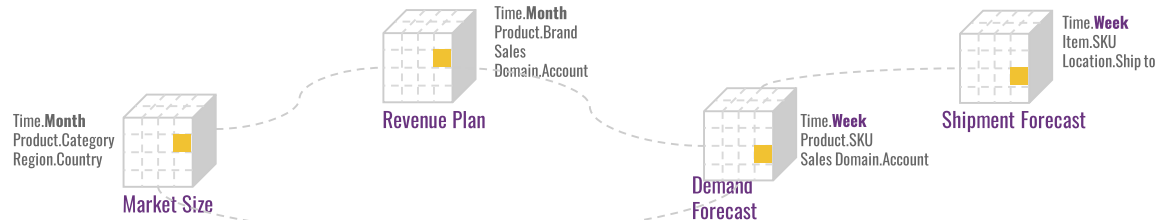
01 Traditional OLAP vs. Graph Models

Link and propagate data across models at varying levels of granularity

TRADITIONAL OLAP
Rigid Modeling

❑ Exponential space growth as dimension increases
❑ Pre-calculation of all combination takes long time
❑ Unnecessary data disaggregation for fake details
❑ Poor user adoption results in dependency on excel files for planning

Data should exist at every single intersections even though some data is not meaningful below specific level in each hierarchy

Sales
Region
Country
Channel
Account

Time
Year
Quarter
Month
Week

Product
Brand
Class
Flavor
Size
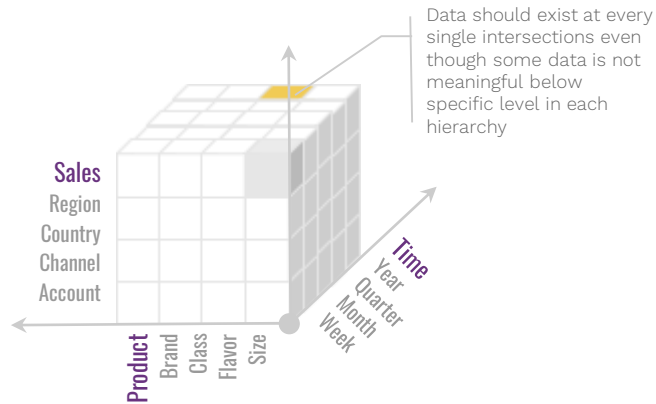
o9 GRAPHCUBE MODELS
Flexibility through linked models

❑ Multi-dimensional model at appropriate level of detail
❑ Fully linked models to propagate changes
❑ Flexible modeling with relevant level of details ensures scalability and performance
❑ Eliminate fake details in data mart

Time.**Month**
Product.Brand
Sales
Domain.Account

+ ADD NEW

REVENUE PLAN

Time.**Week**
Product.SKU
Sales Domain.Account

Time.**Month**
Product.Category
Region.Country

MARKET SIZE

DEMAND FORECAST
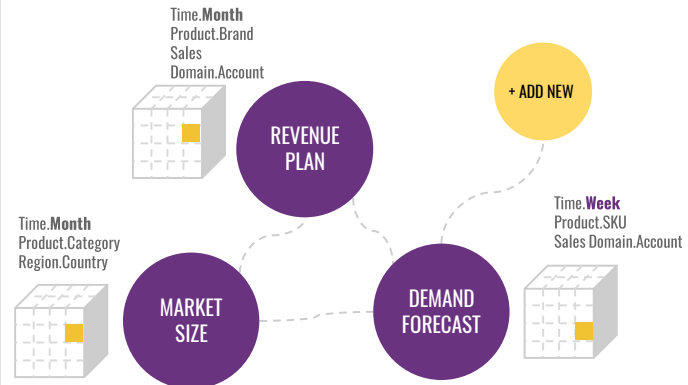
01 Intelligent Algorithms

Faster, Automated, Algorithm Driven Planning, Decision Making and Collaboration

M/L ANALYTICS

- ❑ M/L Forecasting Algorithms
- ❑ Service Level Analytics
- ❑ Expedite Order Analytics
- ❑ Store Assortment Analytics
- ❑ Exception Playbook

D/S MATCH ALGORITHMS

- ❑ Streaming Hadoop Integration
- ❑ Parallel Constraint Planning
- ❑ Native In-Memory Computing
- ❑ Real-Time Incremental Planning

AGGREGATION / DISAGGREGATION

- ❑ Flexible Business Modeling
- ❑ Unlimited Dimensions / Attributes
- ❑ Twin Editable Measures
- ❑ Edit / Lock at any Level

BI-DIRECTIONAL PROPAGATION

- ❑ Graph Based Modeling
- ❑ Propagate changes to all connected / related nodes
- ❑ Smart Tagging of Unstructured data

SCENARIO PLANNING

- ❑ Parallel runs against pre-defined objectives
- ❑ KPIs comparison (side-by-side)
- ❑ Decision making and publishing

