DDF in Action

Transforming Clinical Trials with Standards and Digitalization

"Continuing the Journey, Charting the Future"

Novo Nordisk, Copenhagen
10 October 2024

TransCelerate BIOPHARMA INC.

DDF in Action Agenda

October 10, 2024

Time (CEST)	Topic
9:45 – 10:20 AM	On-site Check-In
10:30 – 10:35 AM	**Agenda and Logistics:** *Elinor Lobner-Olesen, Novo Nordisk*
10:35 – 10:45 AM	**Welcome Remarks:** *Karin Kramer, Novo Nordisk*
10-:45 – 11:00 AM	**DDF Overview:** *Elinor Lobner-Olesen, Novo Nordisk*
11:00 – 11:15 AM	**CDISC Introduction:** *Peter Van Reusel, CDISC*
11:15 – 11:45 AM	**CDISC USDM Overview:** *Dave Iberson-Hurst, CDISC*
11:45 AM – 12:00 PM	Morning Break
12:00 – 1:00 PM	Technical Solution Poster Session
1:00 – 2:00 PM	Networking Lunch
2:00 – 5:00 PM	Plenary Session: Adoption Stories (Livestreaming)
5:00– 5:30 PM	**Reflections and Closing Remarks:** *Lissa Morgan, Amgen*

Complete the pre-event survey if you haven't already.

Ground Rules for the Day

- **We want to make this discussion helpful and answer as many of your questions as we can, so here are some quick ground rules:**
  - –Participation is voluntary, as is using TransCelerate assets/tools
  - –The responsibility for compliance with laws and regulations is owned by the solution adopter
  - –You don't have to identify what company you work for
- **Things we would ask you not to post questions on**:
  - –For clinical trial sponsors, what vendors/sites/CROs a company is working with or not working with
  - –For tech companies, vendors, CROs, & others, what pharma companies you work with or don't work with
  - –Any issues/criticisms companies have with any vendors, tech company, sites, CROs, or sponsors
  - –Future and long-term development plans
  - –Anything related to pricing or costs -- what you pay for the purchase of or receive for the sale of any goods or services
- **We can't address questions about:**
  - –Specific vendors or other business partners with whom any companies are working
  - –Costs of using/implementing TransCelerate assets/tools or any commercial product/service
  - –Which member companies are using or going to use any TransCelerate solution or any commercial product or service
- **TransCelerate does not endorse vendors. This event is not a marketing or sales opportunity.**

Please keep in mind…

Phones and Devices

- **Silence Your Devices**: Please turn off or silence your phones and electronic devices.
- **Emergencies**: If you need to take a call or respond to an emergency, kindly step out

Questions?

- **Use QR Code**: Please use the QR code to enter your questions. The QR code is provided to you as part of your registration packet and is also shared on the screen at regular intervals.

Raffle Participation

- **Raffle Game**: Please play the raffle, available near the Pin Game poster
- **Name and Identification**: Please provide only your first and last name. Do not include your or your organization's name in your entries.

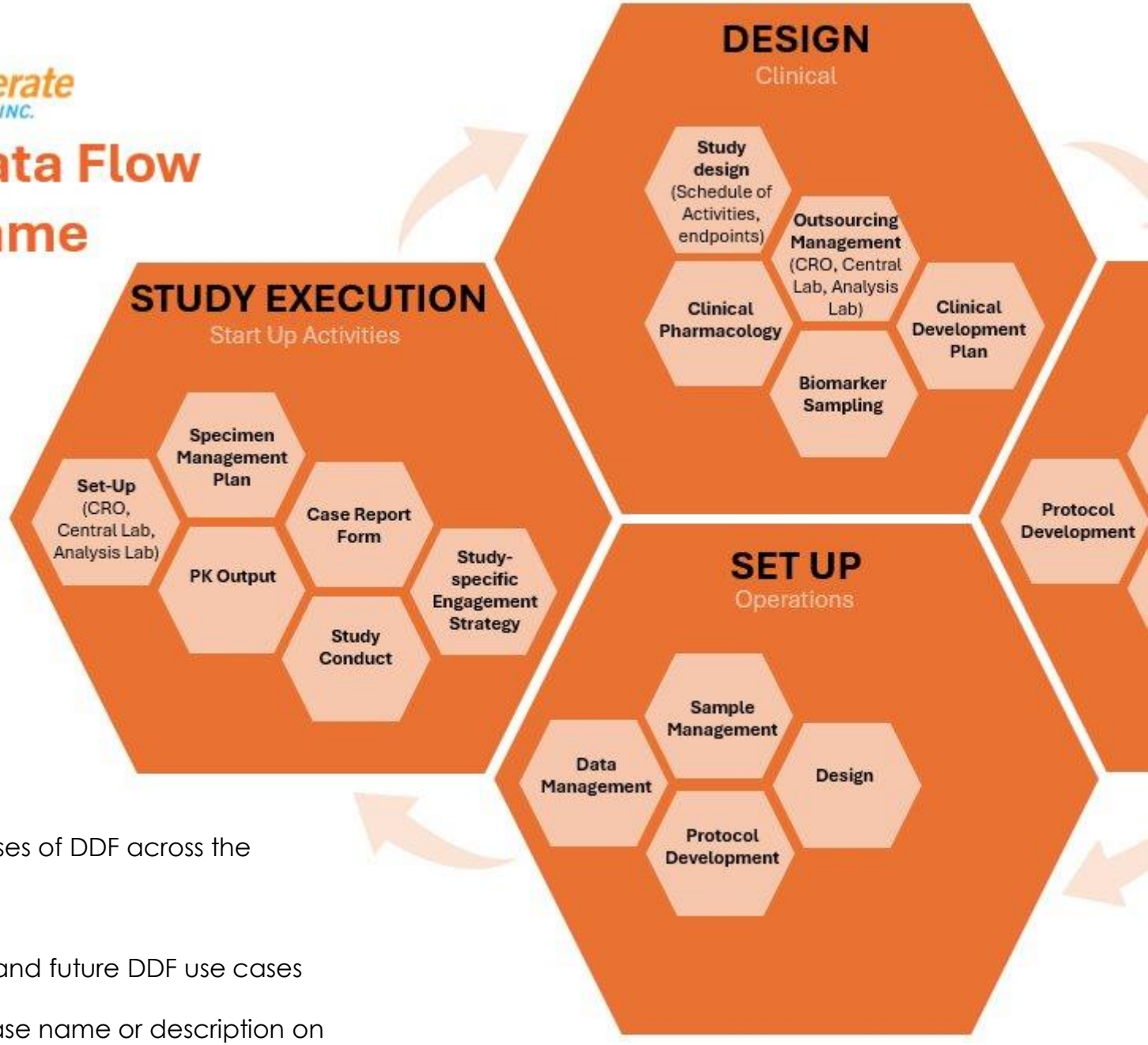
Respect for Time

- **Start and End Times**: We'll start and end on time to respect everyone's schedule.
- **Breaks**: We will have regular breaks. Please return promptly after each break.

TransCelerate BIOPHARMA INC.

Clinical Data Flow Pin Game

Join us and play the DDF Pin Game



How to Play

Join us in this fun pin game to identify current and future use cases of DDF across the clinical study lifecycle that apply to your organization.

Use the stickers provided to:

- Stick them across the clinical study lifecycle to mark current and future DDF use cases that apply to your organization
- Before sticking, feel free to write, in a word or two, the use case name or description on your sticker. Do not include your or your organization's name in your entries.

No names needed! Please do not share your or your organization's name when participating

Welcome Address

Karin Kramer

Novo Nordisk

DDF Overview

10:45 - 11:00AM

Digital Data Flow: Breaking the Document Paradigm

Elinor Løbner-Olesen

Novo Nordisk

Questions? Scan the QR Code on your phone to add in your questions for our presenters and speakers

TransCelerate was conceived to improve the health of people around the world by accelerating and simplifying the research and development of innovative new therapies

In 2012, after several years of discussion, R&D Leaders formed a non-profit to collaborate using the words **"Transform"** and **"Accelerate"** to create TransCelerate.

Member driven mission to collaborate across the global biopharmaceutical research and development community to **identify, prioritize, design, and facilitate** the implementation of solutions designed to drive the **efficient, effective and high-quality delivery of new medicines**.

TransCelerate has grown from **10 pioneering companies** to **22 Member Companies** working towards improvement in key value drivers in clinical research.

TransCelerate aspires toward a vision of Converging Clinical Care and Clinical Research

CONVENE STAKEHOLDERS TO READY THE ECOSYSTEM FOR CLINICAL TRIALS AT THE POINT OF CARE

ENABLE COMPLETE DIGITIZATION & INTEROPERABILITY OF THE STUDY PROTOCOL ACROSS RESEARCH & CARE

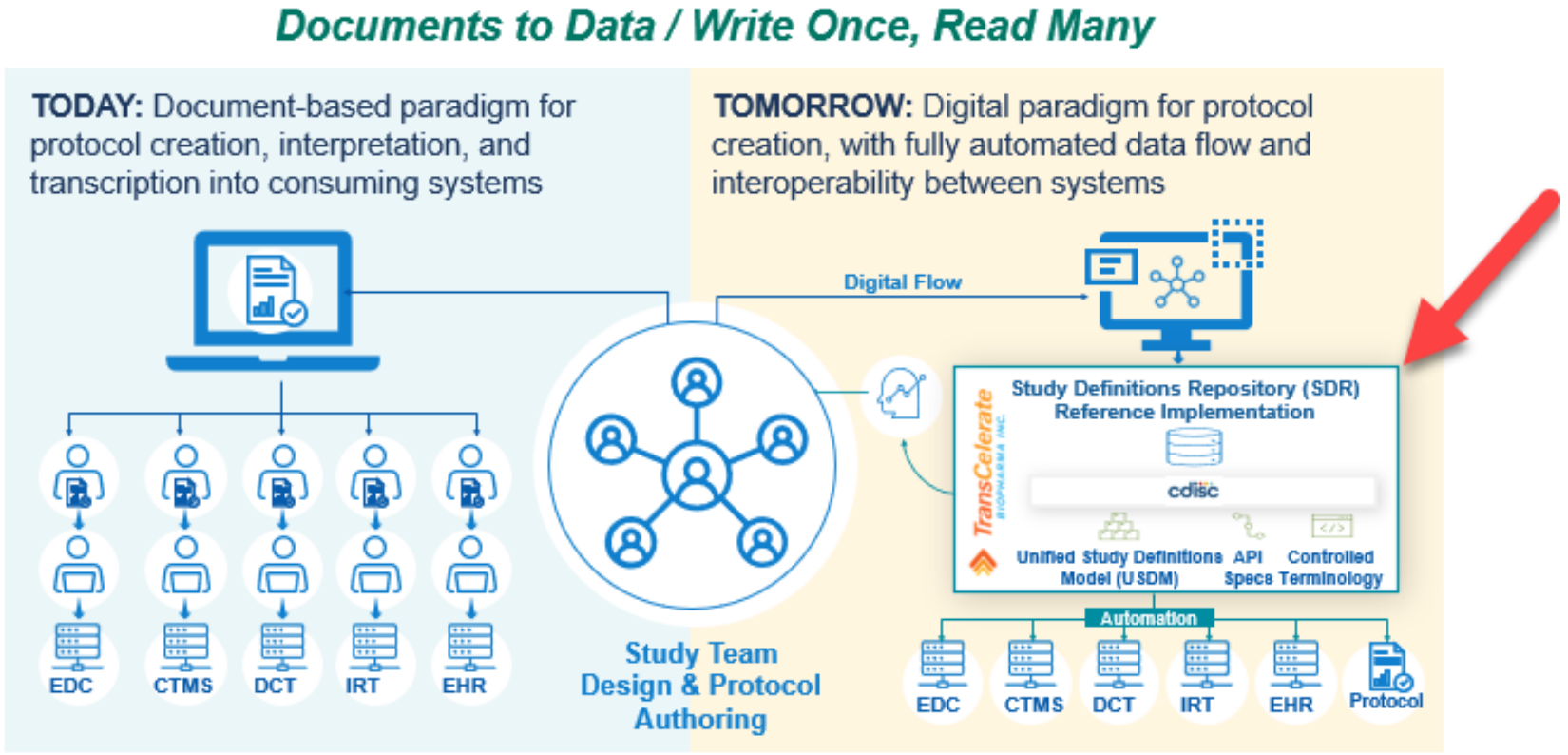
Ecosystem collaboration is fundamental to these goals

- TransCelerate Members
- HCPs / Clinicians
- Community Care
- Patient Groups
- Regulators
- Policy Makers / Agencies
- Technology Community
- Standards Setting Org's
- Other Consortia

Digital Data Flow Ambition: Breaking the Document Paradigm

Digital - standard representation of study protocol
- ✓ structured
- ✓ machine readable
- ✓ executable

Data Flow – industry-wide interoperability
- ✓ exchange of data
- ✓ non-cooperating organizations
- ✓ minimal effort



Eliminate non-value added activities
Enable automation of downstream study startup and conduct processes
Create foundation for study design analytics insights

https://www.transceleratebiopharmainc.com/assets/digital-data-flow-solutions/

DDF Use Cases

From machine actionable Protocol authoring to automation of downstream connectivity

Study Design → **Study Start-up** → **Study Execution** → **Analysis & Reporting** → **Regulatory Submission**

Study Design and Analytics

- Predict and avoid protocol amendments
- Improve study design with comparative analysis
- Automate for complexity and patient burden scoring
- Optimize Inclusion / Exclusion Criteria
- Determine study feasibility

Downstream Process Automation and E2E Traceability

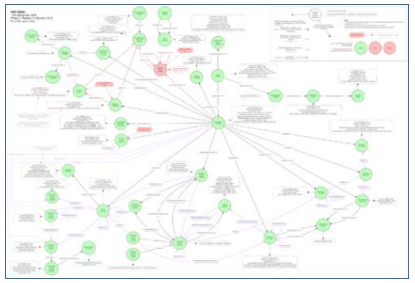
- Auto-configure execution systems
- Auto-generate SDTM trial design datasets
- Auto-populate trial registries
- Publish user-specific protocol views
- Feed study updates into all study execution systems

*"**As a medical writer**, the digitalization of data flows enables me to work faster with my team on one dedicated system, accessing study content in a single digital study design system.*

*"**As a data manager**, the digitalization of end-to-end processes from study design to EDC generates structured data that can be leveraged to track outcomes and progress made.*

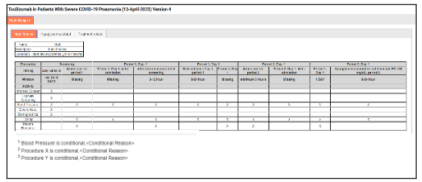
*"**As a technical expert**, the digitalization of data flows reduces tedious manual work freeing up time for more complex projects that cannot be automated (value-added activities focus).*

DDF Initiative encompasses Technical Standards & Solutions, Change Management, and Industry Engagement



Unified Study Definitions Model (USDM) Reference Architecture

TransCelerate's Study Definitions Repository (SDR) Reference Implementation



Digital Data Flow Initiative

Suite of DDF Adoption Resources, Videos & Change Management Tools

Continued Industry Collaboration between TransCelerate, CDISC ICH, and HL7

Growing Solution Collaboration Forum (SCF)*

**Company logos illustrate current involvement and are not used to imply endorsement of specific vendors for DDF or to identify a comprehensive list of all actual or potential future participants in DDF.*

What's Next in 2025?

