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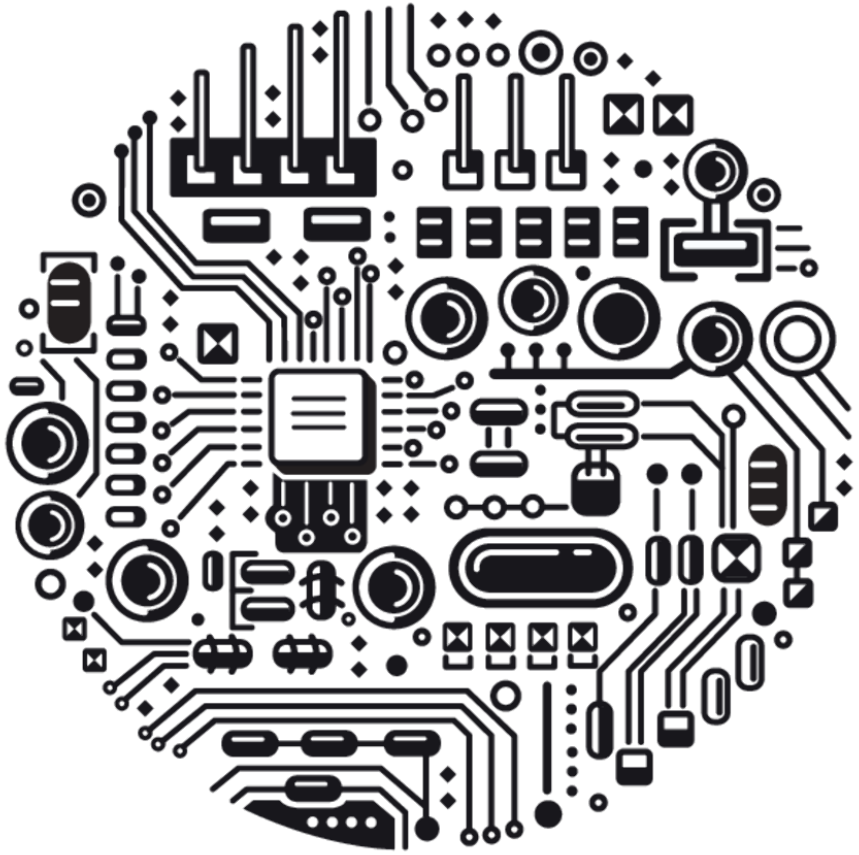


Effective Electronic Patient Record Implementations

Integration and Reporting

June 2021

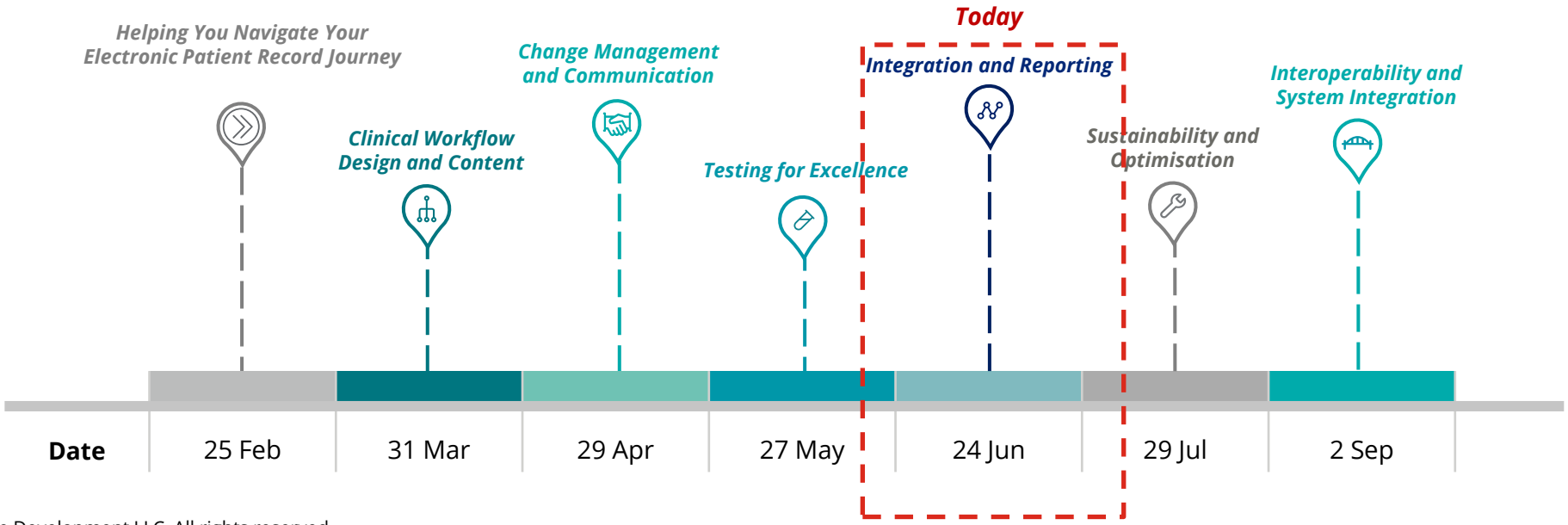
Effective EPR Implementations: Overview of the Series, Purpose, and Schedule

The Effective EPR Implementations webinar series is a set of seven one-hour virtual sessions with Healthcare providers. This series is focused on EPR implementations and driving your success through a holistic implementation approach

Purpose

- ✓ Focus on effective partnerships necessary to succeed in EPR implementations
- ✓ Highlight common pitfalls faced by clients and areas needing support
- ✓ Share key strategies necessary for healthcare practice transformation through EPR implementations

Schedule



Speaking With You Today

Fran Cousins

Partner, UK

Marc Perlman

Global Digital CARE Leader, US

Dan Kinsella

Managing Director, US

Mitchell Bailey

Senior Manager, US

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Topic	Speaker	Timing
Welcome	Frances Cousins	5 mins
Integration • Integration Landscape • Integration Strategy • Project Planning and the Interface Delivery Lifecycle • Best Practices	Mitch Bailey	20 mins
Reporting • Enterprise Applications and Analytics • Data Lifecycle Management Framework • Analytics of the Future	Dan Kinsella	20 mins
Q&A	Frances Cousins	15 mins

Setting the Foundation: Governance, Guiding Principles, and Effective Decision Making

Setting a strong foundation from the beginning enhances overall outcomes and Programme success.