POST GAME ANALYSIS

- ❑ AI-Powered Root Cause Analysis
- ❑ Outlier Correction
- ❑ Process Improvement Playbook
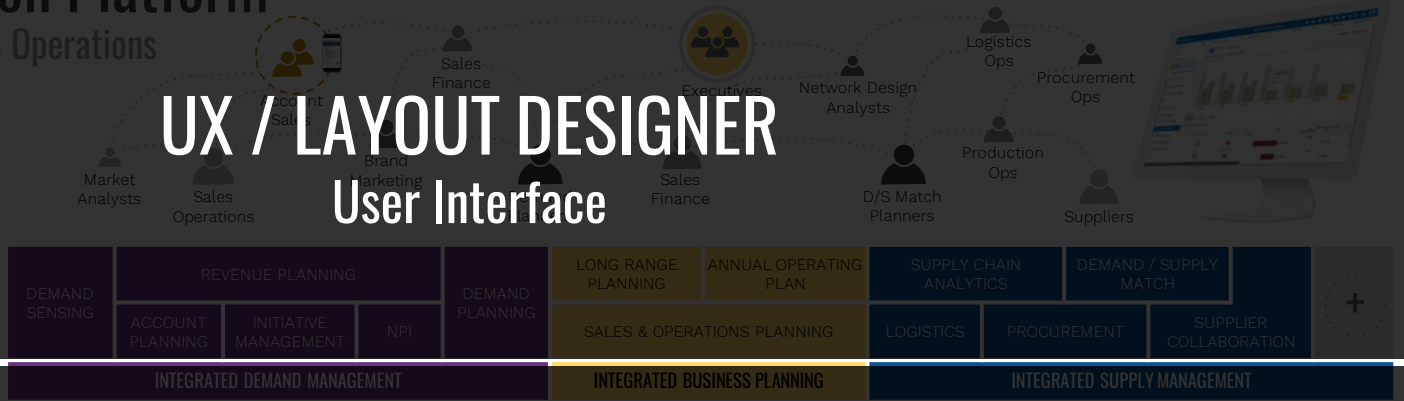- ❑ Early Warning Sensors

Digital Transformation Platform
for Integrated Planning & Business Operations

UX / LAYOUT DESIGNER
User Interface

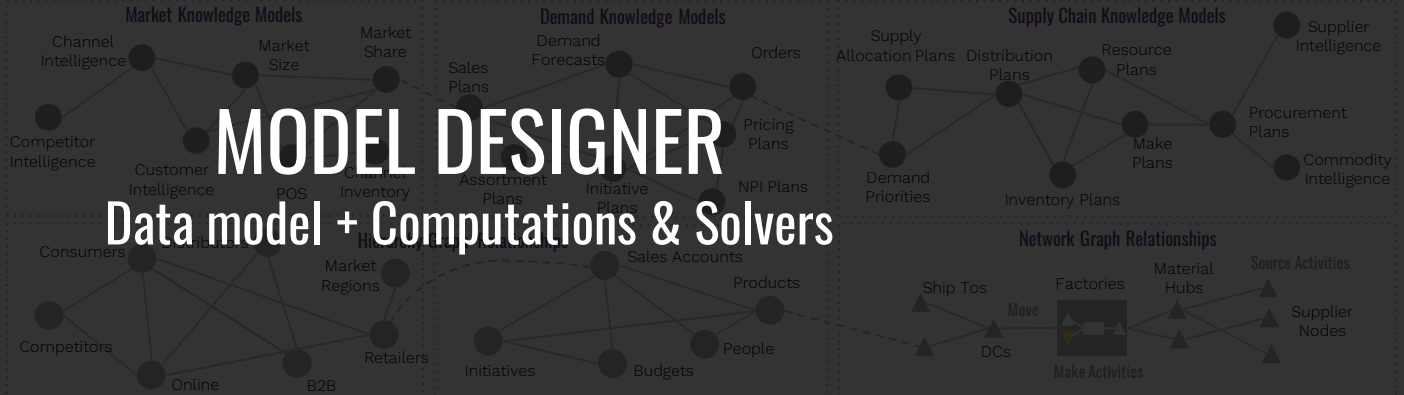## 03 Integrated Planning & Operations
Digital Assistants

10x Agility
Autonomous Planning
10x Productivity, Expertise
Digital Assistants for Key Roles
Enterprise Grade Siri / Alexa

DEMAND SENSING	REVENUE PLANNING			DEMAND PLANNING	LONG RANGE PLANNING	ANNUAL OPERATING PLAN	SUPPLY CHAIN ANALYTICS	DEMAND / SUPPLY MATCH
	ACCOUNT PLANNING	INITIATIVE MANAGEMENT	NPI		SALES & OPERATIONS PLANNING		LOGISTICS	PROCUREMENT	SUPPLIER COLLABORATION

INTEGRATED DEMAND MANAGEMENT	INTEGRATED BUSINESS PLANNING	INTEGRATED SUPPLY MANAGEMENT

01 AI-Powered Enterprise Knowledge Graph

Big Data Store

Graph Data Model

Intelligent Algorithms
- ❏ M/L Analytics
- ❏ D/S Match Algorithms
- ❏ Aggregation & Disaggregation
- ❏ Bi-Directional Propagation
- ❏ Scenario Planning
- ❏ Post Game Analysis