DDF's path forward will focus on advancing the Clinical Trials Ecosystem towards a digitized protocol through the deployment of standards, technology and use case sharing

2025 Protocol Digitization Objectives

Enable Digitization & Interoperability Of The Study Protocol Across Research & Care

Enable stakeholders to easily share digital protocol information and insights

Promote hands-on engagement with protocol digitization solutions

Educate and update stakeholders on implementation paths

This includes:

- Release of:
  - ✓ CDISC's USDM v4
  - ✓ Study Repository v4
  - ✓ Additional open-source tools
- Scoping for CDISC's USDM Phase 5

- Supporting and sponsoring business case development with adoption case studies.
- Organizing events, webinar, trainings to improve understanding and education among stakeholders on implementation of digital data flow.

How You can Contribute

- Collaborate with the DDF team to capture your organization's DDF case studies and adoption stories
- Explore, identify and share USDM, DDF solutions use cases
- Partner with others in the ecosystem to identify ways to build USDM into solutions to achieve protocol digitalization
- Evangelize DDF within your organization, educate your teams on Digital Data Flow and update on latest technical releases, use cases

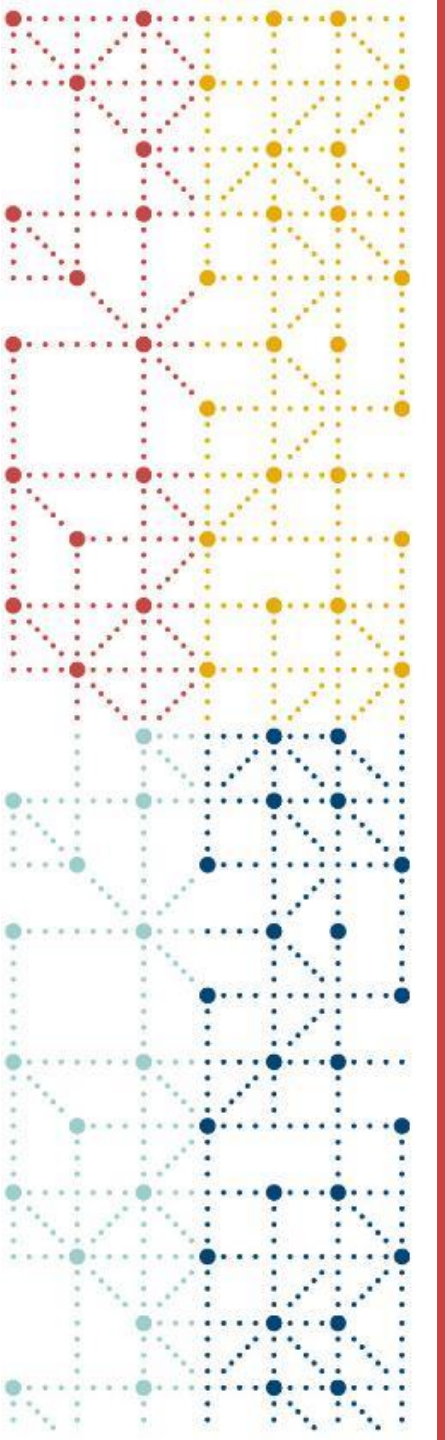
CDISC Introduction

11:00 – 11:15 AM

CDISC USDM Introduction

Questions? Scan the QR Code on your phone to add in your questions for our presenters and speakers

Peter Van Reusel
Chief Standards Officer, CDISC



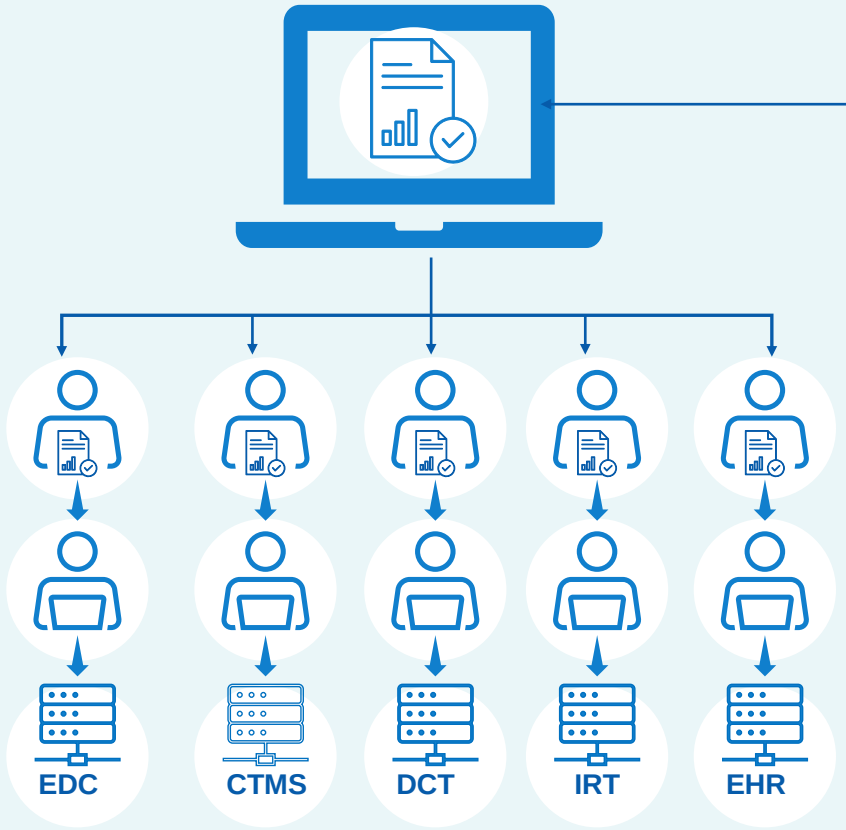
Agenda

1. Introduction to USDM
2. USDM, M11, and the HL7 UDP – how do they come together?

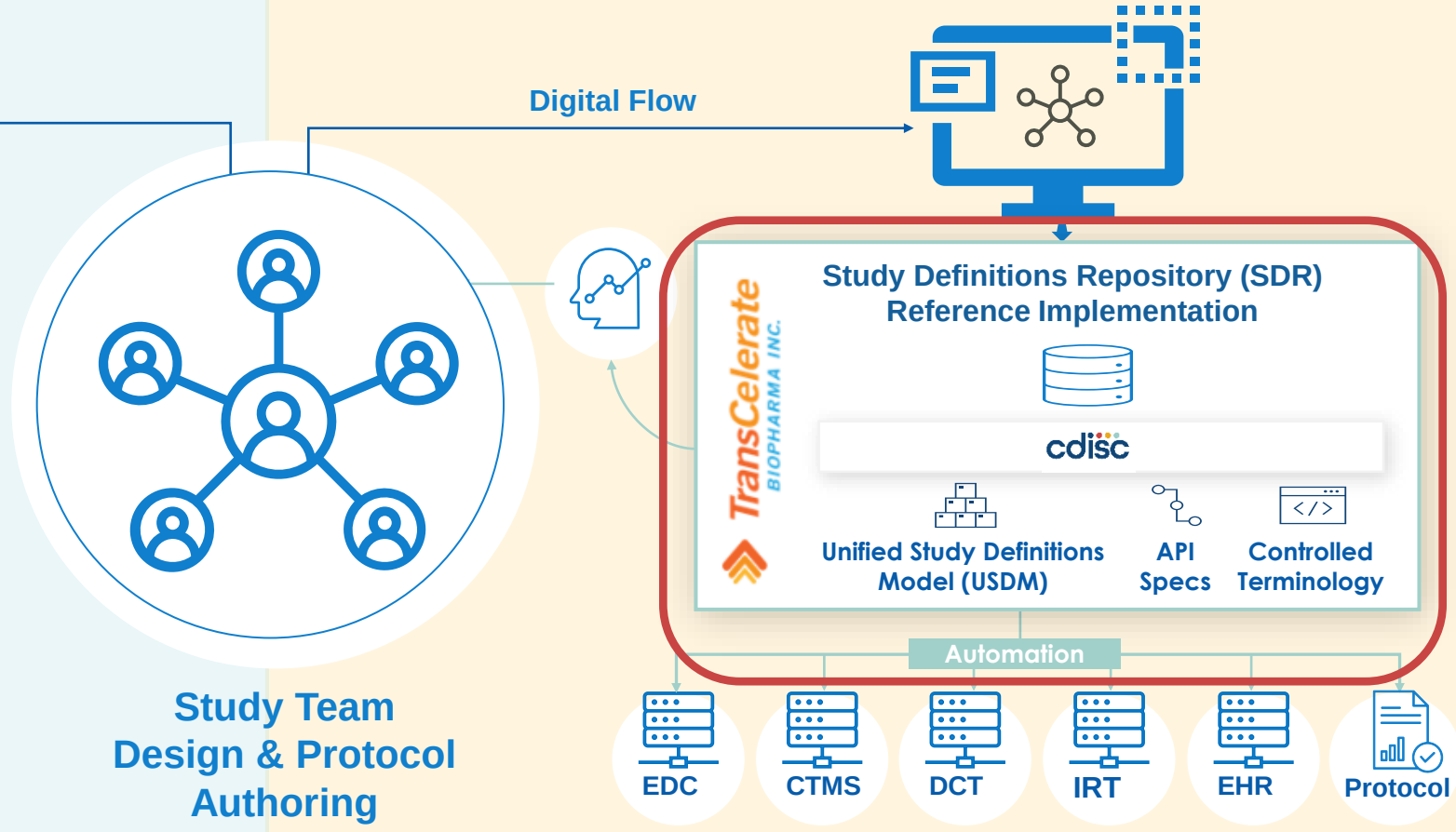
TransCelerate Digital Data Flow (DDF) Ambition

Write Once, Read Many

TODAY: Document-based paradigm for protocol creation, interpretation, and transcription into consuming systems



TOMORROW: Digital paradigm for protocol creation, with fully automated data flow and interoperability between systems

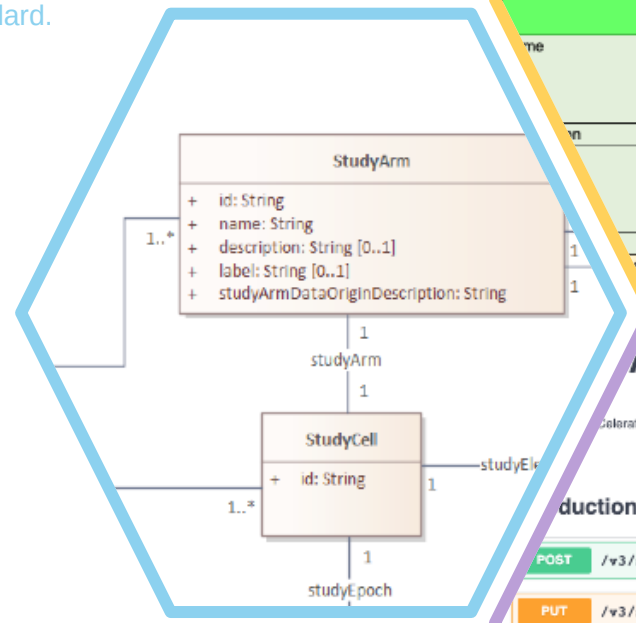


https://www.transceleratebiopharmainc.com/assets/digital-data-flow-solutions/

The USDM Standard

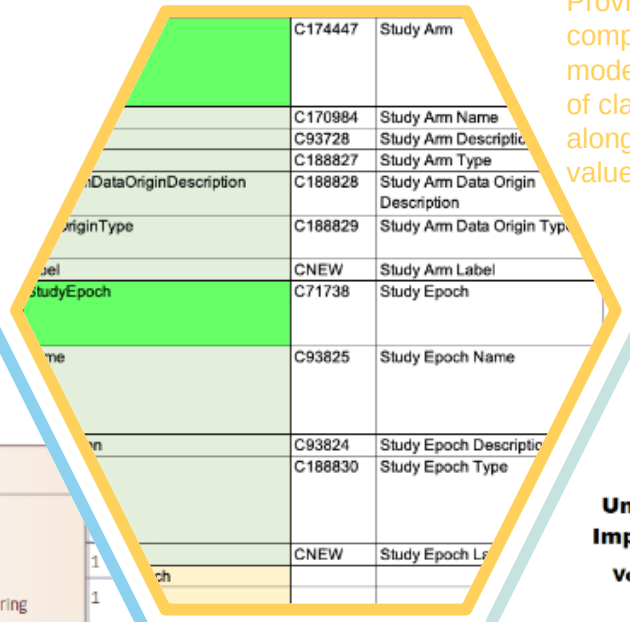
Logical Model

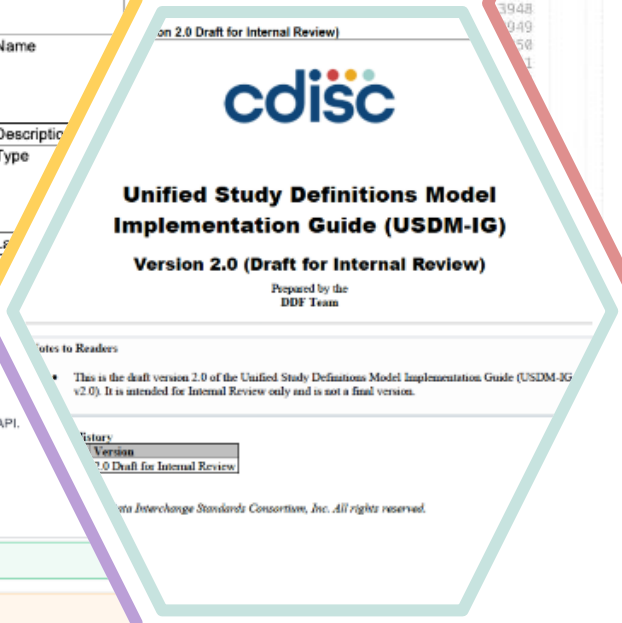
The UML logical model (a class diagram) that provides the basis for the USDM standard.