Governance

A well-structured governance model helps ensure decisions are made at the right level, by the right stakeholders, at the right time

Guiding Principles

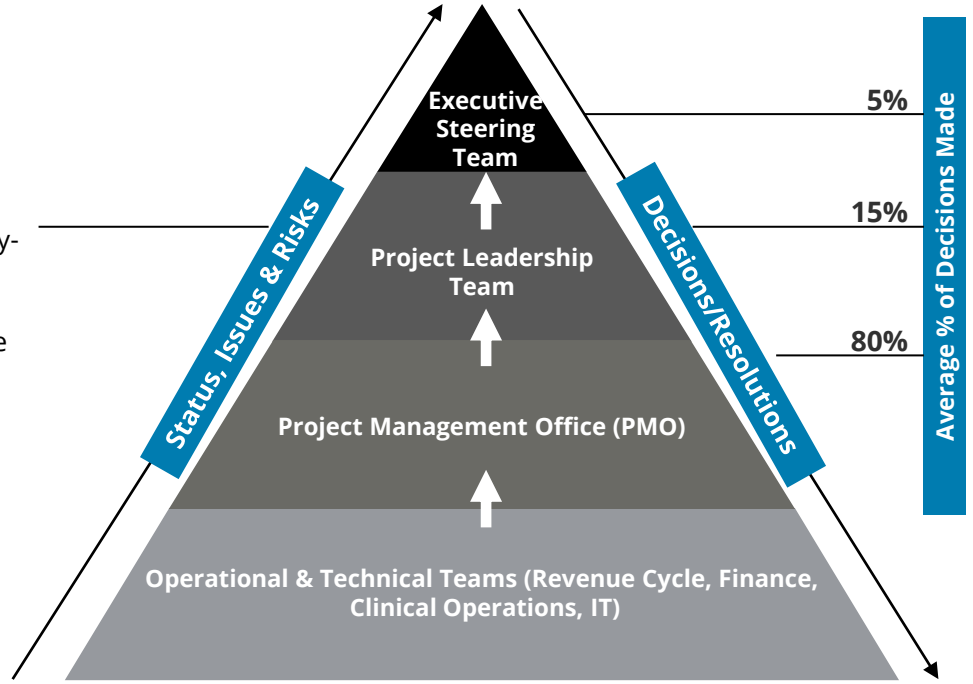
Establishing appropriate Guiding Principles sets the ground rules for system design and implementation, guides decisions, and keeps teams focused on overall goals, objectives, and the desired end state

Effective Decision Making

Decisions that could potentially impact the programme timeline, cost, quality, safety and/or future-state operating model should be escalated to programme and clinical governance

Establish Leadership Support

Leadership support and buy-in is cultivated from the very beginning of the Programme



Key Success Factors

- Executive Steering Committee needs to not only fully understand interface scope but overall integration guiding principles
- PLT and EST understand that new adds to interface scope need to be reviewed and managed against project timelines and resource constraints
- Avoid replication of legacy reports without review of new EPR capabilities
- Activate Data Governance early to ensure alignment on key metric definitions

Guiding Principles

- Manage integration scope against application portfolio to understand what is to be integrated vs. Retired.
- Integration should be tightly managed against other key project workstreams (data conversion, testing), and requirements understood and signed off by clinical and application SMEs
- Reporting (Descriptive Analytics) in the context of vision for Enterprise Analytics

Importance of Governance, Guiding Principles and Effective Decision Making

1. **Commitment from key stakeholders**
2. **Align direction**
3. **Better decisions**

Integration

What do we mean by Integration?

The electronic exchange of data from the EPR to/from ancillary systems and devices across the enterprise, including laboratory, radiology/imaging, provider credentialing, transcription, medical devices, billing, specialty documentation systems and many other systems that are critical to patient care and hospital operations.

Data is typically moved using **HL7** protocol, which is an event-based standard that defines how the clinical and administrative information is packaged and communicated.

EPRs like Epic (Bridges) and Cerner (Open Engine) have modules for configuring and maintain connections outside of the platform.

Most health systems utilise an **integration engine to route and transform data** to and from all of the ancillary systems and devices.

Many enterprises are beginning to utilise Application Programme Interfaces (**APIs**) and the Fast Health Interoperability Resources (**FHIR**) protocol to move data in an "**on demand**" manner.

Key components of the healthcare integration landscape

There are many different flavours of EPRs, Interface Engines, and Medical Device middleware to consider when developing an integration programme portfolio.

EPRs

Electronic Patient Record vendors are the source of truth of all clinical and administrative data, and connect to ancillary systems to exchange data real time.

Interface Engines

Most health systems utilise an interface engine to route and transform data to and from all of the ancillary systems and devices.

Medical Devices

Medical Device Integration automates the collection of clinical data like vital signs or vent readings, and usually require a middleware solution to collect and integrate with the EPR.

Protocols

Healthcare standard protocols utilised by EPRs and Engines to effectively move data around a health system. HL7 v2.x is traditional event based, FHIR is a next generation on demand protocol.

Integration Strategy for an EPR Implementation

Prior to designing, building, and testing interfaces that will be implemented with a new EPR, an all-encompassing Integration strategy must be developed.

Application Landscape

- One of the earliest things to do when planning an EPR implementation is to document the enterprise's entire application landscape and understand each system's functionalities. This allows the integration team to determine which system will be retired, and which will need to be integrated.