Market Knowledge Models
Channel Intelligence
Market Size
Market Share
Competitor Intelligence
Customer Intelligence
POS
Channel Inventory
Consumers
Market Regions
Competitors
Online
B2B
Retailers

Demand Knowledge Models
Demand Forecasts
Orders
Sales Plans
Pricing Plans
Assortment Plans
Initiative Plans
NPI Plans
Sales Accounts
Products
Initiatives
Budgets
People

Supply Chain Knowledge Models
Supply Allocation Plans
Distribution Plans
Resource Plans
Supplier Intelligence
Procurement Plans
Make Plans
Commodity Intelligence
Demand Priorities
Inventory Plans

MODEL DESIGNER
Data model + Computations & Solvers

Network Graph Relationships
Ship Tos
Factories
Material Hubs
Source Activities
Move
Supplier Nodes
DCs
Make Activities

02 Data Sensors

Enterprise & Market Data
Structured & Unstructured Data
Real Time & Batch Data

| **Web Scraping**	**Natural Language and Image Processing**	**Connected Excel**	**IOT / Edge APIs**	**Realtime & Batch APIs**
Websites	Email	Excel	Sensors	DW
Social Media	PPT		IOT	ERP CRM PLM

Data Model Extension

Dimensions & Graphs

> o9 data model can be naturally extended/configured for a given implementation

> This includes Dimensions, Levels, Hierarchies, Graph relationships, all of the above can be extended

Fact data

> Based on the data modeling, new measure data elements can also be created.
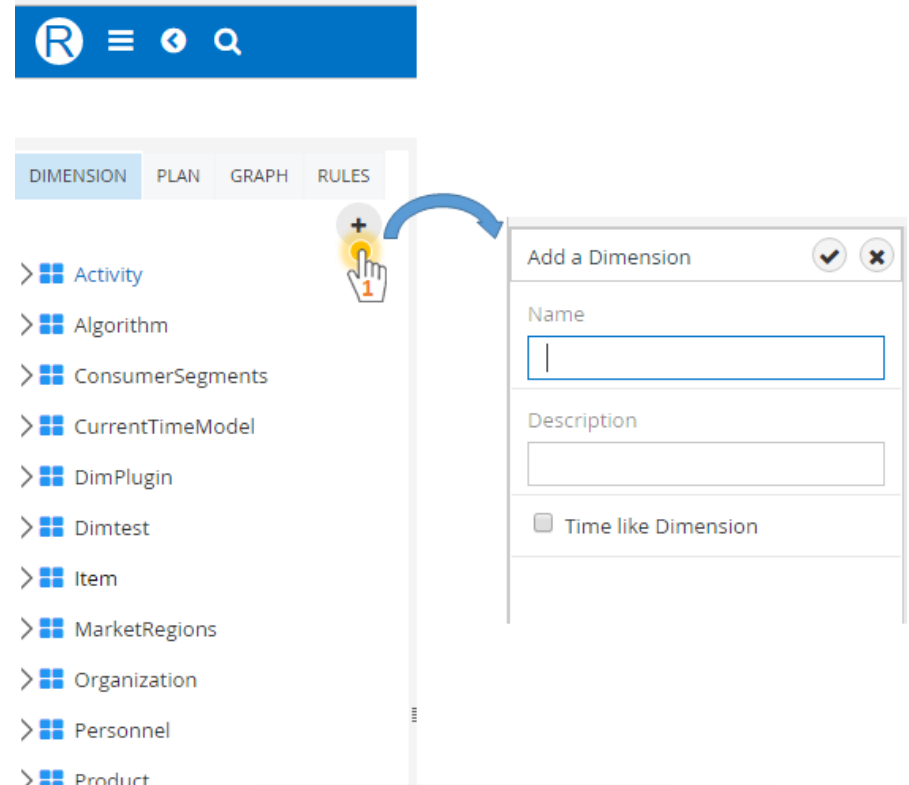
Rules & Computation Extension

Rules

> New formulas can be defined to compute any data elements in the system

> Such formula can be scope based, so that for different scopes

Fact data

> Through the direct in-memory R-integration, any customer-specific R-script can be executed

> This can be set up either as a real-time computation or an on-demand or scheduled action