CDISC Controlled Terminology

Provides further semantics, complementing the UML model. Includes the definition of classes and attributes along with the definition of value sets



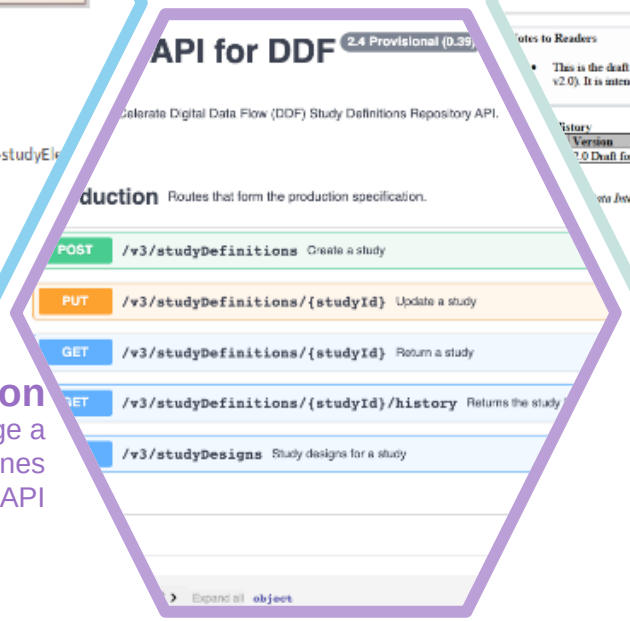


Examples

Example protocols implemented in the USDM with associated JSON files and visualisations

API Specification

Provides the means to exchange a single study between machines using a JSON API

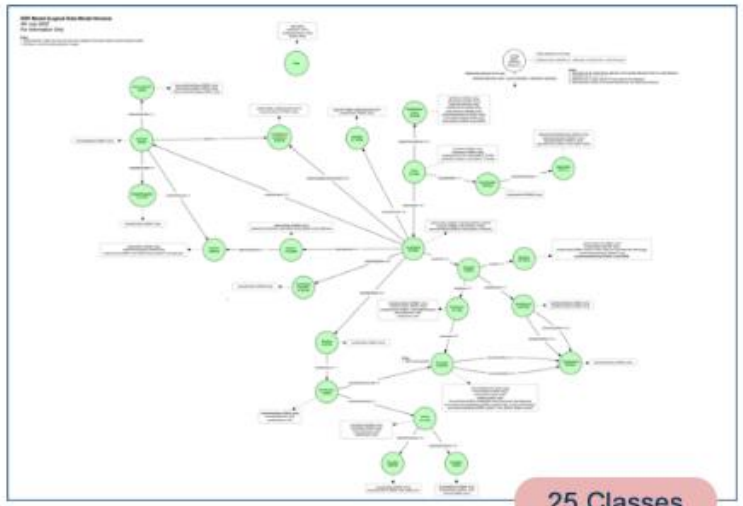


Implementation Guide

Guidance on using the USDM model and ensuring conformance with the standard

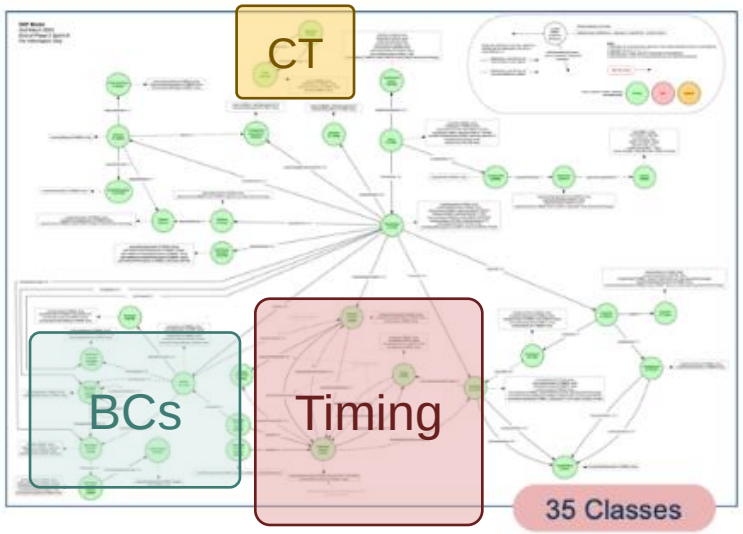
CDISC DDF / USDM: Phases One, Two and Three

Phase One



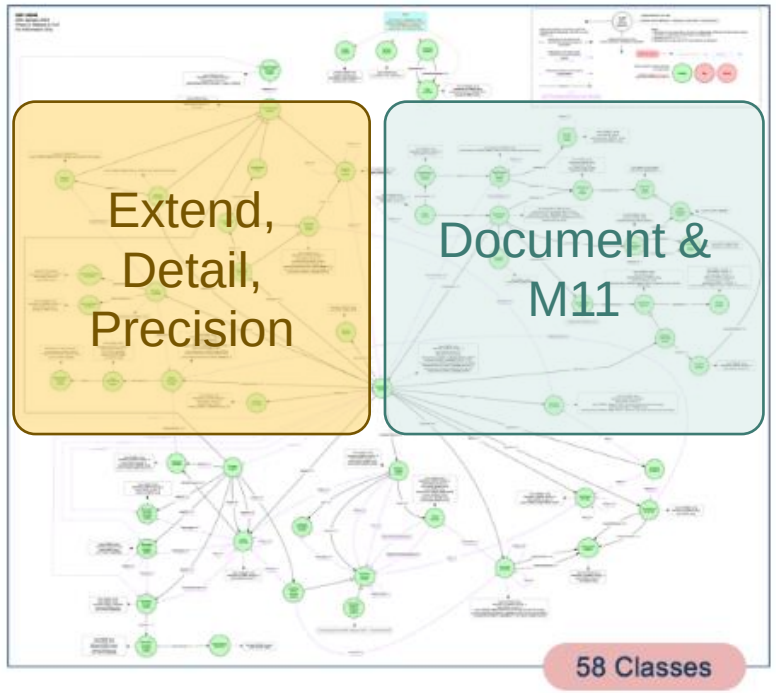
- Solid foundation
- The protocol document was an external entity into which the structured content could be exported

Phase Two



- Focused on the structured elements of the protocol, e.g. the Schedule of Activities (SoA) & Biomedical Concepts (BCs)
- The protocol document still an external entity

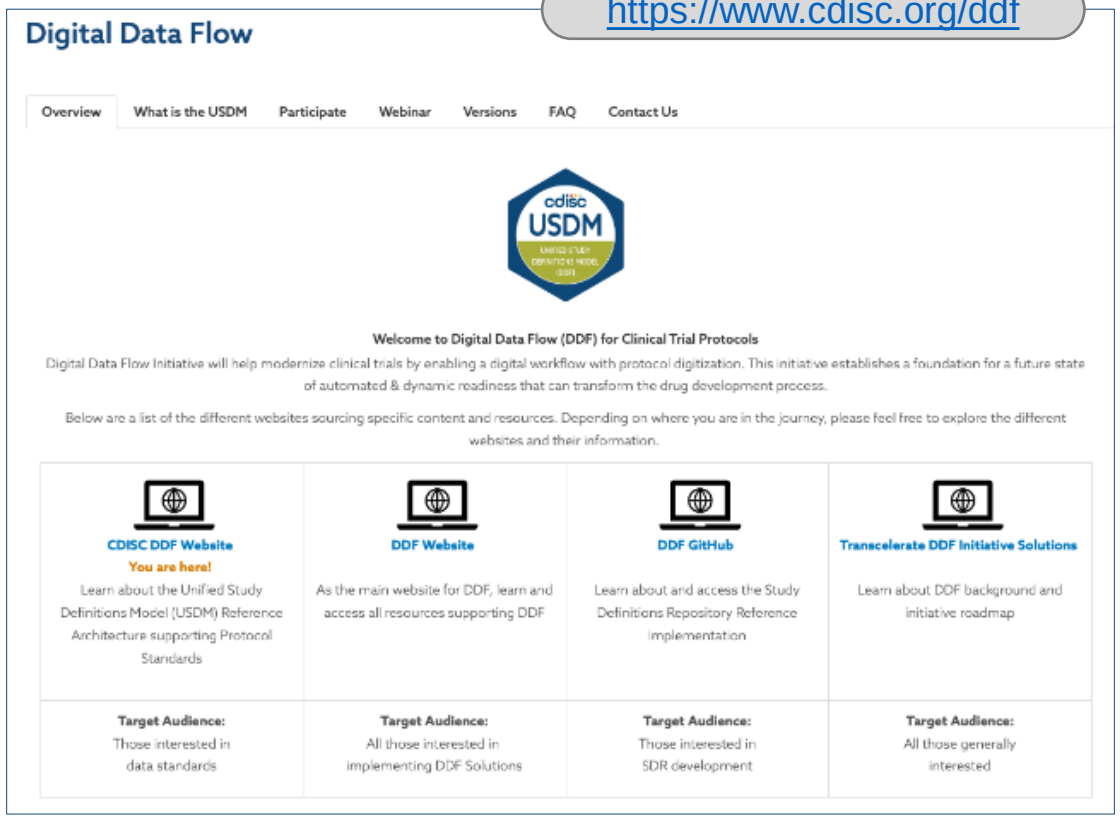
Phase Three



- Now contains structured and unstructured elements
- The entire protocol document can be held within the USDM
- Allows for the protocol document to be generated from the model

Example Resources – CDISC

https://www.cdisc.org/ddf



CDISC Github housing the USDM deliverables (model, CT, API etc) along with examples of protocols placed into USDM.

https://github.com/cdisc-org/DDF-RA

Open-source python package that implements USDM V3. Can be used by anyone to build test data

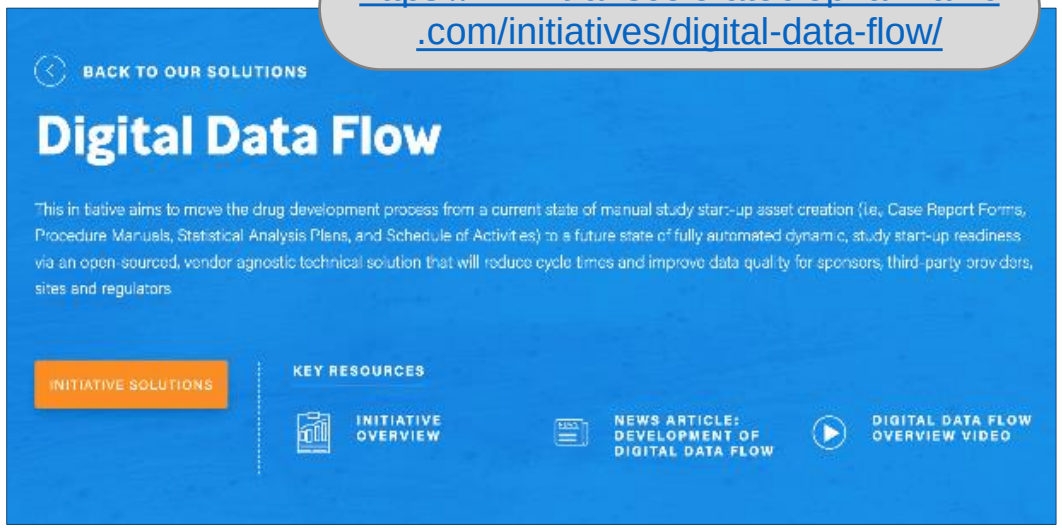
https://pypi.org/project/usdm/

Web-based version of the USDM test tooling.

https://usdm-service.fly.dev/

Example Resources – TransCelerate

https://www.transceleratebiopharmainc.com/initiatives/digital-data-flow/



TransCelerate web page holding.a significant number of DDF and USDM resources including the persona guides

https://www.transceleratebiopharmainc.com/assets/digital-data-flow-solutions/

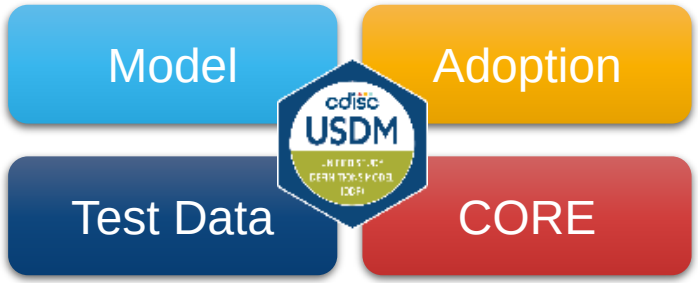
Github housing the source for the Study Definition Repository (SDR) Reference Implementation of the USDM

https://github.com/transcelerate/ddf-sdr-platform

DDF solutions directory. A growing list of self-reported solutions which utilize and follow the DDF Unified Study Definitions Model (USDM)
https://transcelerate.github.io/ddf-directory/directory/directory.html

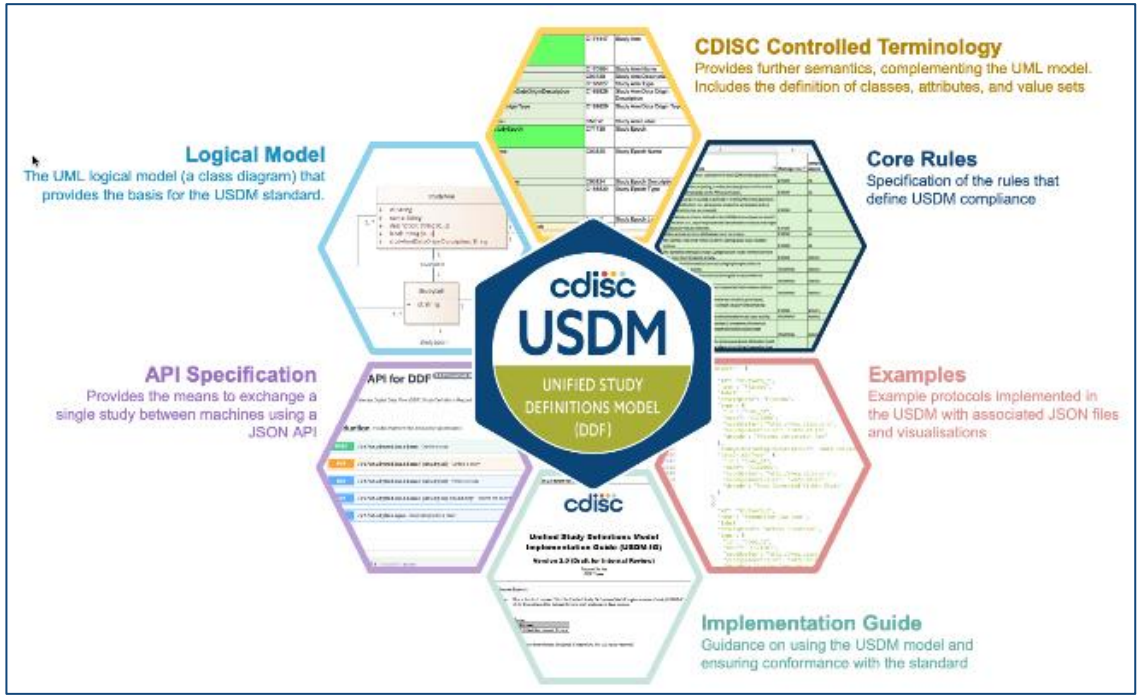
Phase 4 Overview

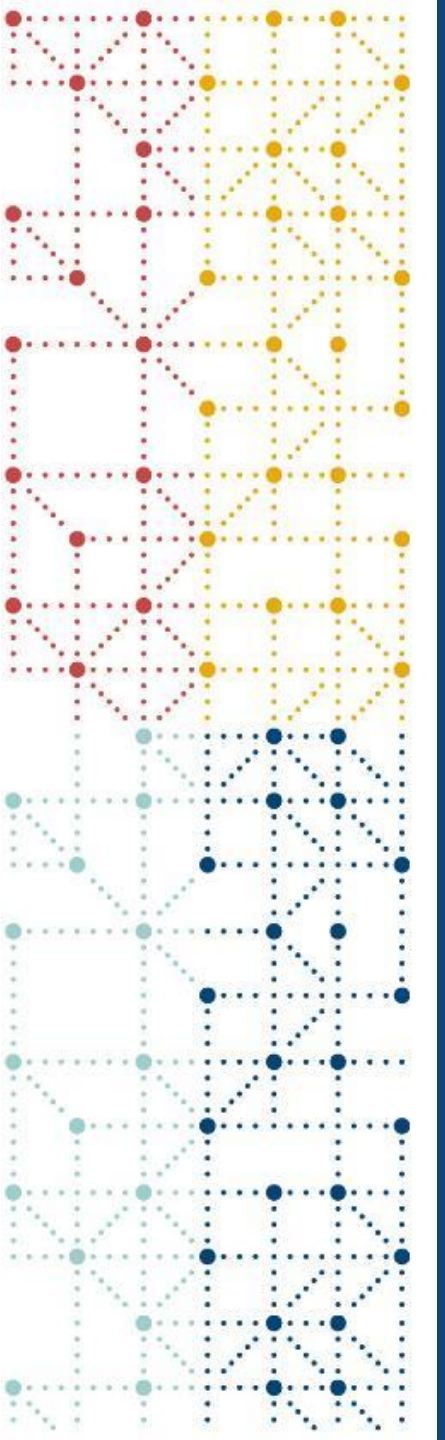
- More focus on refinement rather than new content
- Need to pay attention to backward compatibility
- Harmonization with ICH M11
- Conformance Rules now part of the standard