Current and Future State Interfaces Inventory

- A documented inventory of interfaces should be created and maintained. This includes information around what type of interface (ADT, Orders, Scheduling), the business partner/systems being integrated with, and any key contacts involved with the build and delivery of the interface.

Integration Architecture Components

- Each enterprise has a unique integration architecture. Defining what platforms will be moving the data using what protocols and standards provides structure for the entire programme as key decisions are made. Consider data warehouses for data archiving and legacy data reporting purposes, web services/API capabilities, and data formats/protocols.

Team Governance and Staff Skillsets

- Proper integration governance models should be utilised to facilitate key decisions and escalations to project/programme leadership
- Once an inventory and architecture has been established, an assessment of the team delivering the work is needed. Understand the skillsets (dev/analyst) and identify gaps around project delivery

Document Parallel projects and identify Partners

- A healthcare enterprise is a complex organisation and will likely have many concurrent projects ongoing that can affect the integration work being done. Establish key relationships with the business partners across the ancillary systems, and document and manage any parallel projects.

Project Planning and the Interface Delivery Life Cycle

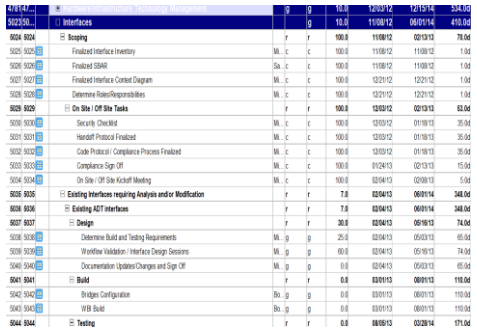
An integration programme must have a workplan covering all phases of the life cycle, and it should be incorporated with the overarching programme project plan and critical path.

Integration Delivery Life Cycle

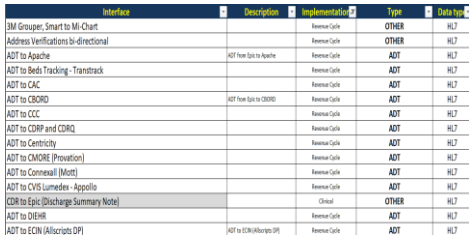
Interface development follows a traditional software delivery life cycle and must be managed from end to end as it steps though each phase of the process. Each phase builds off what was done before and prepares the work to be put into production as a fully tested, and risk minimised integration solution.

Interface Management Tools and Accelerators

Integrated Workplan

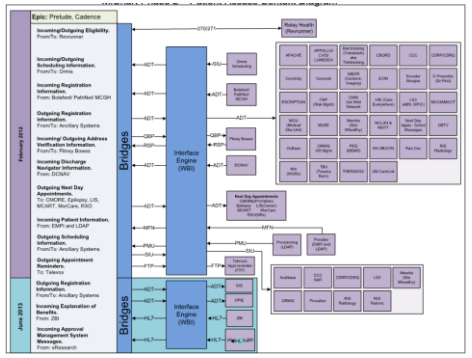


Interface Inventory

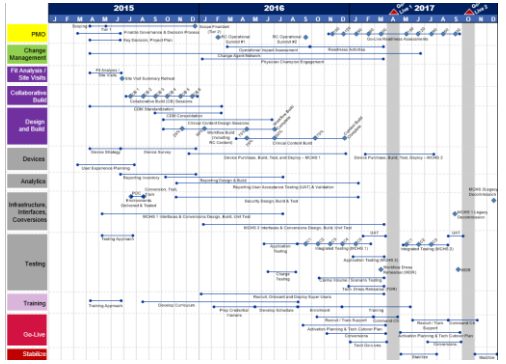


Interface	Description	Implementation	Type	Data type
3M Grouper, Smart to Mi-Chart		Revenue Cycle	OTHER	HL7
Address Verifications bi-directional		Revenue Cycle	OTHER	HL7
ADT to Apache	ADT from Epic to Apache	Revenue Cycle	ADT	HL7
ADT to Beds Tracking - Transtrack		Revenue Cycle	ADT	HL7
ADT to CAC		Revenue Cycle	ADT	HL7
ADT to CBORD	ADT from Epic to CBORD	Revenue Cycle	ADT	HL7
ADT to CCC		Revenue Cycle	ADT	HL7
ADT to CDRP and CDRQ		Revenue Cycle	ADT	HL7
ADT to Centricity		Revenue Cycle	ADT	HL7
ADT to CMORE (Provation)		Revenue Cycle	ADT	HL7
ADT to Connexall (Mott)		Revenue Cycle	ADT	HL7
ADT to CVIS Lumedex - Appollo		Revenue Cycle	ADT	HL7
CDR to Epic (Discharge Summary Note)		Clinical	OTHER	HL7
ADT to DIEHR		Revenue Cycle	ADT	HL7
ADT to ECIN (Allscripts DP)	ADT to ECIN (Allscripts DP)	Revenue Cycle	ADT	HL7

Context Diagrams



Project Critical Path



Defining Requirements and Specifications are Critical to Interface Design

After a strategy is documented and signed off, the interface team will need to design the entire solution, including business requirements documenting the purpose of each interface and how it will be used.

Design

PRIMARY ACTIVITIES

- Business analysts work with ancillary and vendor representatives along with application SMES to gather and document Business Requirements
- Finalise Interface Inventory and Context Diagrams and get sign off from project leadership on scope

OUTPUTS

- Business Requirements Documents
- Initial technical specifications
- Interface Context Diagrams
- Interface Inventory

KEY CONSIDERATIONS

- Review final requirements with EPR Application SMEs and vendors to assure accuracy of documents and gain sign off
- Establish an interface change control process to control any additions to scope

Interface build based on rock solid specifications will allow for robust unit testing

The majority of the development happens in the interface engine, and allowing for the routing and manipulation of the messages sent around the organisation.