User Interface Extension

Report Designer

> Drag & Drop visual report configurator to create new planning reports

> Multiple visualization options

Layout Designer

> WYSIWYG layout designer to design role specific business workflows and views
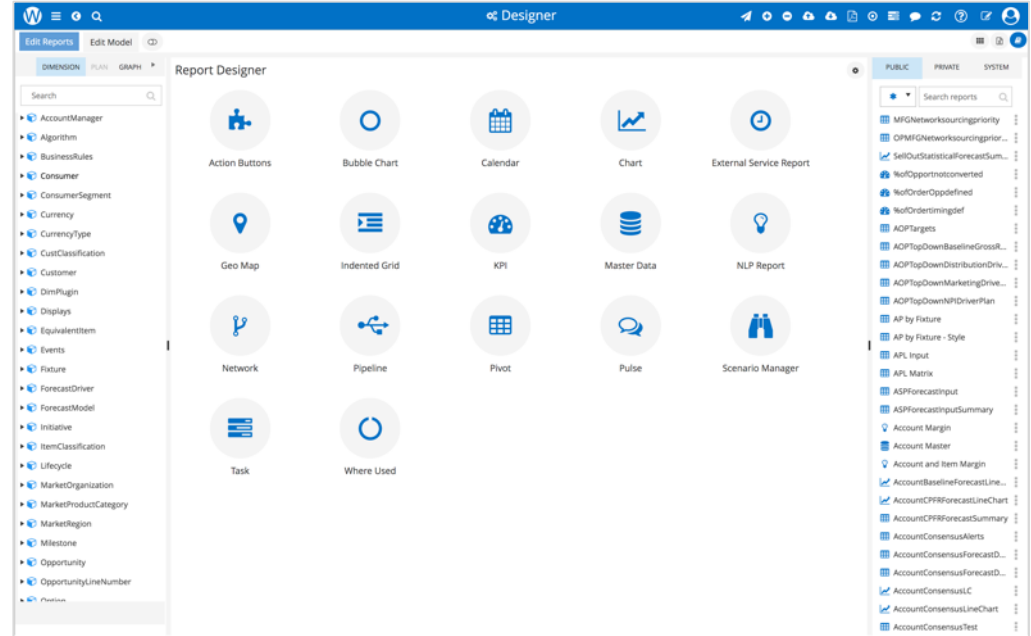
Industry Knowledge Graph based Model Libraries

Open Sourcing Innovations

Reference Apps

Industry Content

Knowledge Sharing

PARTNERS

Custom Apps

White Space Apps

CLIENTS

Custom Apps

Model Library

Industry Knowledge Graph based centralized cloud repository for ubiquitous content and knowledge sharing amongst industry practitioners, partners and technology companies

CLIENTS / CONSULTING PARTNERS

Discover

Learn

Customize

02 Handling Heterogenous, Large Volume Data

o9 Architecture makes it easy to collect and process data from multiple sources

Data Integration Services

| Web Scraping | ETL / Web Services | Natural Language / Image Processing | Connected Excel | ETL / Web Services (Batch / Real-time) | ETL / Web Services (Batch / Real-time) |

Websites

Govt. /
Census

Social
Media

Public Data

npd   nielsen

SPINS   IRi

Syndicated Market Intelligence

PPT

Email

Unstructured Data

Excel

Orphan Plan Data

Sensors   IOT

Big Data Sources

CRM   PLM

DW   ERP

Enterprise Systems of Record

Numerous heterogenous and disconnected data sources
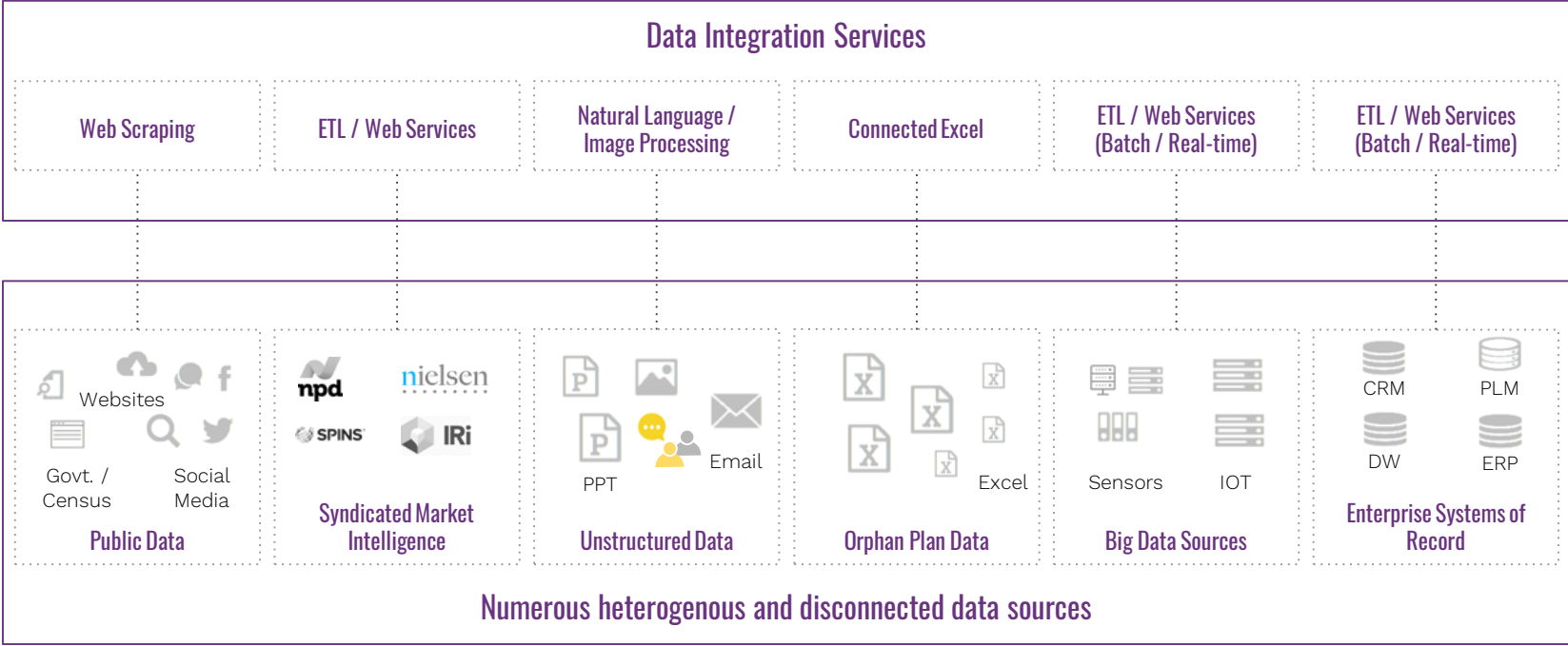
03 Systems of Engagement