Phase Four Focus

1. USDM Enhancements
2. Continued alignment of USDM with ICH M11
3. Utilizing the Digital Protocol (UDP) collaboration
4. USDM Conformance Rules to support USDM v3.0 and v4.0
5. Test data and test tools
6. Development of training and education materials
7. Align USDM and Trial Master File (TMF)



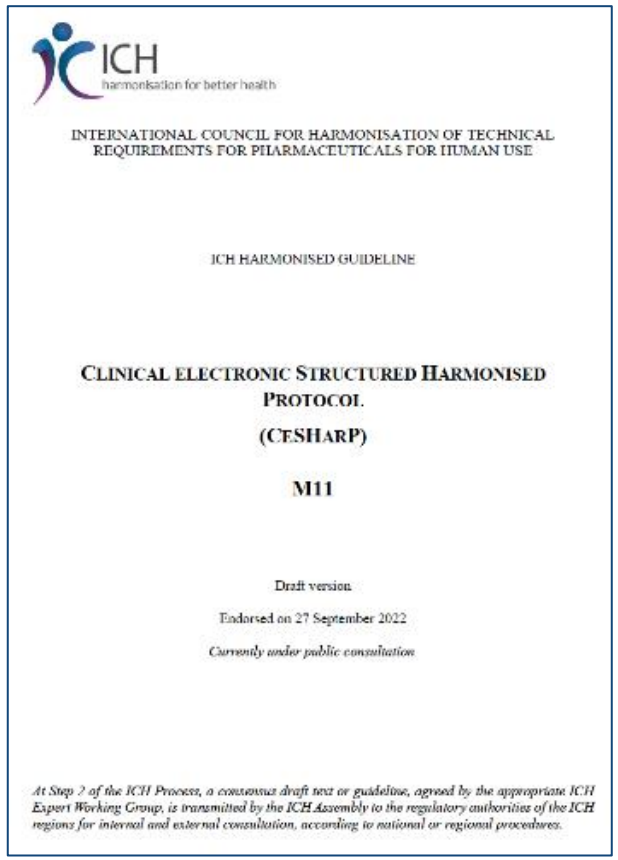


USDM, M11, and the HL7 UDP – how do they come together?

M11 Is …

ICH CLINICAL ELECTRONIC STRUCTURED HARMONISED PROTOCOL (CeSHarP)

https://www.ich.org/page/multidisciplinary-guidelines



ICH harmonisation for better health

INTERNATIONAL COUNCIL FOR HARMONISATION OF TECHNICAL REQUIREMENTS FOR PHARMACEUTICALS FOR HUMAN USE

ICH HARMONISED GUIDELINE

CLINICAL ELECTRONIC STRUCTURED HARMONISED PROTOCOL

(CESHARP)

M11

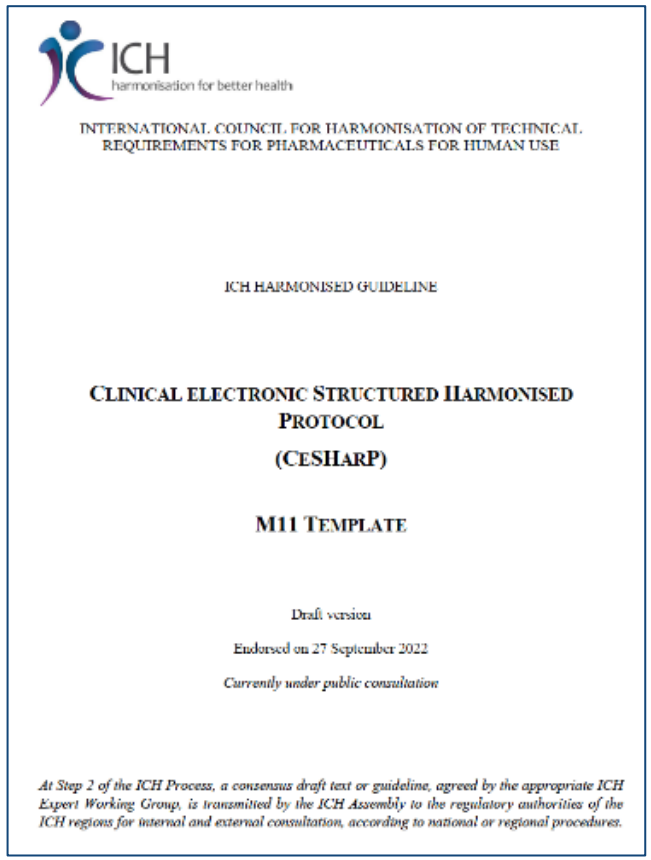
Draft version

Endorsed on 27 September 2022

Currently under public consultation

At Step 2 of the ICH Process, a consensus draft text or guideline, agreed by the appropriate ICH Expert Working Group, is transmitted by the ICH Assembly to the regulatory authorities of the ICH regions for internal and external consultation, according to national or regional procedures.

Provides background, purpose, and scope as a guideline



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ICH HARMONISED GUIDELINE

CLINICAL ELECTRONIC STRUCTURED HARMONISED PROTOCOL

(CESHARP)

M11 TEMPLATE

Draft version

Endorsed on 27 September 2022

Currently under public consultation

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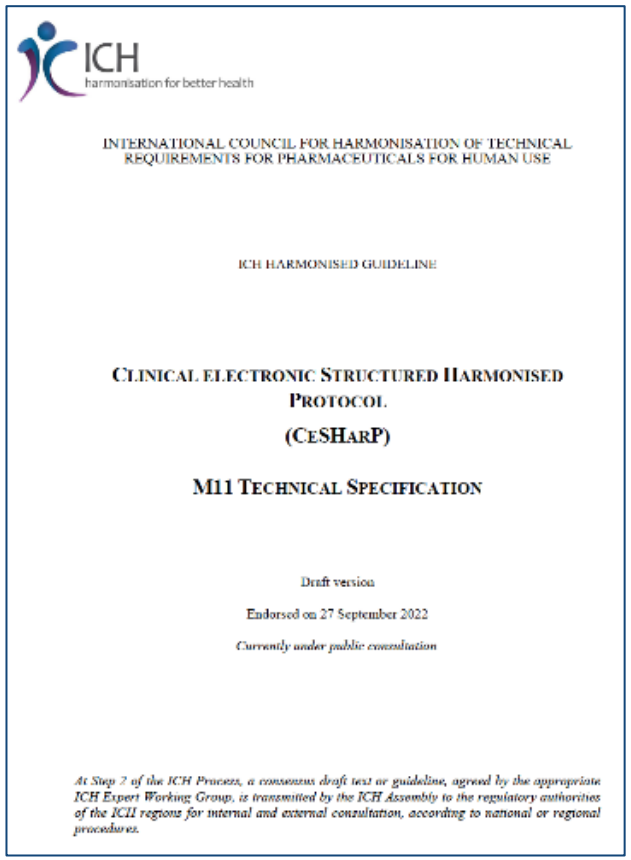
Provides the written format for the Interventional Clinical Trial Protocol Template



ICH harmonisation for better health

INTERNATIONAL COUNCIL FOR HARMONISATION OF TECHNICAL REQUIREMENTS FOR PHARMACEUTICALS FOR HUMAN USE

ICH HARMONISED GUIDELINE

CLINICAL ELECTRONIC STRUCTURED HARMONISED PROTOCOL

(CESHARP)

M11 TECHNICAL SPECIFICATION

Draft version

Endorsed on 27 September 2022

Currently under public consultation

At Step 2 of the ICH Process, a consensus draft text or guideline, agreed by the appropriate ICH Expert Working Group, is transmitted by the ICH Assembly to the regulatory authorities of the ICH regions for internal and external consultation, according to national or regional procedures.

Provides the technical representation aligned with the guideline and protocol template

ICH and CDISC MOU (Memorandum of Understanding)

As a collaboration between ICH and CDISC, the goals of the agreement are to:

- Use a unified governance process and terminology services for the long-term support of ICH controlled terminologies
- Curate and maintain ICH controlled terminologies
- Follow a robust process for the public review and publication of ICH terminologies
- Ensure the terminologies are freely available to the public following public review

Scope

For ICH members to adopt and implement a clinical information standard it is critical that all terminology components, including but not limited to definitions described in the technical specification, are part of a greater international controlled terminology resource managed by an internationally recognized standards development organization (SDO). CDISC has been identified by ICH as a reputable SDO with the qualifications and capabilities to support the maintenance and facilitation of the governance process for ICH controlled terminology.

This Memorandum of Understanding (MOU) sets forth the roles and responsibilities of each party as they relate to the governance of the ICH terms and definitions developed in collaboration with CDISC. This MOU is intended to describe the goals, the high-level governance process, and how each party will collaborate. Specific projects (e.g., M11 controlled terminology) will be defined in detail as part of an annex to this MOU mutually agreed upon by CDISC and ICH.

Goals

As a collaboration between ICH and CDISC, the goals of the agreement are to:

1. Use a unified governance process and terminology services for the long-term support of ICH controlled terminologies.
2. Curate and maintain ICH controlled terminologies.
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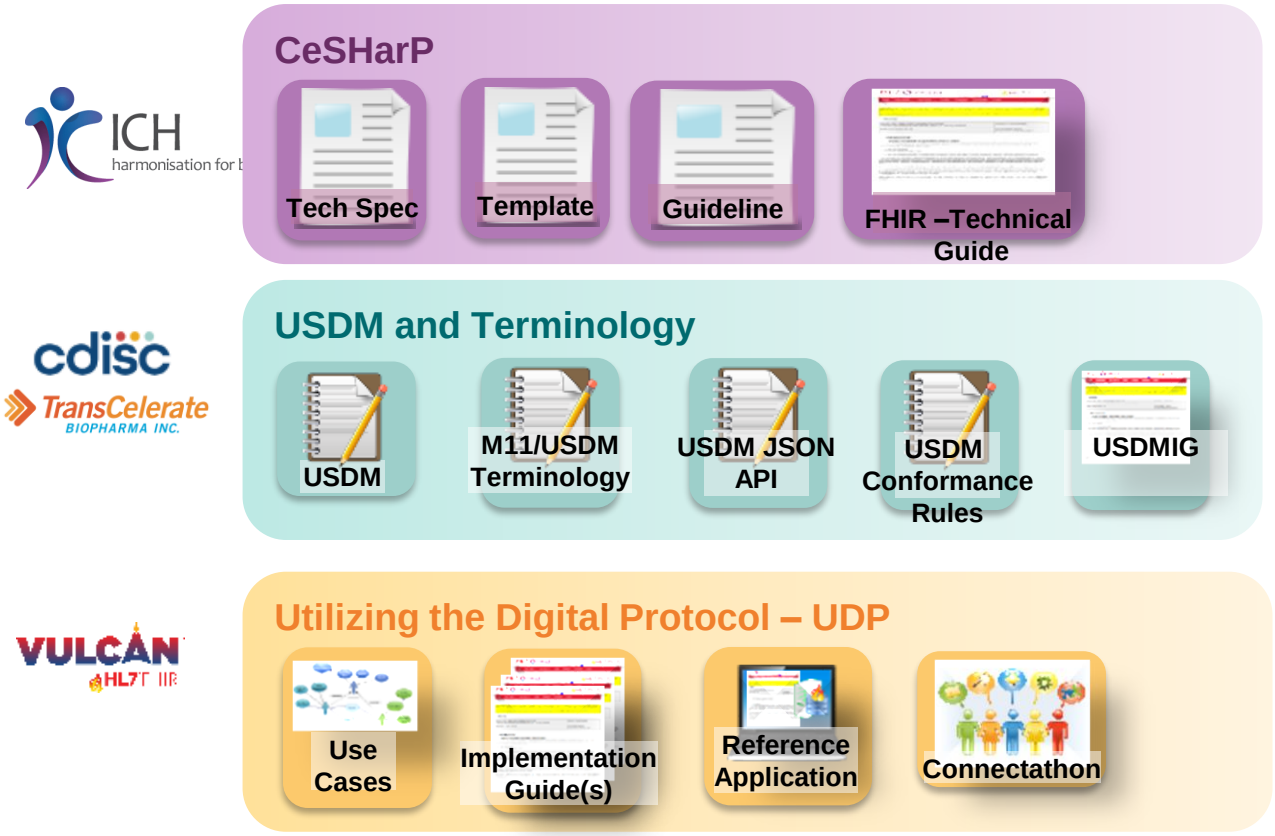
4. Ensure the terminologies are freely available to the public following public review.