Build

PRIMARY ACTIVITIES

- Business analysts and Developers work with Ancillary/vendor representatives to finalise technical specifications and data mapping Developers build interface engine interfaces and code and configure EPR functionality
- Conduct connectivity and unit testing

OUTPUTS

- Technical specifications
- Data Mapping documentation
- Coded and configured interfaces promoted to the correct environments
- Documented completion of unit test scripts

KEY CONSIDERATIONS

- Build includes not just integration engine build. Make sure to track EPR interface build/configuration and downstream ancillary system build as well
- During unit testing, test messages from end to end, from triggering of message to posting in downstream system

Interface testing should be tightly coupled with a robust testing program

A fully mature testing programme will rely heavily on a complete suite of built and unit tested interfaces to support the integrated testing of the enterprise EPR solution.

Test

PRIMARY ACTIVITIES

- **Interface team participates in all testing activities that require data movement. Including functional, volume/bulk, mapped record testing, user acceptance testing, and integrated testing**

OUTPUTS

- **Completed testing scripts for all phases of testing**
- **Interface defects closed and fixes implemented into appropriate interfaces and environments**

KEY CONSIDERATIONS

- **Interface team should work closely with QA/Testing team through all testing cycles and be ready to correct any defects as soon as possible. Interface issues can be major bottlenecks with testing**
- **Utilised testing tool to track scrips and defects to facilitate quick resolution**

Incorporate interface cutover plans into the larger program activation strategy

Similar to prior phases, as interfaces are cutover to production, all teams that were involved in the build will need to be coordinated in the activation.

Cutover / Operational Support

PRIMARY ACTIVITIES

- Interface team develops detailed cutover plan for each interface including timings for go live, what will be migrated, and responsible parties
- As systems cuts over to production, interface team will be needed to support all go live activities and post live support

OUTPUTS

- Interface cutover plan
- Interface Activation/Go Live staffing plan
- Post Live Operational support plan
- Optimisation Plan (includes interfaces deferred to after go live)

KEY CONSIDERATIONS

- Many interfaces can be turned live in advance of the night of activation. Do an analysis to determine which ones could be part of a “soft” live effort
- Fully participate in dry run mock activities to determine timings and encourage ancillaries to join
- Determine post live model, including optimisation waves

Best Practices and Lessons Learned

Important points to consider as you begin your EPR Integration journey.

- **Estimate level of effort for interface build appropriately and recruit staff to meet demand**

- **Manage scope tightly and understand impacts of any net new interface adds**

- **Plan for engine upgrades to minimise impact to programme**

- **Communicate early and often with clinical and application SMEs to make sure requirements are understood and baked into interface build**

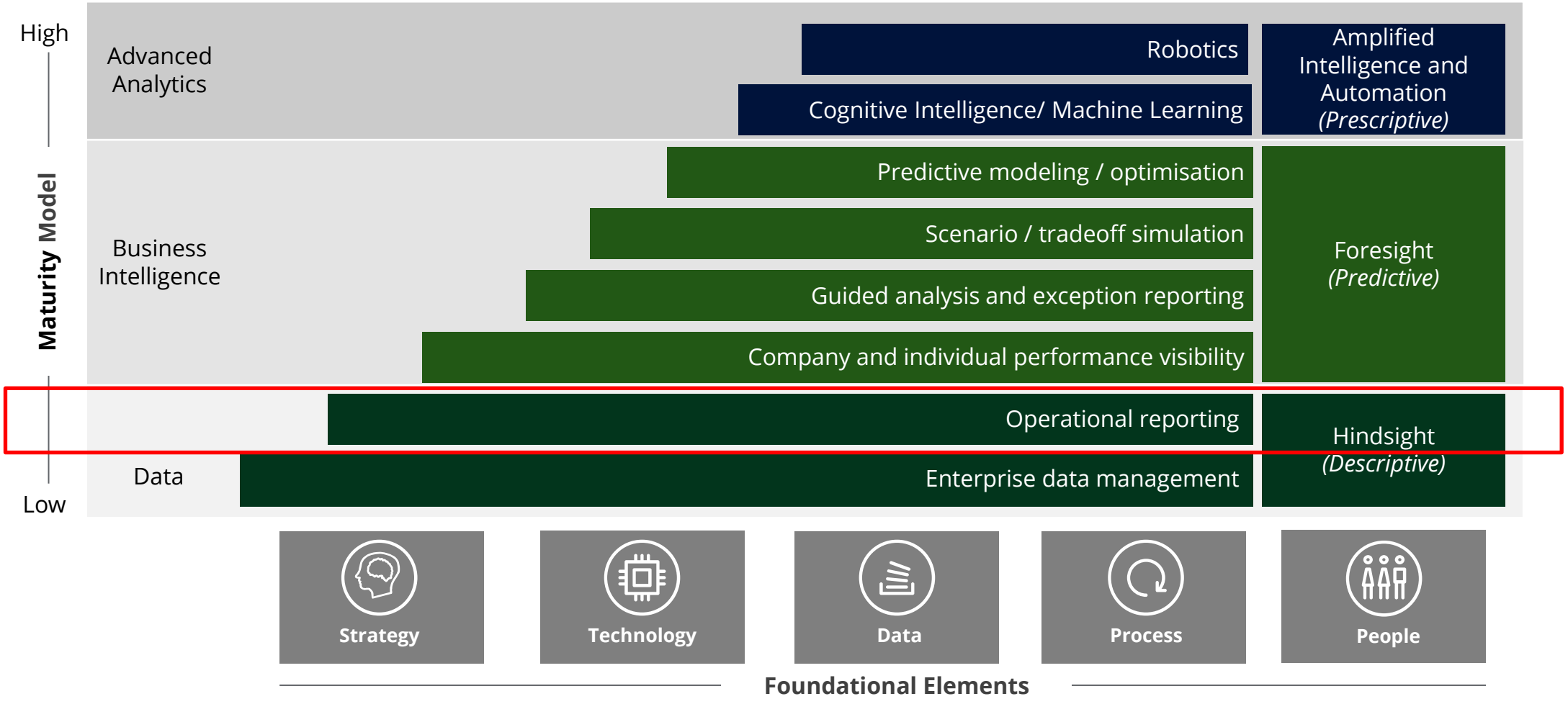
- **Build in regular touchpoints with interface partners / ancillary vendors to keep them apprised of project activities and inform them as to when they're needed to participate (testing, activation, etc)**