Features that adapt to way users work making adoption easier

EXECUTIVES
BU, Product, Sales, Marketing, Supply Chain, Finance, R&D

PLANNERS / ANALYSTS
Sales, Marketing, Product, Demand, Supply, Finance

OPERATIONS
Sales, Marketing Ops, NPI Ops, Logistics Ops, Factory Ops, Buyers

IT / BP INNOVATION TEAMS
BU, Product, Sales, Marketing, Supply Chain, Finance, R&D

CONNECTED EXCEL

INTEGRATED EMAIL

NATURAL LANGUAGE SEARCH

3RD PARTY BI INTEGRATION

SELF SERVICE

SMART COLLABORATION

03 Amazingly Simple to Use

Drive 10x more adoption

01 Excel
Where planners love to analyze plans daily

02 Email
Where we consume and dissipate unstructured data everyday

03 Mobile
Where users have finger-tip visibility on their phones and tablets

04 Natural Language Search & Navigation
Where we use powerful yet simple Google like applications everyday

05 HTML5 WebUI with Interactive Editable Dashboards
Where executives, managers interact in real-time with the system rather than static read-only dashboards

o9 is Designed for All Enterprise Users
Our EKG is designed to empower enterprise users to continue using existing systems of engagement, thereby driving higher adoption

o9 Server Performance and Scalability

GraphCube Server: o9's in-memory Compressed Columnar Database

Hi-speed query performance

Virtually in memory using memory map

State of the art for analytical workflows over large data

B-Tree storage for efficient updates

Automatic merge of the columnar base and B-Tree overlay

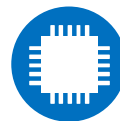### Smart Hierarchical Partitioning

Separate read-only and writable partitions

Sub-partition by keys

Hot queries effectively cached
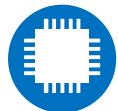
Highly Scalable MongoDB for Textual data

Conversations and documents stored in the highly scalable MongoDB

Parallel computation of sub-problems

Automatic analysis of all configured calculations for interdependencies and run computations in parallel where possible

o9 Performance Benchmarks (1)

o9's current largest production dataset has 0.5 trillion data cells in a single model

Performance on Large Volume (Billion row table) dataset

- Dataset: Retail forecasting & replenishment planning
- 90 thousand regular skus, 1.5 Million special order Sku's, 4 DC's, 2 yrs past, 65 wks future
- Forecast computation performance: 4 mins
- Network planning computation:
  - Weekend batch run(global plan): 50 mins

Interactive Response Performance

- Dataset: Retail merchandise financial planning workflow
- Dataset: 40 depts, 2 yrs past, 65 wks future
- Typical Report open times: 7-8 sec
- Typical Interactive response time incl. recalculations: 3 sec

o9 Performance Benchmarks (2)
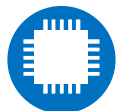
Data import/export performance
- Dataset: Retail forecasting and replenishment planning
- Imports: 2.2M rows in 2.4 min

Multi-user performance
- Dataset: large services organization
- User base: 4000 users
- Dataset params:
  - Indents: 10000 new every day
  - Resources: 80000
  - Skills: 3000
  - Time Horizon: 3 years
  - Locations: 1000
- Typical report open times: 5 seconds
- Typical interactive response time including recalculations: ~2 seconds
- Talent supply-demand match solver nightly run: <10 mins

o9 Solver Performance

Data Objects	Customer_I	Customer_M	Customer_P	Customer_S
Industry	Auto Supply	Fashion	CPG	CE
# of demands	5119112	154626	18425	623310
# of material nodes	111303	443222	1862	46882
# of capacity nodes	20	610	4	809
# of BOD activities	816671	867929	1261	39920
# of MFG activities	310745		336	61429
# of supply chain stage (material node depth)	4	4	4-6	4
Simultaneous/Alternate resources	No	No	No	Yes
Avg. # of alternate sourcing per material node	2	2~3	2	2~3
# of buckets (UOM)	79 (W)	37 (M)	79(W)	25 (W)
Build ahead /late limit	4-4	0/2~5	Infinite/13	0-4 / 0
% of safe stock material nodes	73	NA	17	2
Unique Functionalities	Lot Planning	No carry material node	Lot size (min/multiple)	Plan Date, Demand Attribute Based Sourcing Priority, Attribute Based Mandatory Prebuild, Safety Stock Planning during JIT planning, Locked WIP, Demand Slice Threshold
Configuration	Parallel Exports (6 threads)	NA	NA	NA
Runtime - Import	1 min	3 min 41 sec	1 sec	10 sec
Runtime - Plan	14 min	32 sec	2 sec	2 min 1 sec
Runtime - Export	7 min	23 sec	3 sec	28 sec
Total Runtime	22 min	4 min 36 sec	6 sec	2 min 39 sec

o9 UI Performance and scalability

Compression techniques
- Compact json protocol is used which reduces data volume to be transferred between server and UI
- Additionally, standard compression technique (gzip) are applied on the network data packets
- 2 MB data yields 7 kb network traffic