ICH M11 and Vulcan Utilizing Digital Protocol (UDP)



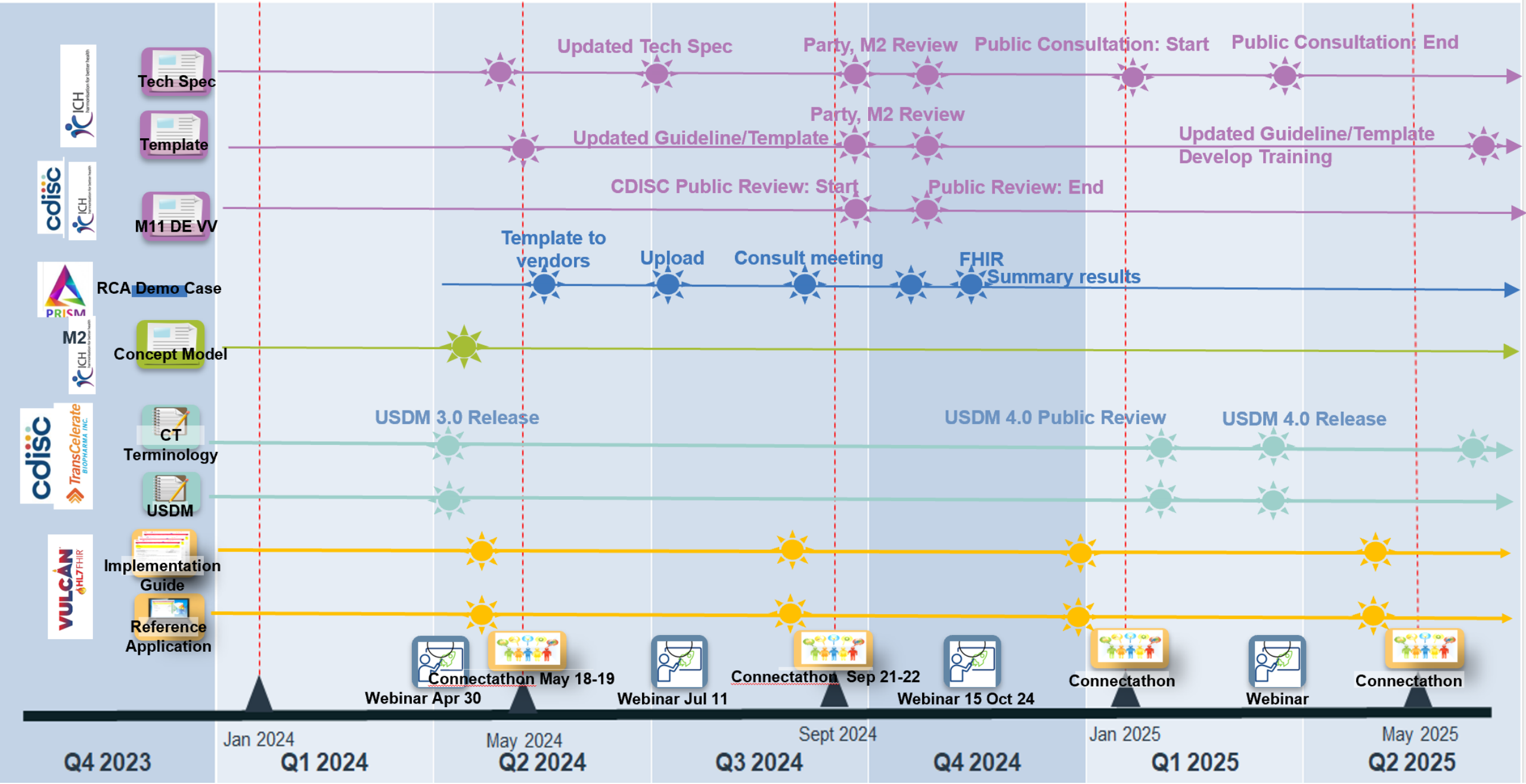
Inputs:

- ICH M11 template
- ICH M11 technical specification
- Models, definitions

FHIR will carry CDISC CT and USDM content

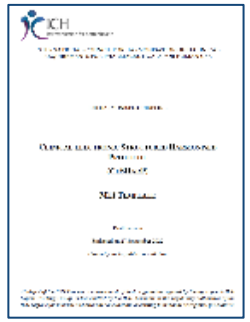
The technical specification can be used to develop other Implementation Guides

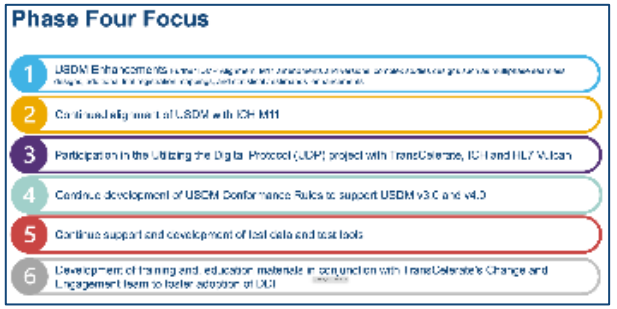
Aggregate Timeline



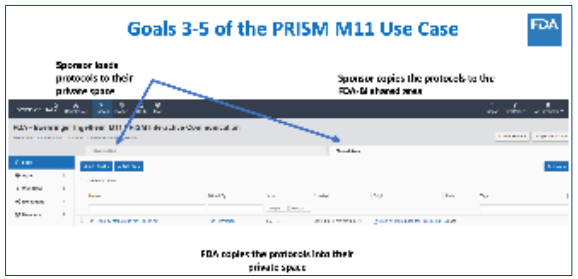
USDM Status

ICH & M11 Specifications
USDM being kept aligned with the ICH M11 work via close communication and development of M11 CT





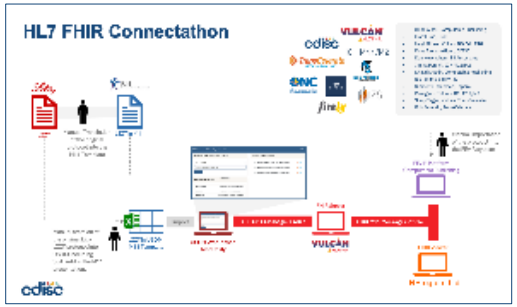
USDM Phase 4
Refine, improve, adopt



FDA & PRISM
Working with FDA to pilot first elecgronic transfer of an M11 protocol as well as tooling to support

cdisc USDM
UNIFIED STUDY DEFINITIONS MODEL (DDF)

HL7 Vulcan & UDP
Working with HL7 Vulcan to build FHIR message to support exchange of USDM / M11 content. Next connectathon is Atlanta, Sept 2024



EMA & CTIS
Working with EMA to align USDM with CTIS to faciliate work such as dashboards

TransCelerate & Adoption
Several sponsors and vendors working with USDM. Latest adoption will be visible at the TransCelerate 'DDF in Action' day

cdisc

CDISC Interchange 2024: All About Digital Protocol

13:00 - 13:30
ICH M11, TransCelerate, CDISC & HL7: Driving the Adoption of Digital Protocol
Peter Van Reusel, CDISC

13:30 - 14:00
Digital Data Flow: Achieving Protocol Digitalization and Clinical Research Interoperability through Multi-stakeholder Collaboration
Bill Illis, TransCelerate Biopharma

14:00 - 14:30
USDM in Action – From Protocol to SDTM
Dave Iberson-Hurst, data4knowledge

15:00 - 15:30
DDF and Breaking Down the Document Barrier
Bob Brindle and Frederik Malfait, Nurocor

15:30 - 16:00
Transforming Vision into Reality: BMS Journey to Embrace the Digital Protocol
Viral Vyas, Bristol Myers Squibb

16:00 - 16:30
Digital Protocol Panel Discussion

Digital Data Flow Workshop

October 22, 2024 8:45 AM-4:00 PM MST

Following on from the the first public, in-depth, workshop on the Unified Study Definitions Model (USDM) at the EU Interchange in Berlin, the DDF team is pleased to announce a sister workshop at the US Interchange. The workshop will take a deep dive into all aspects of the model and how study protocols and designs can be represented using the USDM.

The day will be organised as a series of focused sessions, with each session covering the theory on an individual aspect of the model combined with hands-on exercises and discussion.

USDM Overview

11:15 -11:45 AM

CDISC USDM Overview

Dave Iberson-Hurst,
USDM Product Owner, CDISC

Questions? Scan the QR Code on your phone to add in your questions for our presenters and speakers

USDM in Action
Use Cases Supporting the DDF Vision

Use Cases

Retrospective

Prospective

Protocol 'Store'

Past Protocols
The storage of past sponsor protocols in to support a variety of use cases such as:

- Therapeutic area specific content
- Standard inclusion and exclusion criteria.
- Libraries of objectives, endpoints and estimands.
- Asses the past to prevent protocol amendments.
- General search across the library

Study Design

Protocol Authoring
Support the authoring of new protocols including complex studies such as Master, Umbrella etc.

This would include analyzing previous protocol information to inform design choices (see Protocol Store).

Writing associated SAP, Informed Consent, Monitoring Plan, Drug Plan etc via content reuse.

Study Build
Build of the study based on the protocol I including all detailed procedures and assessments to allow for immediate deployment.

Feasibility & Cost
Support study feasibility and complexity evaluations.

Determine the cost of the study including such items as vendor and CRO costs and support the laboratory RFP process

Regulatory Authority
Approval for the execution of the study including IND, CTA etc and discussions with regulatory authorities

Stakeholder Views
Tailored views for stakeholders such as IRB and ethic committees.

Study Start-up

Deployment
Deployment of the study across the enterprise using the USDM to support electronic configuration rather than manual data entry including Data collection systems (incl. EDC), CTMS, IRT, Data transmission specifications and more

TMF
Linking the protocol to the specification of milestones and essential documents

Data Collection Strategy
Ensure all data that is needed for analysis is collected. Remove unnecessary procedures & data collection to reduce trial cost and patient burden.

Trial Registries
Registration of the study with registries such as CT.gov, CTIS etc.

Training
Provision of training materials to those involved in the study including sites

Site Support
Provision of tailored information to sites regarding study execution.

Study Execution

Amendments
Support the amendment process with the ability to indicate the precise changes to the user community.

Ensure fewer amendments (see Protocol Store).

Subject Information
Provision of improved information to subjects regarding study execution, improve expectation management.

Drug & Study Materials
Assist in the planning and provision of study drug, materials and supplies

Subject Recruitment
Support the identification of subjects to help improve subject recruitment to the study. Help support EHR participation identification.

Analysis & Reporting

Automation
Provide a solid foundation for the automation of analysis and reporting outputs such as TLFs and CSRs.

SDTM
Creation of 'T' domains. Auto generation of data domains

ADaM
Use the protocol statistical metadata to assist in the derivation of analysis datasets

Statistical Analysis Plan
Use the protocol as the initial source of the SAP to ensure consistency with objectives, endpoints, estimands

Regulatory Submission

Submission
Preparation of the submission by the sponsor

Regulatory Review
Review of the submission by the regulatory authority and discussions / questions with the sponsor

Statistical and Safety Review
Support the comparison of data by arm or study design.

Allow for the verification of planned (protocol) data versus actual (study data) captured data

'DDF In Action'

Indicates that a poster touching on the use case described will be presented at the respective event.

US, New jersey

Europe, Copenhagen

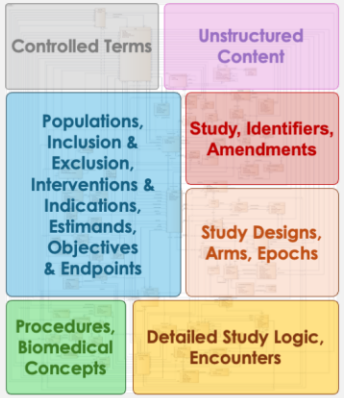
Across The Lifecycle

Dashboards
The display of protocol related information sourced from one or more protocols in ways which have not been achievable before

Comparison
Compare and verify differences across versions and similar protocols

NOTE: The use cases presented are illustrative and the list is not intended to be exhaustive.

Unified Study Definitions Model (USDM)



Study Details
The overall study, its various versions, identifiers and associated governance. Also includes the amendments made to the study

Study High Level Design
The single or set of study designs making up the study detailing the epochs, arms etc.

Study Science
The detailed description of the study science: the populations and the associated inclusion and exclusion criteria, the indications being studied, the interventions being used and the objectives, endpoints and the associated estimands.

Detailed Study Logic
A precise definition of the study logic including support for the Schedule of Activities.

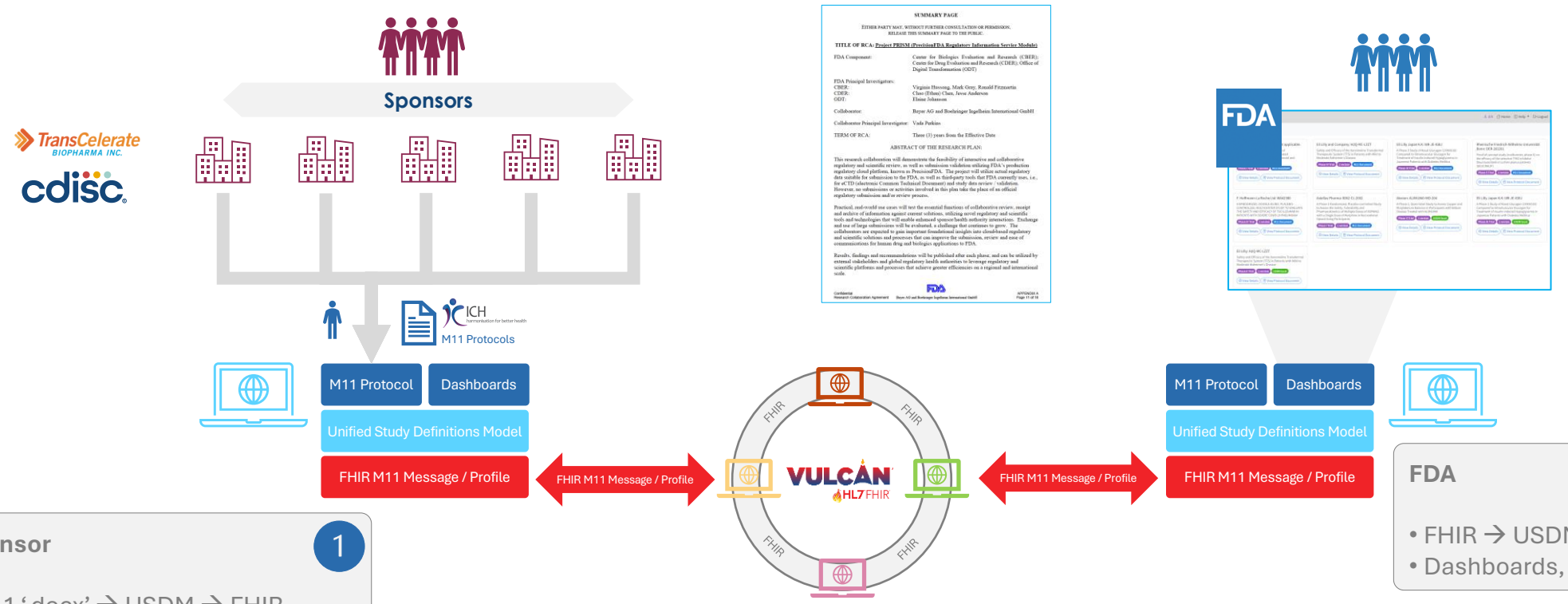
Unstructured Content
The ability to support one or more document presentations of the USDM content including the ICH M11 protocol template, sponsor templates and other documents.

Procedures and Biomedical Concepts
The detail around the procedures and observations to be performed as part of the detailed study designs.

Controlled Terms
The controlled terminology needed to define the semantics within the model. Managed in the same manner as all CDISC CT and aligned with the M11 template standard.