- **Incorporate data conversion plan and strategy into interface planning as they will be tightly knit (E.g. Legacy lab results conversion will be paired with real time lab interface)**

Reporting

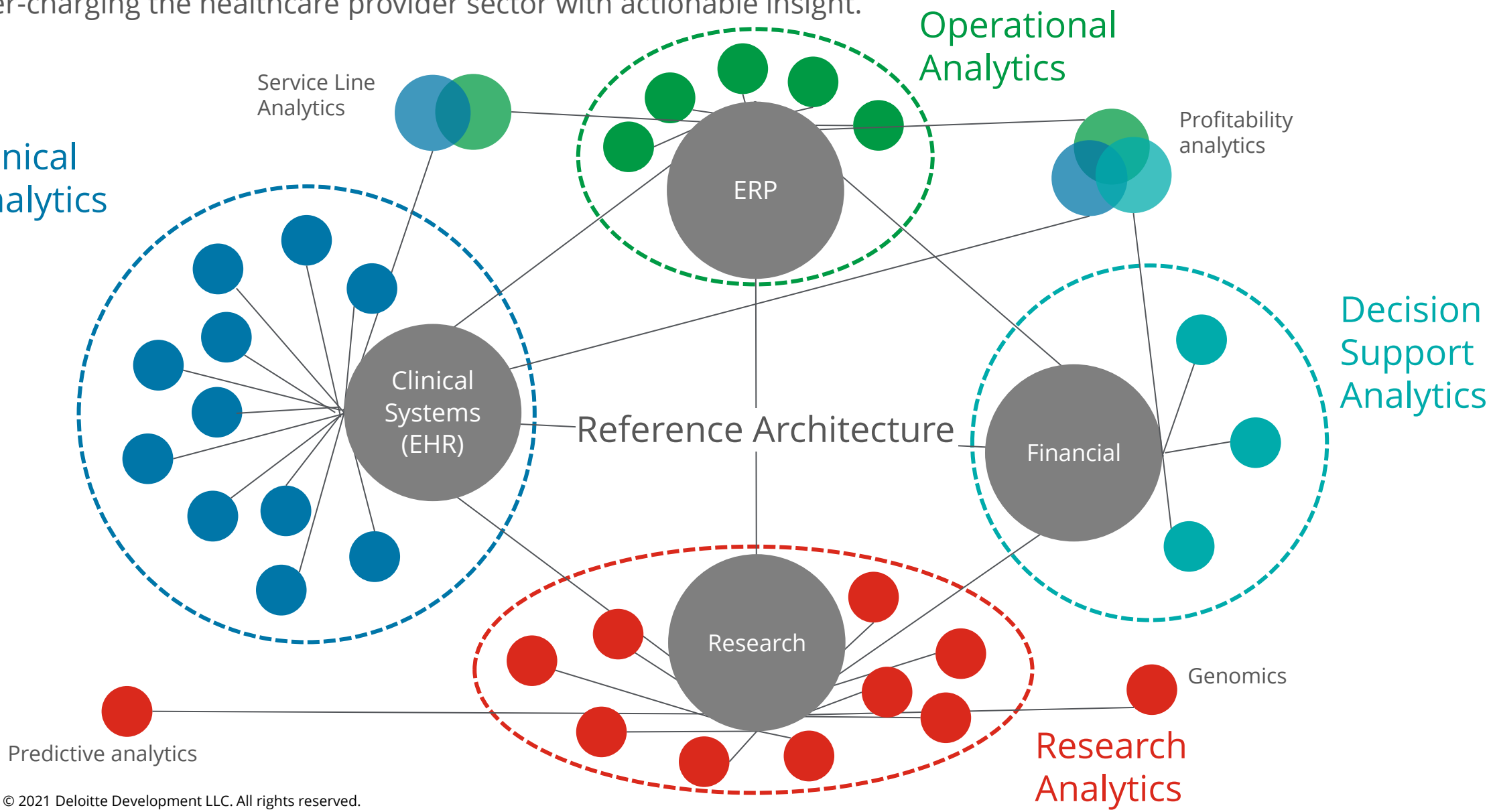
What Do We Mean by Analytics?

Analytics is the practice of transforming data into actionable insights to describe, predict, and improve business performance to deliver tangible business outcomes. Traditional reporting is a foundational capability.



Enterprise Applications and Analytics

Super-charging the healthcare provider sector with actionable insight.



The Insight Driven Organisation

Becoming a more Insight-Driven Organisation (IDO), delivering breakthrough value, and continuing to do so over time, requires the following elements to be considered.