Single page app design
- Only net change data sent over network

Smart data caching
- Serve data from cache unless anything has changed(using message bus for change communication)
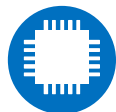
Selective refresh of impacted cells
- Intelligently detect changed cells and only refresh the changes cells
- Same concept applies for collaboration content as well

UI/Dom virtualization
- Reuse data structures as user browses large datasets, so that client side memory footprint is contained

o9 Reliability: Transaction Log and Recovery Mechanisms

All Transactions are written to a Replay log on disk

- In the unlikely event of a system crash, this log can be played back to fully recreate the state of the system (with all committed transactions)

Disaster and Recovery

- o9 will leverage the Cloud Infrastructure providers (AWS, Azure) geo-resilient persistent storage and recover the solution in a different Availability Region than the one affected

HA: Standby Secondary Server

- o9 will support a High Availability architecture which involves a secondary Standby server, which will take over in the unlikely event of a Primary server crash, wither due to Software or Hardware faults.

Cloud Deployment Options

o9 provides flexible deployment options across cloud providers

	Public Multi-tenant	Public Single-tenant	Private* On-premise
Secure Cloud Amazon AWS or Microsoft Azure or Google Platform	Yes	Yes	Tenant Datacenter
Data Security	Logical Segmentation	Dedicated VPC	Yes
Infrastructure	Shared	Dedicated VPC	Own Equipment
Connectivity	Public	VPN	Internal
Software Releases / Updates	Monthly	Monthly	Monthly
Fully Managed o9	Yes	Yes	Can be o9 managed or tenant managed

* o9 Requirements for Private Cloud Deployments

‣ A server cluster be provisioned, per o9's requirement, that will host both o9 software as well as the client data.
‣ o9 will discuss with client IT department and work out a mutually agreeable method for managing deployments and upgrades

Upgrade / Patch Release Process

## Cloud environments follow monthly release cycles

- o9 does not release until automated tests have passed for all tenant configurations

- o9 takes ownership of functional and integration testing on client / tenant pre-production instance

- Tenant takes ownership for user acceptance after all prior testing is passed by o9

- o9 guarantees that new platform enhancements / features are backward compatible

	Process	Owner	Frequency
1	Daily Build	o9	Daily
2	Unit Testing	o9	Continuous
3	Release Labeling	o9	Monthly
4	Deploy to Dev / QA	o9	Monthly
5	Functional testing on all tenant configurations	o9	Monthly
6	Release candidate labeling	o9	Monthly
7	Migration to customer Dev / QA environment	o9	Monthly
8	Functional testing on customer data	o9	Monthly
9	Migration to customer pre-production environment	o9	Monthly
10	Integration testing in pre-production environment	o9	Monthly
11	Customer testing and acceptance in pre-production	Customer	Monthly
12	Migrate release to customer production environment	o9	Monthly

o9 DevOps

Accelerating software design, development & deployment cycles
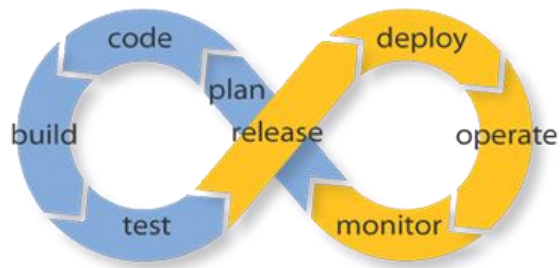
Sprints:

‣ o9 development process operates in weekly sprint cycles.

Production Release Cycles:

‣ o9 makes monthly production releases for its customers.

Codelines:

‣ o9 operates a single codeline development process.

Continuous Integration:

‣ o9 development process requires check-ins into a shared repository from which automated daily builds are run. Such builds go thru automated (a) Unit tests (b) Functional tests (c) PSR (Performance, Scalability, Reliability) tests (d) Customer dataset regression tests

Release Process:

‣ Additional to the automated tests, prior to the monthly release, the release build goes through one additional week of testing, both automated and manual. It is then deployed to a preproduction environment that the customer had access to for preview purposes. Following validation in the pre-production environment, the software is deployed to production environment.