Version 4, 10th October 2024. Prepared by D Iberson-Hurst for the TransCelerate 'DDF in Action' day.
With thanks to Rob Ferendo (TransCelerate), Bill Illis (Novartos), Jasmine Kestemont (Argenx), Kirsten Langendorf (d4k), Mary Lynn Mercado (Novartis), Lissa Morgan (Amgen), Johannes Ullander (d4k) and Peter Van Reusel (CDISC)

PRISM Use Case
(PrecisionFDA Regulatory Information Service Module)

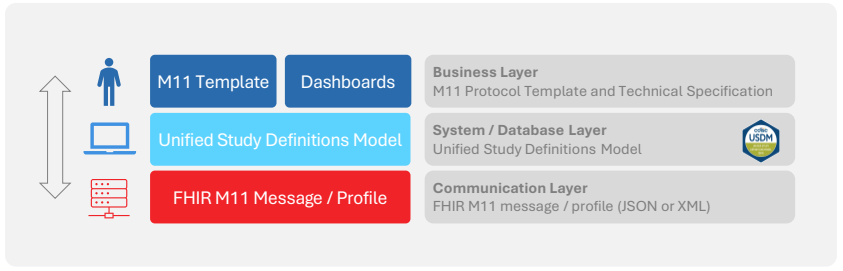


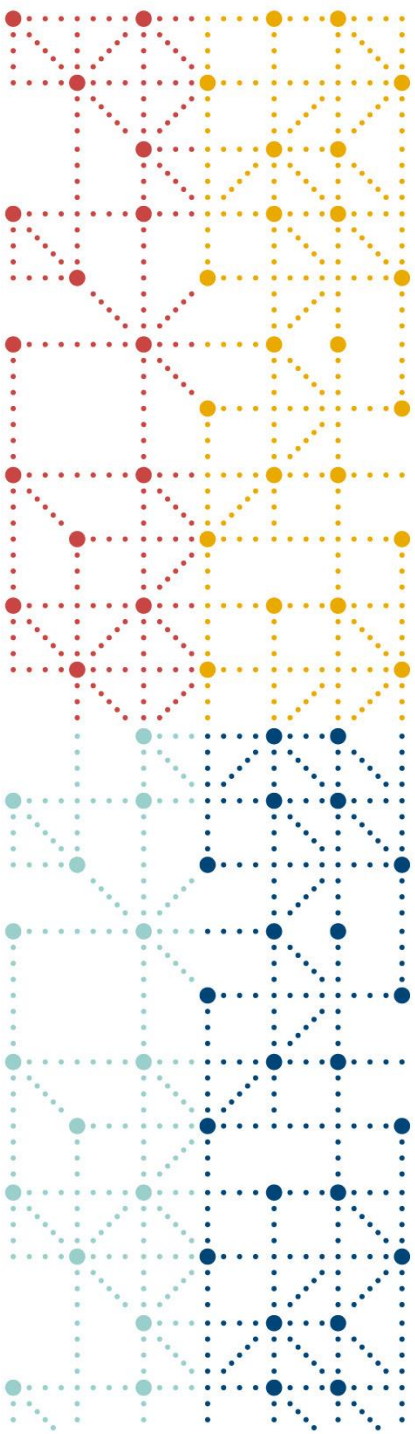
Sponsor 1

- M11 '.docx' → USDM → FHIR
- Try and make it easy, "a few clicks"

FDA 2

- FHIR → USDM → M11 Presentation
- Dashboards, what is possible?





Thank You

cdisc

Technical Solution Poster Session

12:00 – 1:00 PM

Visit the Technical Solution Poster Session to learn more about the different protocol digitalization technical solutions from the following organizations:

- Data4knowledge
- EQTY Lab Sciences and Clinline
- Novo Nordisk
- Nurocor
- Sycamore Informatics
- TransCelerate Biopharma Inc

Questions? Scan the QR Code on your phone to add in your questions for our presenters and speakers

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Technical Solution Poster Session: We need your input!

What you have to do:

Use the stickers provided to you at the time of check-in to vote for the top three tech solution solutions you want to hear more about in the panel discussion that follows this poster session.

And why:

The three posters with the highest number of stickers will be chosen to be part of the panel discussion to discuss protocol digitalization technical solutions that leverage and apply the USDM and DDF solutions, to achieve protocol digitalization.

Lunch
1:00 PM – 2:00 PM

Panel Discussion

2:00-3:00 PM

Questions? Scan the QR Code on your phone to add in your questions for our presenters and speakers

Panel facilitated by:

Belinda Griffin

TransCelerate

Plenary Session

3:00-5:00 PM

LIVESTREAMING

DDF Adoption Stories

Questions? Scan the QR Code on your phone to add in your questions for our presenters and speakers

Adoption Story from a Biopharmaceutical Organization

Case Study: The Digital Schedule of Activities (DSOA) – Using Digital Data Flow for Portfolio Acceleration

Future State Vision

Digital End to End
from Protocol Authoring to Clinical Study Report Generation

Information-centric Protocols

FROM

Existing authoring processes build upon the traditional document paradigm to which most professionals are accustomed. Document authoring is people-friendly but not good for digital information capture & downstream use.

TO

Protocol authoring transforms into an information generation activity. Resulting data can be mined for new insights, inform new study designs, and propagated downstream with high accuracy.

Capture Information at Inception

FROM

Existing business processes wait for protocol approval as a pre-requisite for translating protocol content into downstream action.

TO

Protocol content is captured digitally at inception, enabling downstream jump-start of trial initialization and setup activities in parallel with authoring. Overall productivity increases even with possible downstream rework resulting from protocol changes prior to Approval.

Eliminate the White Space

FROM

Existing business processes execute sequentially as they **wait for upstream people & systems to complete tasks** and inform the next stage that it's OK to take it from there.

TO

Digital-driven automation **eliminates process wait-time and facilitates process parallelization.** Trial planning, startup, execution, analysis and submission takes less overall time. The Portfolio achieves greater velocity and throughput.

How do we start the Transformation?

Start with a Digital Schedule of Activities (DSOA)

Why Start With SOA?

“Build a little, test a little, learn a LOT”

-- Adm. Wayne Meyer

Start with a Digital Schedule of Activities (DSOA)

Incremental Process Impact

Current State: Authoring activities unaffected
Target State: Non-SOA authoring activities unaffected

Why Start With SOA?

"Build a little, test a little, learn a LOT"
-- Adm. Wayne Meyer

Biggest Whitespace Impact

Drives greatest number of downstream consumer automation opportunities

Start with a Digital Schedule of Activities (DSOA)

Incremental Process Impact

Current State: Authoring activities unaffected
Target State: Non-SOA authoring activities unaffected

Why Start With SOA?

"Build a little, test a little, learn a LOT"
-- Adm. Wayne Meyer

Biggest Whitespace Impact

Drives greatest number of downstream consumer automation opportunities

How Do We Get There?

Proof of Concept

- Extract SOA from Approved Protocol Docs.
- Refine Extraction Logic
- Experiment with consumers for consumption
- Organizational Change Management!

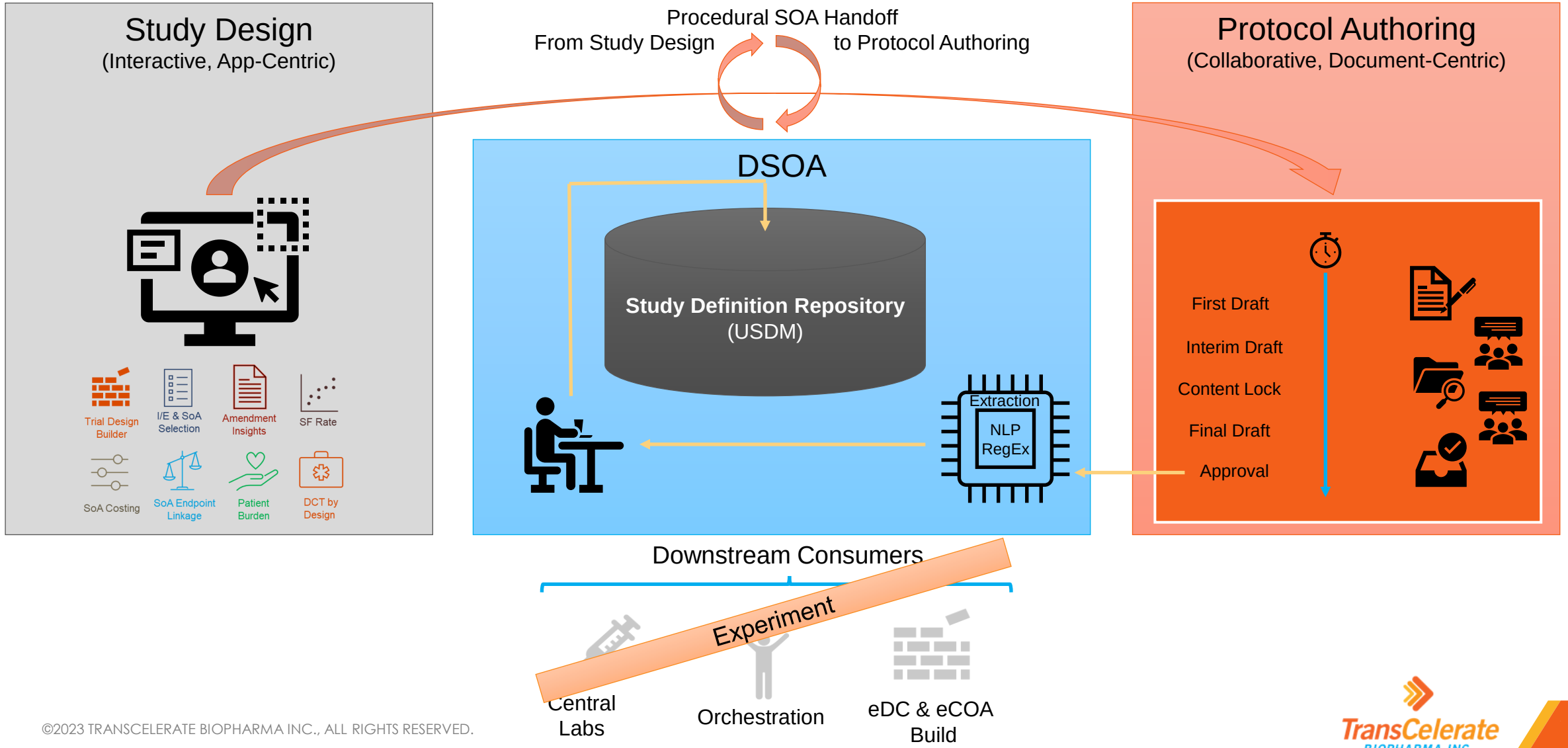
Pilot

- Pre-populate draft SOA appendix
- Extract SOA during Protocol Authoring
- Harden Extraction Logic
- Initial Automated downstream consumption
- Organizational Change Management!

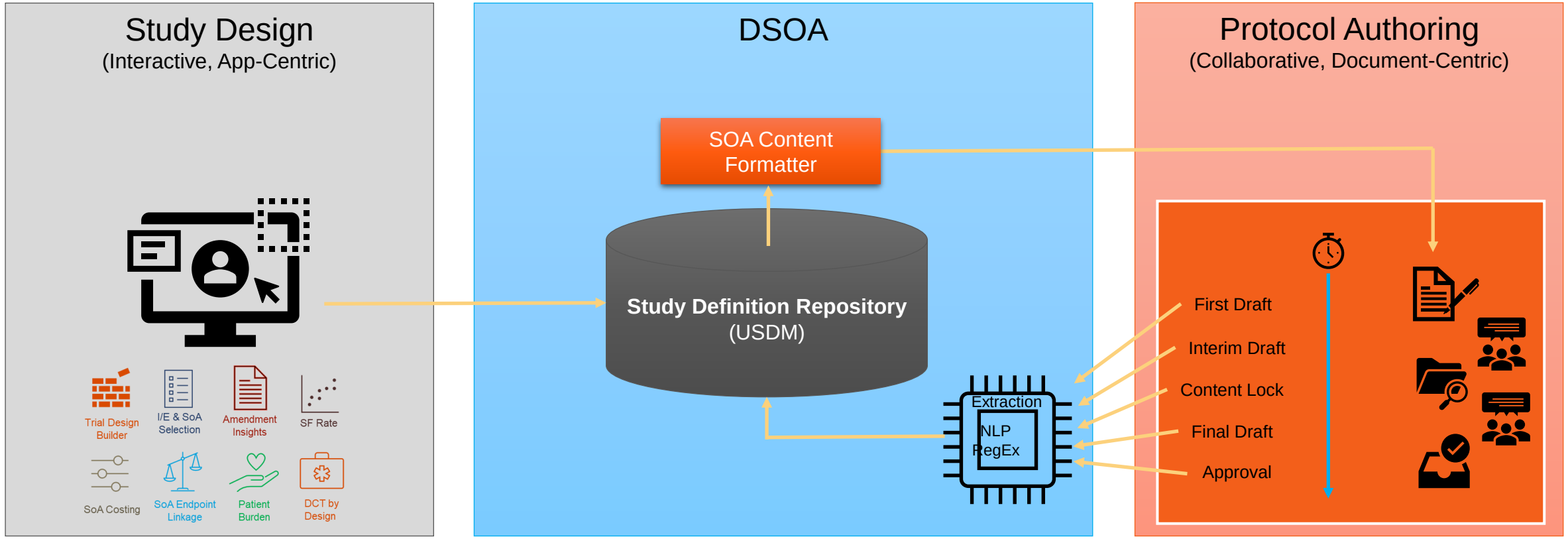
Scale

- Capture SOA information digitally at inception
- Expand and harden downstream consumption
- Organizational Change Management!

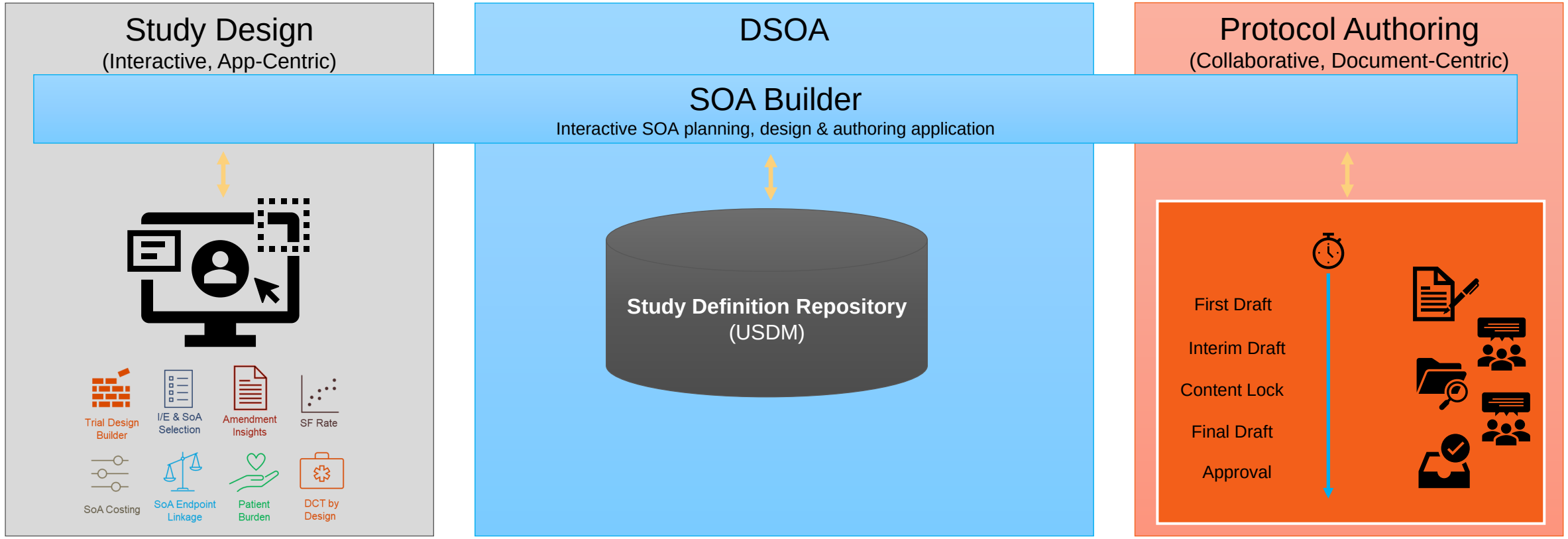
DSOA Current State (Proof of Concept)