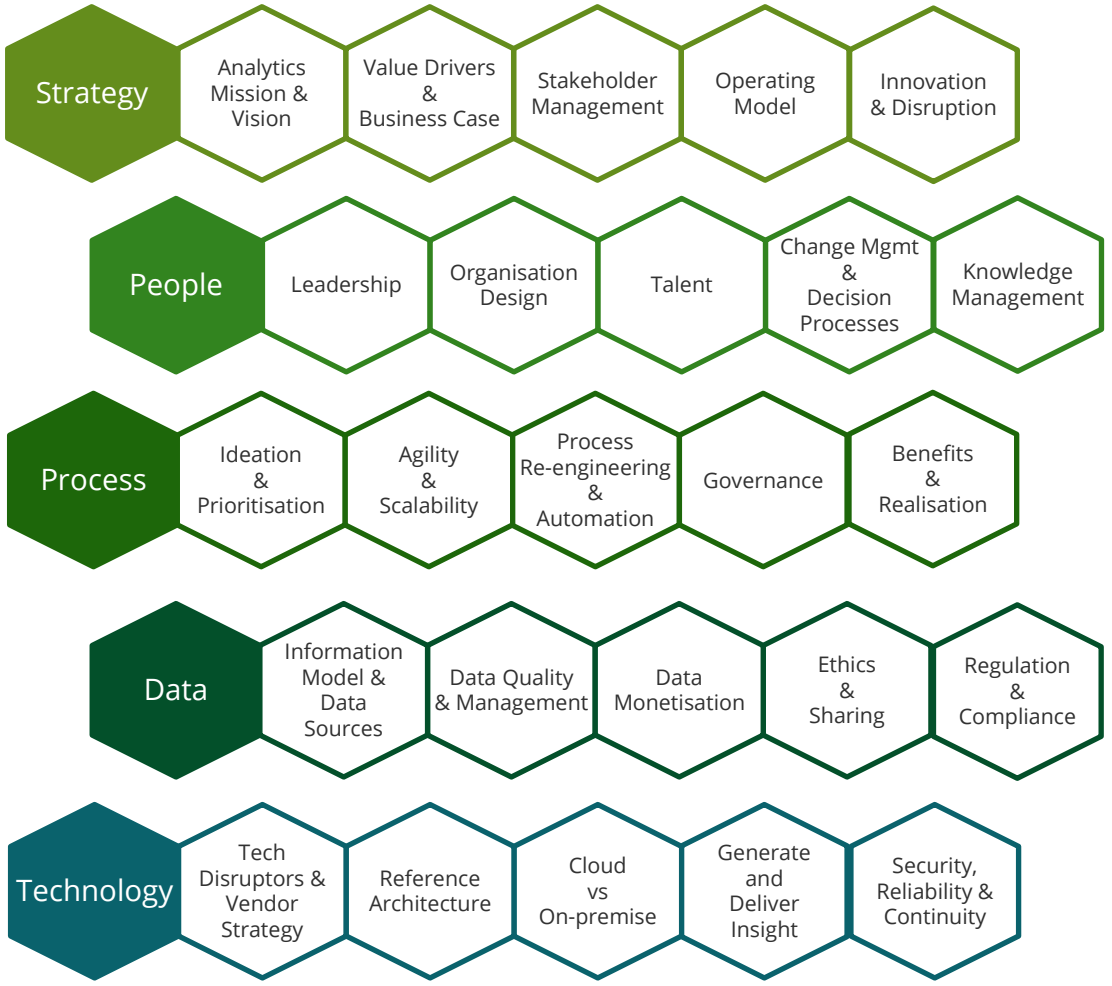
S Analytics Strategy reflects an understanding of where the enterprise is heading **and** the art of the possible related to technology.

P What organisational structure do we need to put in place to support our analytical strategy – **Now, Next, Later**? Who do we need to engage in other departments and what are their roles? What other talents do we need and what is the plan for getting them?

P From Analytics and Data Governance through intake and execution excellence, how do we balance **agility with discipline**? How will we comply with relevant regulations? How will we measure our progress?

D **What data do we need to answer the business questions**? From where is it sourced – internal, external, licensed, open? How do we bring it together and what are the challenges in transforming, linking and publishing it? How can we pursue **data excellence**?

T What is the **reference architecture** that accommodates what we already have vs. what we need to collect, curate, calculate and consume information?



Process Dimensions for What Good Looks Like

Re-engineering processes in the organisation to support the growing customer needs as well as market trends and changing existing structures and models to enable improved governance.

Ideation & Prioritisation	Cultivating ideas that generate business value through analytics, and prioritisation of these ideas by assessing them against the strategic value drivers in the organisation
Agility & Scalability	Developing Proof of Concepts to test hypotheses and enable decision making, and delivering long-term dynamic solutions that supports future analytics growth and needs
Process Re-engineering & Automation	Remodeling organisation processes to align with the changing customer needs and analytics capabilities, while aiming for a qualitative and quantitative result
Governance	Realising the need and identifying the need for data governance to minimise the risk of unethical data usage across all dimensions of data management
Benefits Realisation	Identifying new value add opportunities and leveraging existing capabilities by discovering meaningful patterns in current and past organisational data

Leverage Design Thinking to Integrate Analytics

Design thinking allows you to tightly link your analytics capabilities back to the business problem at hand and the outcome you want to achieve, so that you scale analytics capabilities not for the sake of technology, but to address key business challenges specific to the end user.

Design Thinking is a structured process with a set of skills, tools, and methods to solve problems and identify new opportunities by combining *empathy*, *creativity*, and *user experience*.

01 / IDENTIFY

Identify key stakeholders and end-users, understand the problem statement and **create a hypothesis of user needs**

02 / INQUIRE

Walk in your customer's shoes. Inquire, listen and **understand the "why"** of what they are saying

03 / SYNTHESISE

Consolidate insights to **user-types & critical moments** in order to make problems approachable

04 / IDEATE

Brainstorm services or products that solve problems, **match them with business value**