Fastest Time to Value in the Industry
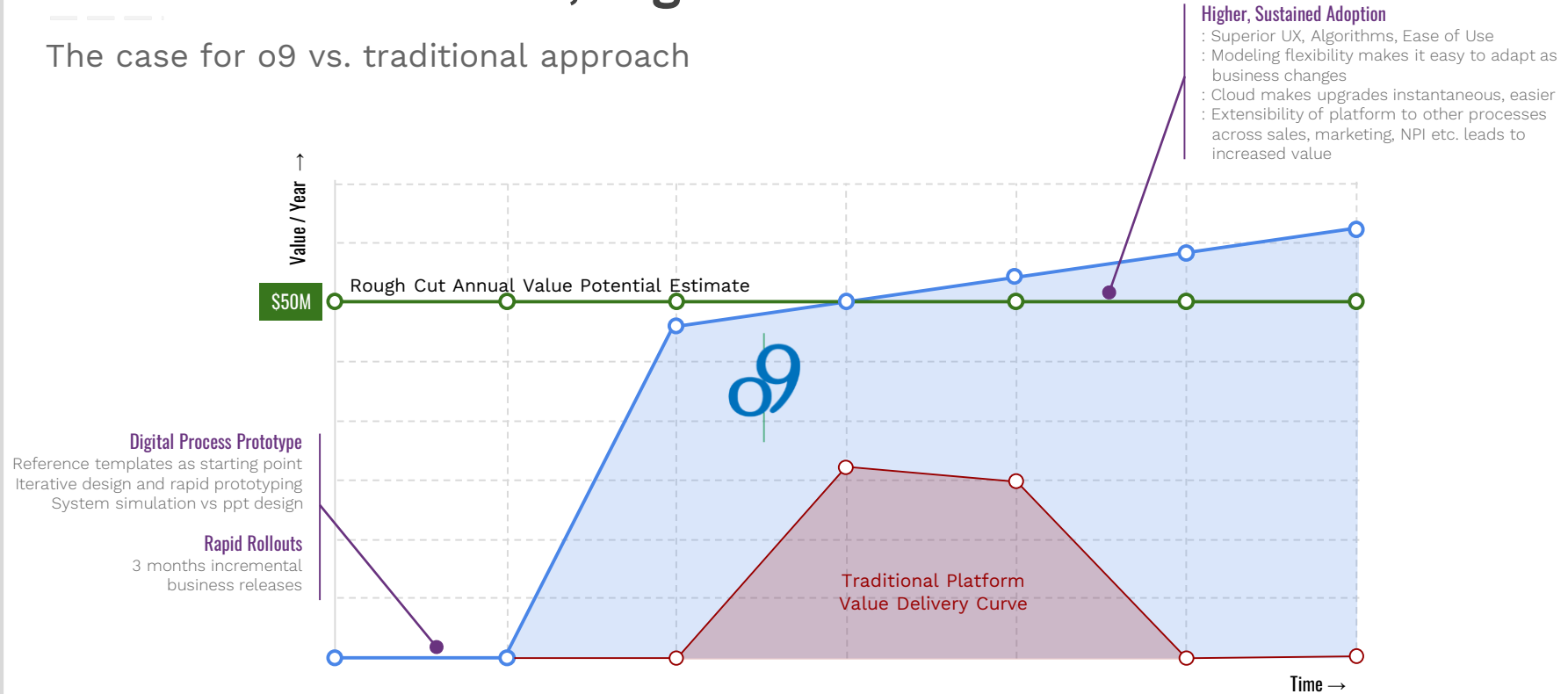
Faster Time to Value, Higher Value

The case for o9 vs. traditional approach

Higher, Sustained Adoption
: Superior UX, Algorithms, Ease of Use
: Modeling flexibility makes it easy to adapt as business changes
: Cloud makes upgrades instantaneous, easier
: Extensibility of platform to other processes across sales, marketing, NPI etc. leads to increased value

Value / Year →

$50M — Rough Cut Annual Value Potential Estimate

Digital Process Prototype
Reference templates as starting point
Iterative design and rapid prototyping
System simulation vs ppt design

Rapid Rollouts
3 months incremental business releases

Traditional Platform Value Delivery Curve

Time →

4 REAL LIFE EXAMPLES
FROM OUR CUSTOMERS

Customer Case Studies

Automated Intelligent Forecasting at Leading Coffee Co.
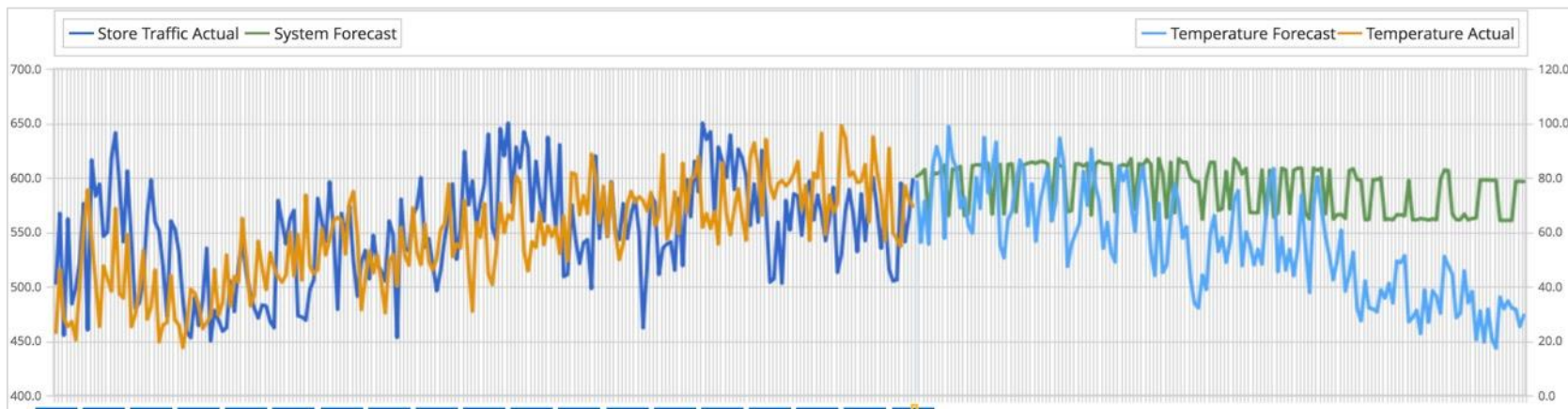
Store Assortment
Weather, Temperature
Store Pulse > Special Orders > Local Events > Store displays
Local Public Events
NPI / Innovation Programs
Marketing & Promo Initiatives
Daily POS