DSOA Interim State (Pilot – in development)



DSOA Target State (Scale)



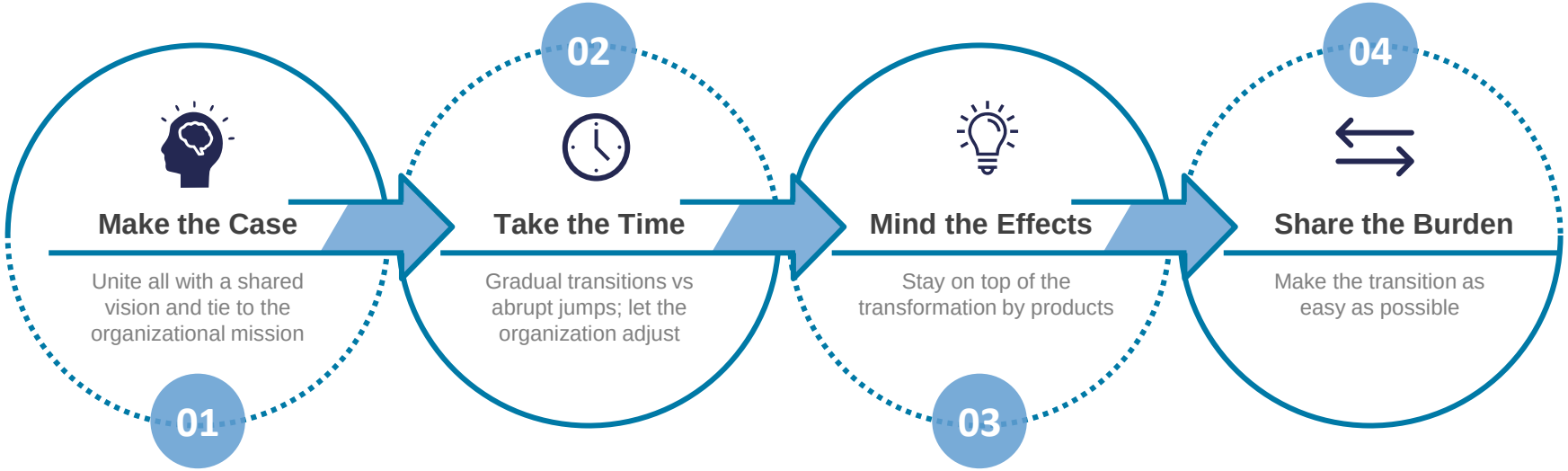
Downstream Consumers

Central Labs | Orchestration | Budgeting | Trial Materials | eDC & eCOA Build | Monitoring | Pharmaceutical Dispensing

OCM Considerations

DDF Adoption = Technology + Standards + Integration + OCM

The Four OCM Challenges (*Peter Senge, The Fifth Discipline*)



*"We call this the era of **Never Normal**. This era is characterized by frequent shocks — both internal and external — and a constant need for crisis management."*

-- Gartner Predicts 2024: Strategic Portfolio Leaders Must Plan for the "Never Normal"

OCM Considerations

Make the Case

DSOA → DDF → Digital from Protocol to CSR → Next

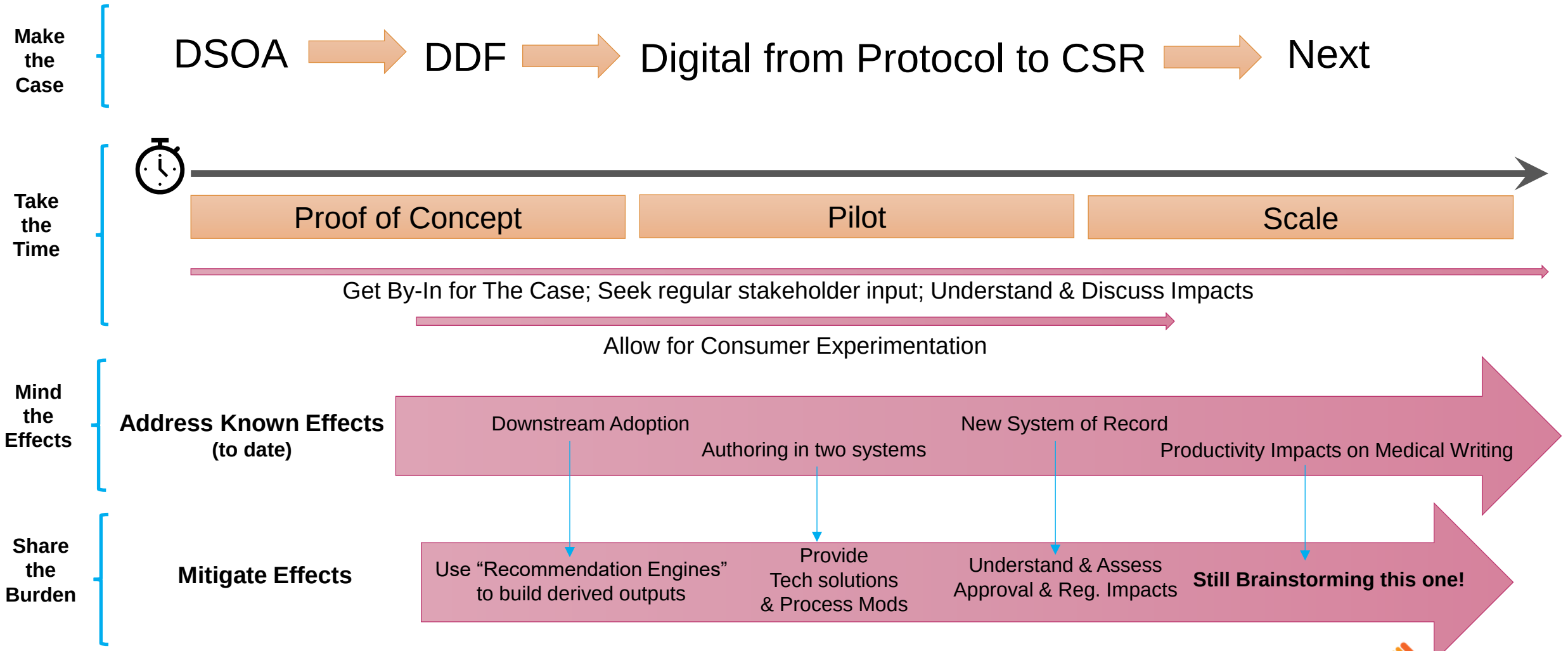
Take the Time

Proof of Concept | Pilot | Scale

Get By-In for The Case; Seek regular stakeholder input; Understand & Discuss Impacts

Allow for Consumer Experimentation

OCM Considerations



Concluding Thoughts…

DDF Transformation Gets Complicated… FAST

Things to remember on the journey

Build a Roadmap – i.e., what *Done* looks like and how to get there

Secure & **Continuously Enforce Stakeholder Alignment**

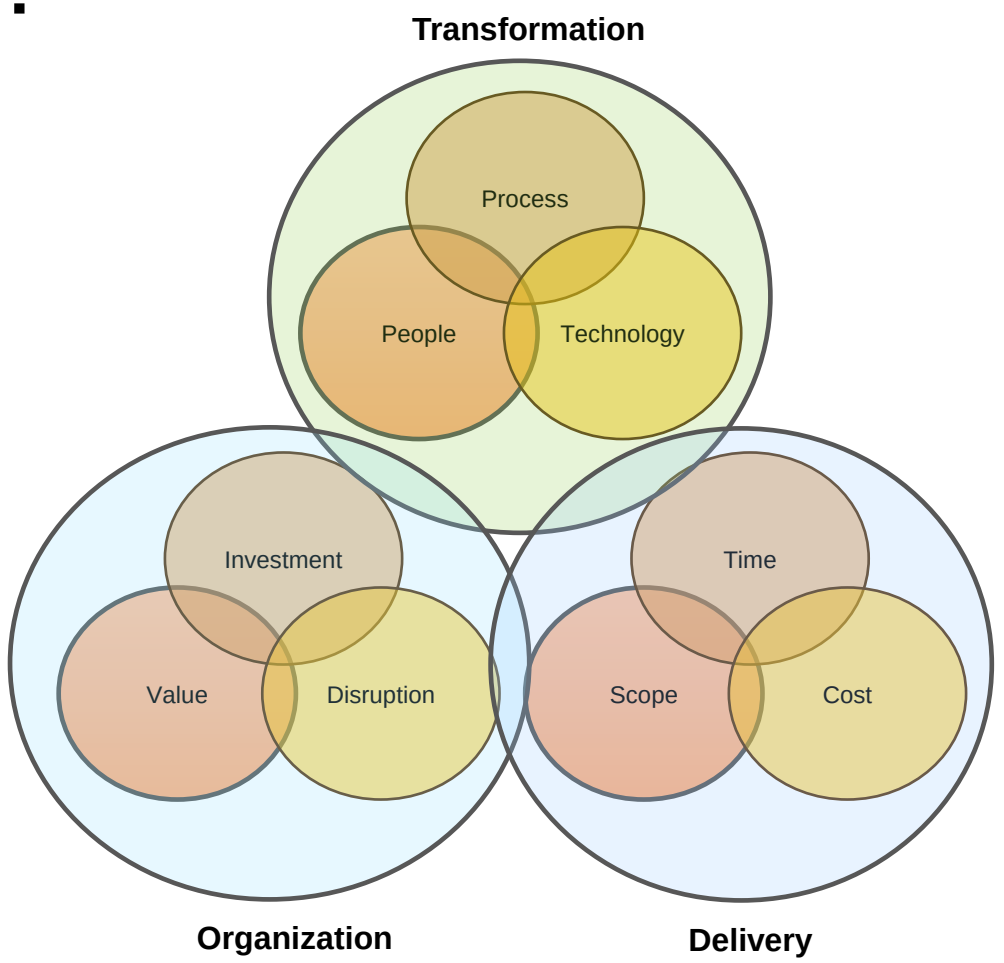
Iterate to *Done* with realistic & achievable instantiations

Learn and Adapt the roadmap as you go

Deliver incremental value to **Sustain Organizational Commitment**

Give people and the organization the **Time to Adjust**

Adoption is the Goal



Thank you

Adoption Story from a Biopharmaceutical Organization

Case Study: Adoption of Digital Data Flow

Agenda

- Why the need for DDF
- How DDF is implemented
- Adoption learnings

Why the need for Digital Data Flow?

… on the surface we work together
– in reality, we work in isolated IT bubbles

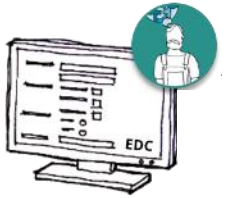
The **Data Manager** specifies the study design and Schedule of Activities (SoA*) in the **Metadata mgt. sys**

The **Medical Center of Expertise** maintains the catalogue of in- & exculsion criteria in the **Quality mgt. sys**

The **Disclosure Specialist** enters study design and endpoints for public disclosure into **PharmaCM**

The **Medical Specialist** estimates study cost and feasibility in a **Study Design application**

The **Medical Writer** enters the SoA, endpoints, objectives and in- & exclusion criteria into the **Protocol Template (Word)**



The **Data Manager** translates the SoA and in- & exclusion criteria into the **Electonic Data Collection sys (EDC, Lab, eDiary etc.)**

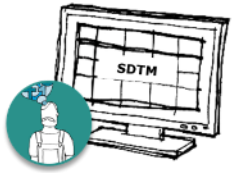
The **Data Manager** enters the study design and endpoints into the **SDTM TS dataset**

- which leads to **re-creation of the same content** in different contexts - resulting in double work, high need for QC and lack of overview

Protocol

4.2.1 Primary endpoint

- Subjects who after 68 weeks achieve (yes/no):
  - Body weight reduction ≥ 5% from baseline at week 0



SDTM – trial summary (ts)

Parameter Value
Subjects who after 68 weeks achieve (yes/no) - Body weight reduction >=5%. Time frame: From baseline at week 0 to week 68.

PharmaCM (for upload to CT.gov)

Primary Outcome Measures:

- Subjects who achieve 5 or more percent body weight reduction (yes/no) [Time Frame: Week 68]
  Number of subjects.

SDTM: study data tabulation model

*SoA = Schedule of Activities

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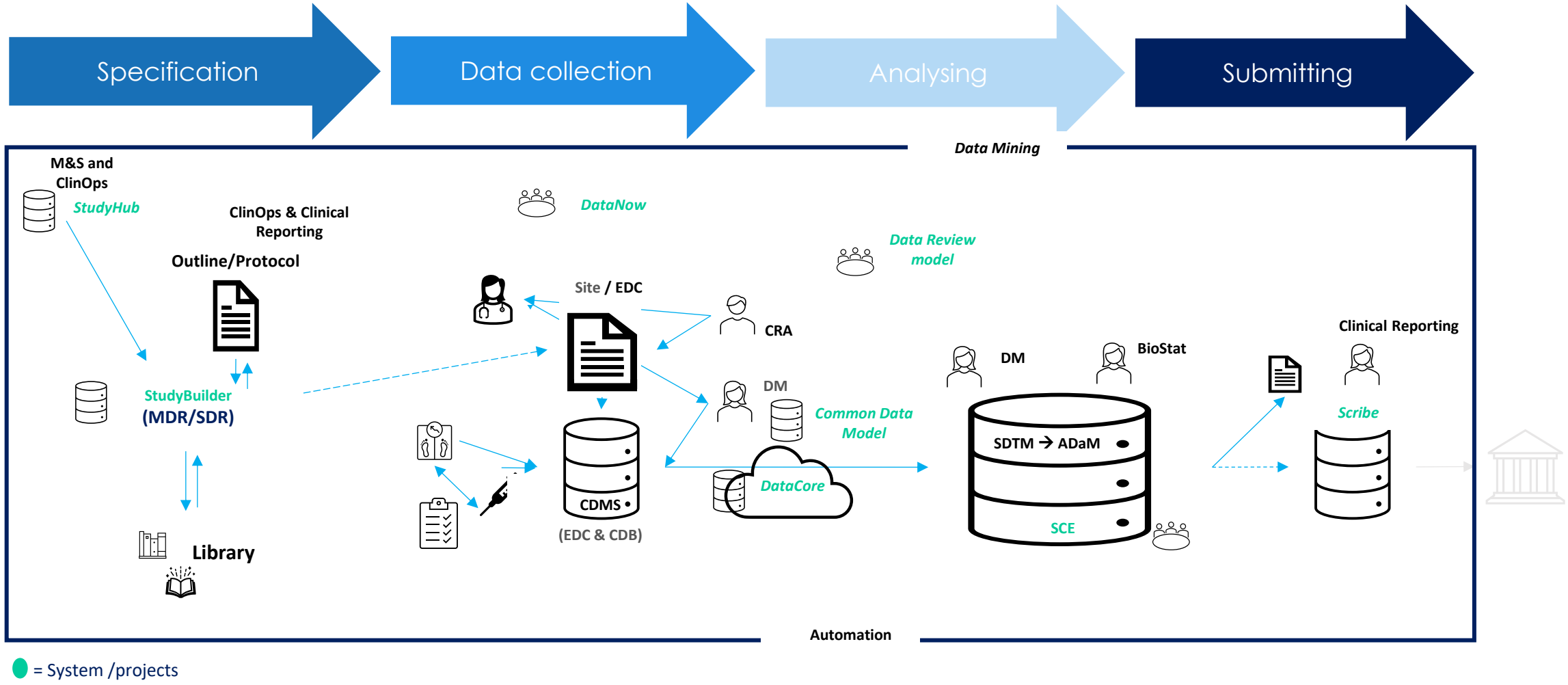
One Digital Data Flow → Future System Landscape



= System /projects

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Digital Data Flow mission

We aim to **digitalize** the metadata of the study specification (e.g., protocol) to allow for a higher **degree of reusability** and **automation** & limit **manual document driven** work. All as part our **'One Digital Data Flow**'.