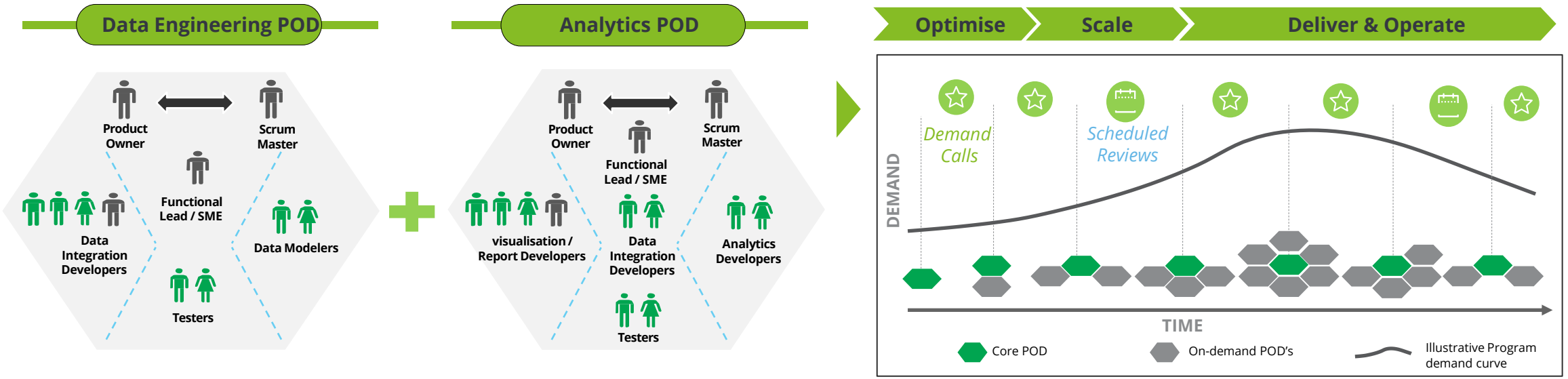
05 / DESIGN & DEVELOP

Implement the basic value proposition of your solution **as quickly and simply as possible**

Analytics Solution Foundry

Analytics and Data Engineering Pods with a fixed term and capacity along with on-going governance and oversight to manage demand and quality.

Flexible Resource Model leveraging highly skilled PODs



- Provides flexible resources to meet program demands aligned with the project plan
- Maintains core POD's that enable new PODs to hit the ground running quickly, there by gaining efficiencies and improving velocity
- Provides a model to integrate shared capacity seamlessly with Agile execution teams
- On-demand resources based on both quarterly scheduled demand reviews and monthly demand management calls

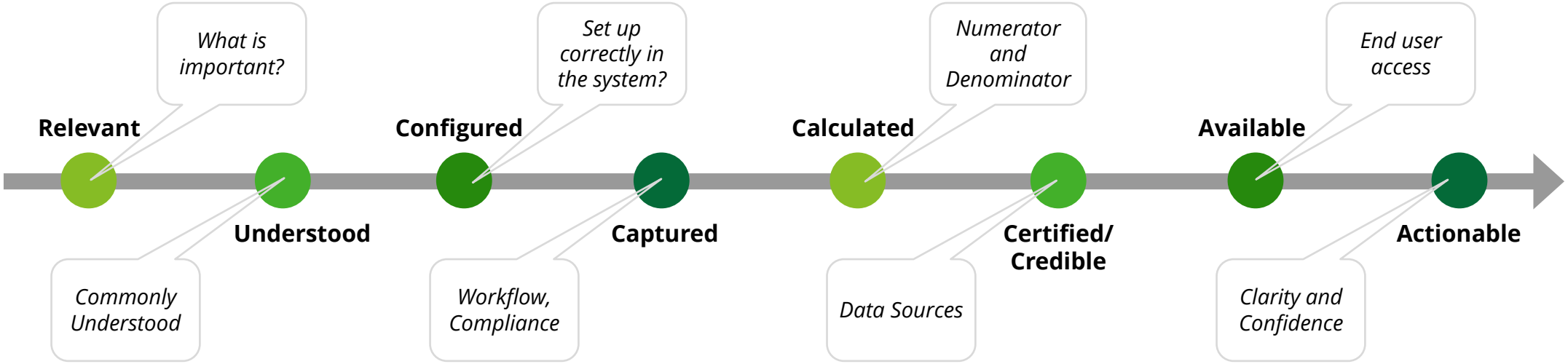
Data Dimensions for What Good Looks Like

Ensuring high quality data delivery for analysis by supervising the flow of data from source to output, and ensuring accurate access to data to increase the overall value generated by analytics engagements.

Information Model & Data Sources	Identifying different data sources and transforming it into meaningful data in enterprise information models that support analytical capabilities
Data Quality & Management	Enabling master data management to eliminate redundant and inconsistent versions of data across various functions of the organisation
Data Monetisation	Generating revenue by leveraging data to gain competitive advantage and increase market share
Ethics & Sharing	Enforcing internal and external policies supporting identity, privacy, reputation and ownership of data across the organisation
Regulation & Compliance	Recognising the importance of data to abide by regulation and compliance requirements