Forecast Analytics, Automated Forecast Generation

- ❏ M/L Forecast Models - Random Forest Model
  - ❏ Store Traffic = f(Weather, Temp, Mkt, Local Events)
  - ❏ SKU Mix = f(Temperature, shelf space, in-store promos)
- ❏ Multiple time series models - (SES, DES, TES, ARIMA, MA, Bestfit etc.)
- ❏ NPI -> Like item based forecasting
- ❏ Best fit model selection
- ❏ Forecast accuracy metrics / Post game analysis

Exception Driven Forecast Review & Adjustments

- ❏ Review cycle over cycle forecast change alerts
- ❏ Adjust forecasts / capture reasons
- ❏ Accept majority of system generated forecasts
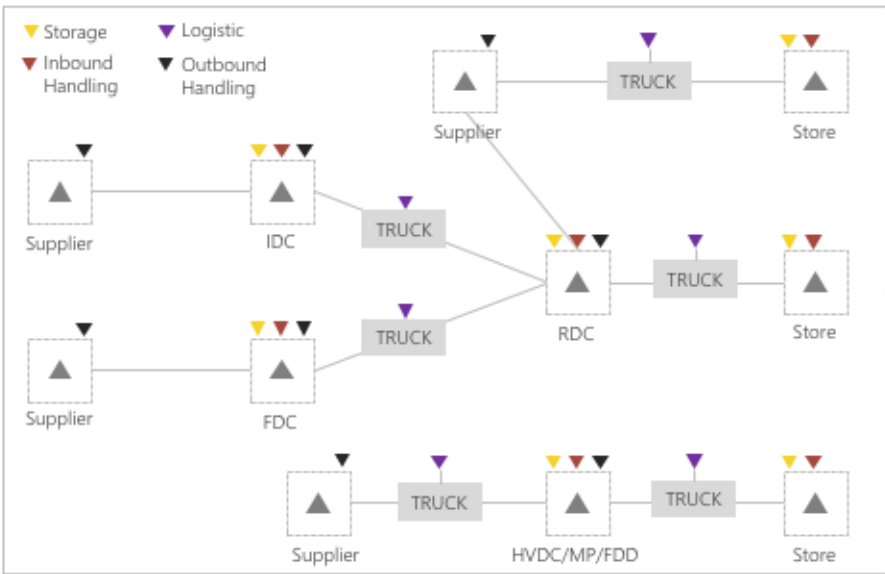
Publish Forecast Changes to Replenishment Planning ✔

Integrated Planning at World's Largest Retailer

Collaboration / Flow Meetings

DC Ops · Store Ops · Executives · Merchandising · Flow Planners · Logistics

Inputs

- **DEMAND FORECAST**
  Everyday, features, mods and committed buys

- **DEMAND PRIORITIES**
  Item A/B/C, store A/B/C, due date

- **NETWORK**
  Stores, DCs, Suppliers
  Items, hierarchy, BODs, packs

- **CONSTRAINTS**
  Storage, handling, engineering, transportation

- **PLANNING POLICIES**
  Inventory targets/bands
  Flow policies

- **INVENTORY**
  Inventory (on-hand) and open PO's

Legend:
- ▼ Storage
- ▼ Inbound Handling
- ▼ Logistic
- ▼ Outbound Handling

Supplier · IDC · FDC · RDC · Store · HVDC/MP/FDD · TRUCK

Outputs

- **FLOW OPTIMIZED CAPACITY PLANS**
  DC & store storage plans
  DC & store handling/labor plans
  Logistic capacity plans
  Vendor plans

- **FLOW OPTIMIZED REPLENISHMENT**
  Inbound/Outbound Flow Plans
  Inventory policy changes

- **FLOW OPTIMIZED DEMAND FORECASTS**
  Constrained demand forecast

Process Capability
Scenario planning: do nothing, smoothing, flex, flow path change
Store demand fill-rate vs. Cost tradeoff analytics
Root cause analysis
Cost to serve (total landed cost) analysis