We must ensure the users defining the **study protocols** can use StudyBuilder efficiently

We must ensure the users defining digital **study data specification** can use StudyBuilder efficiently

We must ensure the digital study data specifications enable **automation** in our digital dataflow products

We must ensure **adoption and continue support** of StudyBuilder in the organization

Opportunity Map

Our solution explores features to meet business's here-and-now needs while establishing foundational capabilities needed to enable and support several initiatives that will drive Development's long-term aspirations

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Digital Data Flow Implementation

- Replace the current MDR – but not a 1:1 replacement
- Expand the scope of the MDR to also become a SDR
- Transfer document-based protocol standards to the new MDR/SDR (OpenStudyBuilder)
  - Eligibility criteria, Objectives & Endpoints
- Prepare for the future with the new MDR/SDR by aligning to industry standards e.g. USDM, CDISC etc.

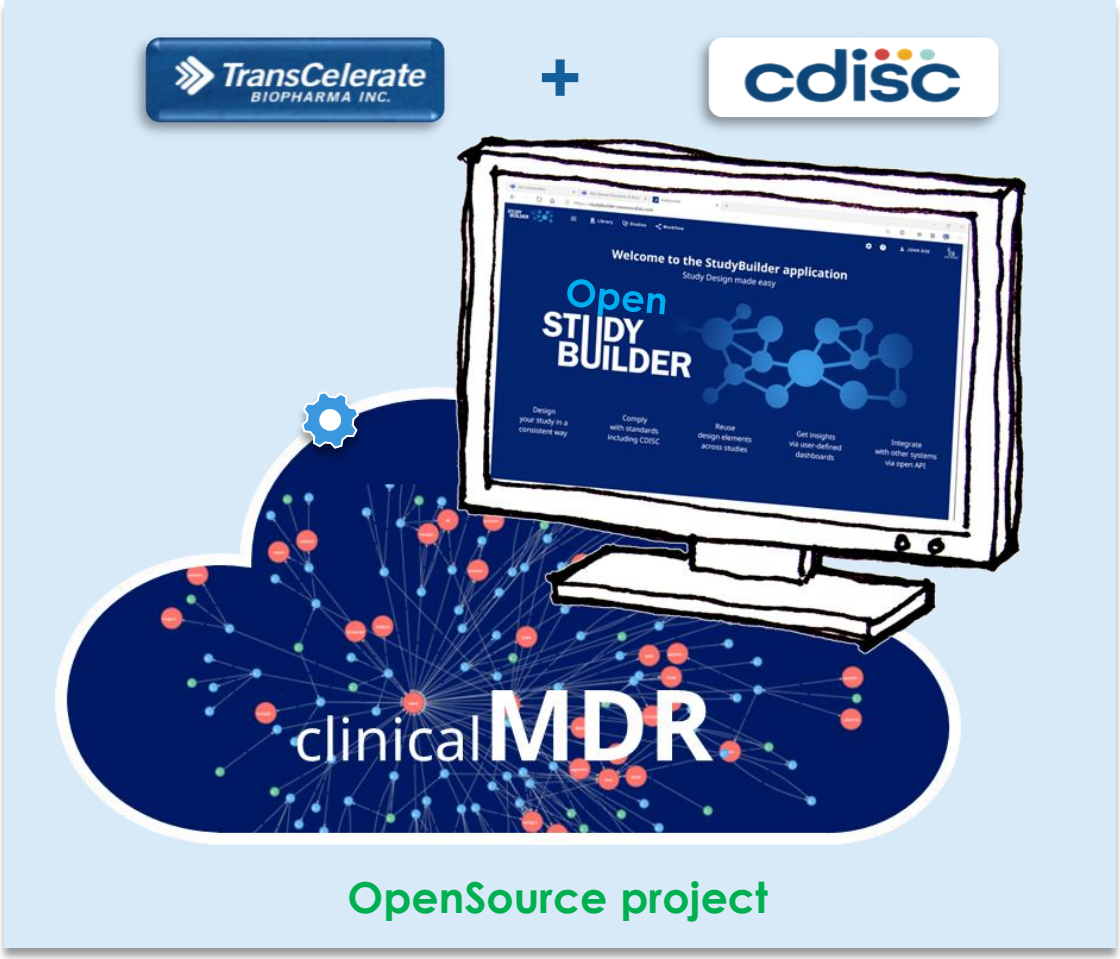
How is Digital Data Flow implemented?

The OpenStudyBuilder is a **new approach** to the study specification process that will:

- Ensure a higher degree of end-to-end consistency
- Have built-in compliance with external and internal standards
- Facilitate more automation

The OpenStudyBuilder comprises three elements:

- **OpenStudyBuilder application** (web-based user interface)
- **Clinical Metadata Repository (clinical MDR)** (central repository for all study specification data)
- **API layer** (allowing interoperability with other applications) (DDF API Adaptor – enabling USDM compatibility)



Adoption Learnings

Feedback:
- System Performance
- Navigation Issues
- Terminology Issues
- Missing Functionality
- Operational burden

MVP Release

Usability test (Interview)

Usability test (Automated)

User report

Oct 2023 | Nov | Dec | **Jan 2024** | Feb | May | End **2024**

Hyper Care

First business release (MVP*):

- All interventional ph 2-4 studies
- Users within Clinical Operations, Clinical Reporting & Data Mangement
- Key protocol metadata (SoA, Study Structure, Eligibility Criteria, Endpoints & Objectives)

* MVP = Minimal Viable Product

Scope **reduced**

Limit the operational burden of maintaining old and new systems/processes

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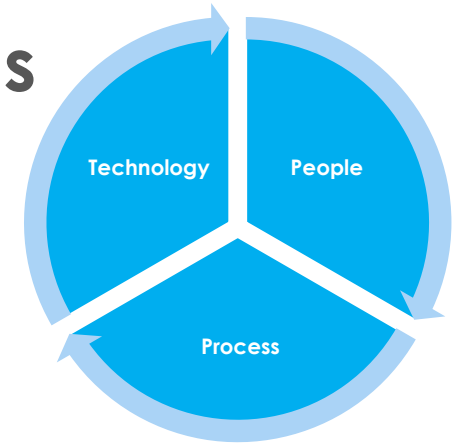
Summary of implementation and adoption learnings



People are key:

- Early involvement of end users is key to ensure successful adoption
- Sufficient resources within the product team and impacted business areas is crucial

Processes are important:

- Sharing of metadata is key, but **difficult** to implement across business areas
- Implementation of a cross functional products require central project ownership and cross-area involvement
- Clear business values and outcomes – short time and long term – is essential

Technology is the facilitator:

- Transition from documents to systems requires a large change management effort (training, support, communication, guidance) **as well as** management buy-in / sponsorship
- High system performance is key
- Ease of use is important
- Keep release small and learn fast

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Key learnings

- Switching from documents to a Digital Data Flow requires an effort, but has great potential
- Prepare organization for parallel work/double work before business value is realized
- Focus on small releases and adjust fast based on user feedback
- Alignment on goals across business units is key
- Easy to use technology makes the adoption easier

Thank you

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Closing Remarks

Lissa Morgan

Amgen

My Reflections of the Day

Upcoming Events

2024 Events	Date
Vulcan UDP Webinar Spotlight on the September Connectathon	15 October 2024
2024 CDISC US Interchange 2024 CDISC + TMF US Interchange | CDISC	21-25 October 2024
SCOPE Europe 2024 Digital Data Flow: Digitalising Clinical Protocol Information to Accelerate Clinical Research and Enable Healthcare Interoperability	29-30 October 2024
PHUSE EU Connect 2024 PHUSE EU Connect 2024 (phuse-events.org)	10-13 November 2024
DDF Solution Showcase Webinar Series #2	5 December 2024

* Please note, related industry events are not formally endorsed by TransCelerate and are listed for awareness only

Additional Opportunities to Stay Involved with DDF

You can stay involved and learn more about the Digital Data Flow initiative by visiting the following websites:

DDF Website

As the main website for DDF, learn and access all resources supporting DDF

Scan QR Code to explore DDF Website

CDISC DDF Website

Learn about and access the Unified Study Definitions Model (USDM) Reference Architecture supporting Protocol Standards.

TransCelerate DDF Initiative Solutions

Learn about DDF initiative background and roadmap

DDF GitHub Repos

Learn about and access the Study Definitions Repository Reference Implementation and supporting codebase

Questions? Feedback? Please email us at DDF@transceleratebiopharmainc.com

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TransCelerate Tools & Resources

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Click here to learn more about our solutions

View our annual achievements archive, here

Click here to read our recent blog posts

Thank you for participating in the DDF in Action Day!

Post Event Survey

We would love to hear your feedback.

Appendix

Speaker Bios

Maria Filippou-Frye Roche

Maria Filippou-Frye

Scientific Development and Innovation Lead, Roche

Maria is a highly experienced Medical Doctor with over 14 years of specialized expertise in clinical trial development, management and coordination, bridging the gap between clinical science and business performance. She has a proven ability to translate complex scientific data into actionable business strategies, with experience in medical monitoring, clinical research operations, and agile project management.

Maria's leadership in protocol development, coupled with her business expertise, position her uniquely into driving the digital transformation at Roche, with the Digitalization of the Protocol initiative. She is a dynamic leader, adept at guiding cross-functional teams, managing clinical trial portfolios, and spearheading the adoption of innovative digital solutions to enhance clinical development.

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Belinda Griffin
TransCelerate

Belinda Griffin

Program Manager, Digital Data Flow, TransCelerate Biopharma Inc.

Belinda serves in a contractor capacity as the Program Manager for the TransCelerate Digital Data Flow Initiative. She has been in this role for the last four and a half years and has led the program from visioning and start-up through to the delivery of the latest version of the DDF solution which is now in its third release.

She is passionate about clinical trials transformation and prior to her work on DDF has had the opportunity to work on a number of large transformation initiatives with a variety of biopharmaceutical organizations.

Shagun Grover
Roche

Shagun Grover

Digital Health Leader | Senior Director, Product Management, Roche

Shagun Grover is an accomplished digital health leader with over 25 years of experience in healthcare technology and pharma. She specializes in driving digital transformation strategies, product development, and interoperability solutions. Shagun has led complex projects across fields such as oncology, ophthalmology, and health information systems, working with a range of healthcare providers.

Currently a Senior Director at Genentech, she leads the Digitalization of Protocol initiative, helping create innovative solutions that transform Study Design and Protocol Generation processes. Shagun is a key contributor to TransCelerate BioPharma's Digital Data Flow initiative. She has deep expertise in imaging data platforms and has won multiple awards in this space for her innovative vision, including the Ocular Imaging Challenge.

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Dave Iberson-Hurst CDISC

Dave Iberson-Hurst
USDM Product Owner, CDISC

Dave has over 40 years' experience across several industries with the last 20 years spent in the pharmaceutical industry combining his technology and software development experience with clinical data standards.

During this time, he has worked on, and led, several CDISC teams, presented in many forums in Europe, the US, and elsewhere across the globe. He has worked closely with the FDA, EMA, HL7, ISO, and other standards organizations and was a member of CDISC's Blue Ribbon commission. He is currently the CDISC Product Owner for the Digital Data Flow project.

He is a partner at data4knoweldge in Copenhagen and is focused on getting greater value and utility from clinical trial data

Don Jennings
Eli Lilly

Don Jennings
Senior Architect, Eli Lilly

Don Jennings currently serves as a Senior Architect in Eli Lilly's technical organization responsible for defining, evolving and driving innovation in Lilly's clinical trial design and operations capabilities. Don also participates in the Transcelerate Digital Data Flow (DDF) workstream as Vendor Engagement sub team lead where he advocates for industry-scale data system interoperability using USDM and its associated APIs.

Previously, Don was a Lilly Digital Health technology advisor leading engineers in developing SaMD solutions to improve delivery of therapy for complex disease states (2018-2023). Don also led Lilly teams in development of eSource technologies, automated clinical information exchange, PK/PD simulation and genomic analytics (2007-2018). Prior to his roles at Lilly, Don participated in the original sequencing of the human and rat genomes at Celera Genomics (2000-2007) and delivered science ground segments for several NASA and ESA high energy astrophysics missions (1989-2000).

Don holds an MBA from Butler University, an M.S. in Physics from Iowa State University, and bachelor's degrees in Physics and Computer Science from the University of Missouri.

Camilla Kehler Novo Nordisk

Camilla Kehler

Product Owner, Study Builder, Novo Nordisk

Camilla started her career in 2003 in the Call Center Solution department of TDC (large Danish Telecom company) where her focus was on implementing interactive voice and web call center solutions at large Danish companies. In 2008, she joined the Clinical Supplies area of Novo Nordisk and continued for 5 years her journey within voice/web solutions, but now with the focus of setup/specification of RTSM systems (randomization and dispensing) for clinical studies.

In 2012, she moved to Data Management and became a Clinical Data Manager, responsible for the data collection setup for clinical trials and this evolved into a Project Data Manager position overseeing the data management activities for our large outcome studies.

In late 2022 (November), she changed her focus from the conduct of clinical studies to digital product development and became Product Owner for the agile product team, developing a new inhouse build metadata repository / study definition repository ((Open)StudyBuilder), which is the Digital Data Flow initiative within Novo Nordisk aimed at digitalizing the study specification process from protocol to submission.

Elinor Lobner Olesen Novo Nordisk

Elinor Lobner Olesen

Project Director, CDOI Integrations and Mergers at Clinical Data Operations & Insight, Novo Nordisk

Elinor is Project Director, CDOI integrations and mergers at Clinical Data Operations & Insight at Novo Nordisk and is currently Involved with several data integrations. Furthermore, Elinor is a member of the OCM team in the area and is working on a number of transformational projects, including the usage of AI and ML and other initiatives from RBQM. She has been Head of Data Management and Standards departments.

Additionally, she has experience leading several large IT projects across the Clinical Development area. Elinor has 20 years of industry experience spanning areas of IT Project Management, Vendor Management, Risk-based Monitoring, Data Standards and Data Management and is passionate about people.

Peter Van Reusel CDISC

Peter Van Reusel
Chief Standards Officer, CDISC

Peter Van Reusel provides executive leadership to the development and implementation of clinical standards in line with CDISC's strategy and operational plans, working closely with the President and CEO, as well as CDISC staff and stakeholders. He has over 25 years' experience in senior roles in pharma and at CROs, providing standards expertise and carrying out other standards work in various organizational settings. A long-time, CDISC-authorized instructor, Peter has helped significantly in developing CDISC training courses.

He previously served as CDISC European Coordination Committee's Chair, fostering relationships with key European regulatory, academic, and biopharma stakeholders. Peter is also an active PHUSE Collaborator.