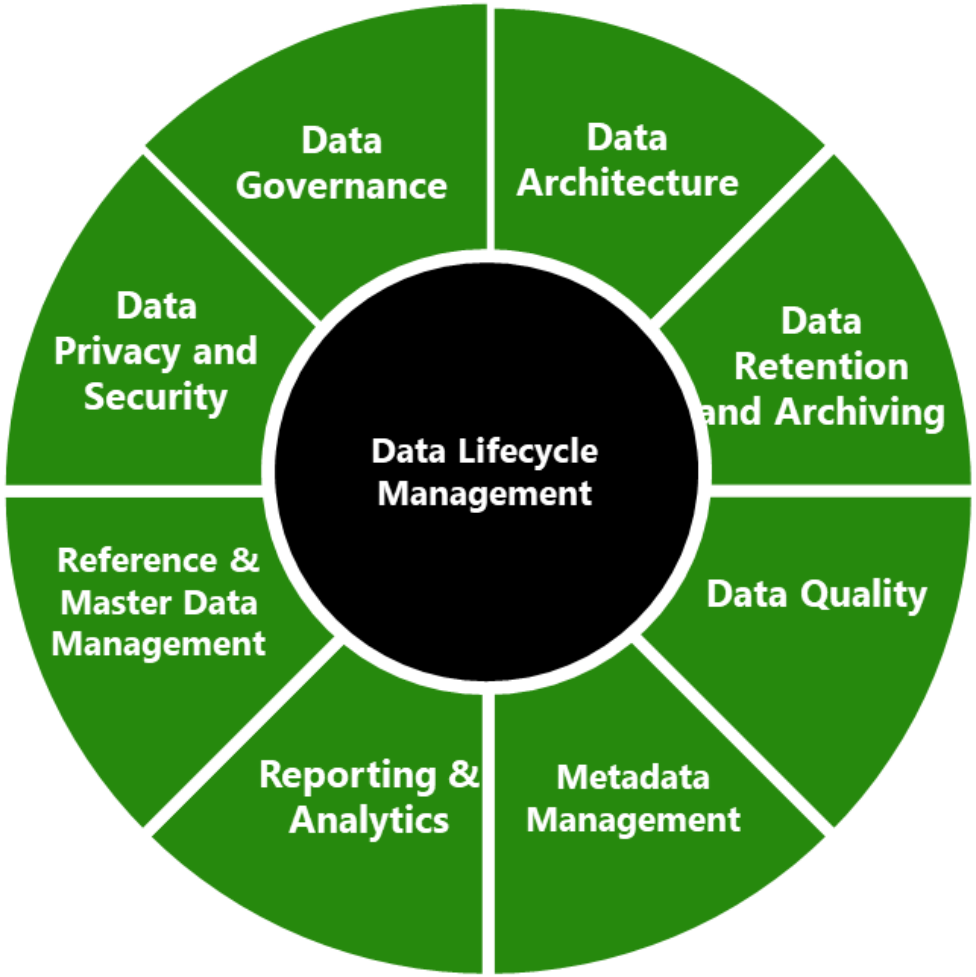
Data: An Example

Root cause analysis and solution refinement requires collaboration among constituents up and down the Value Chain of Data Excellence.



Data Lifecycle Management Framework

A formally established framework of capabilities, which when executed together result in quality data that is accurate and consistent to meet business needs and objectives.



Technology Dimensions for What Good Looks Like

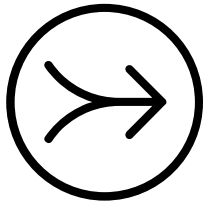
Enable an analytics ecosystem comprising of innovative technology solutions, products and platforms to maximise return on investments, and position for transformation while leveraging existing capabilities.

Tech Disruptors & Vendor Strategy	New technologies and techniques are driving change and provide the most potential value in the data and analytics space for an Insights driven organisation
Reference Architecture	To effectively exploit the myriad of opportunities presented by information, organisations must take a holistic view of the supporting architecture
Discovery Zone	Explore and uncover multi-dimensional transitive relationships from data to discover and visualise situation-aware, relevant insights
Cloud vs. On Premise	Organising sustainable analytics across the whole organisation is important and requires an operating model which supports this goal
Security, Reliability, & Continuity	Effectively managing technology risks and protecting information to enable convenient, on-demand access to insights

Analytics of the Future

An inevitable architecture is a must for now and into the future. Open standards, cloud-first designs and loosely coupled architectures are the norm in start-ups. Now, large enterprises have similar ambitions.

Use what you have, buy what you need, build what you must



- Flexible
- Automated
- Scalable
- Asset Leverage

Collect

Curate

- Dynamic
- Accurate & Correct
- Centralised
- Standardised
- "No new system of Record"

- Configurable
- Automated
- Process Oriented
- Transparent

Calculate

Consume

- Role Based Security
- Federated Access
- Enrichment
- Self-Service & Ad-Hoc
- Defined Roadmap

Reference Architecture and Analytics Data Platform

A reference architecture that provides a template solution in a particular domain (e.g., analytics) and the Zone based Analytics platform meets key analytics capability requirements.

- Flexible
- Automated
- Scalable
- Asset Leverage

Collect

Curate

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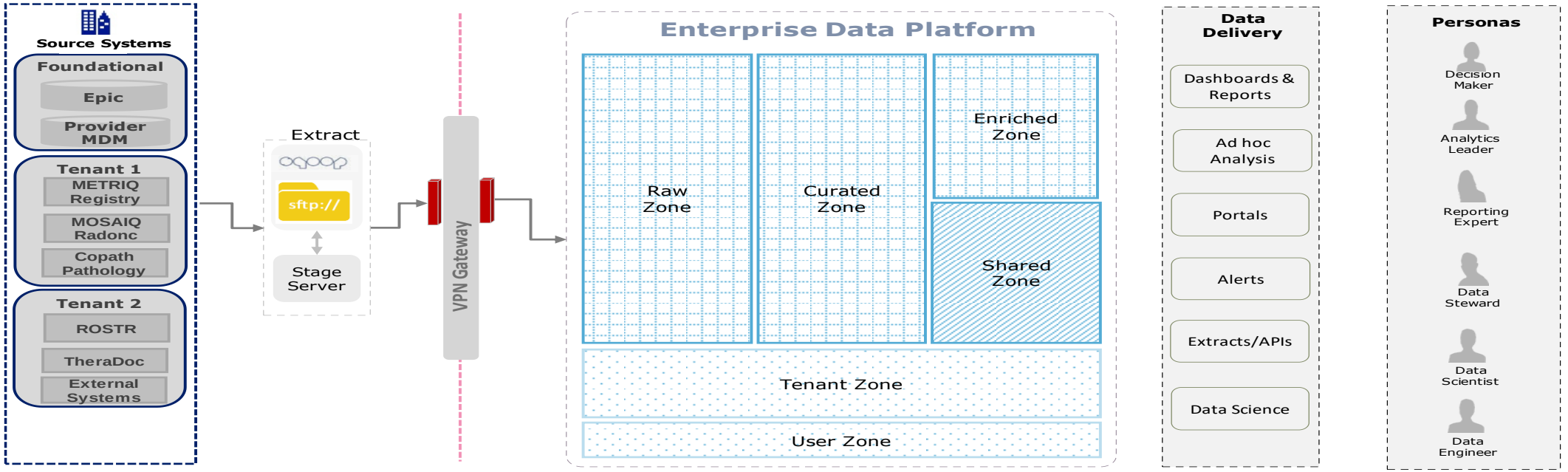

Q&A

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