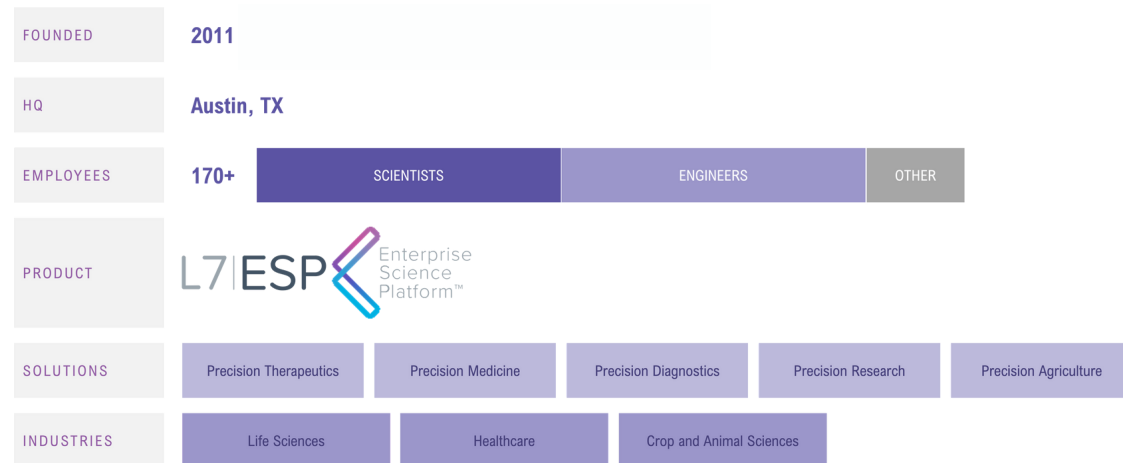L7 INFORMATICS

L7|ESP
Enterprise
Science
Platform™

EBOOK

L7 | PRECISION MEDICINE

streamline and automate the patient workflow by digitalizing diagnosis-to-treatment

About L7

L7 Informatics, Inc. is a leading provider of integrated scientific data and analytics solutions. The company offers a comprehensive platform that enables seamless data integration, advanced analytics, and collaborative workflows, empowering scientists and researchers to accelerate discoveries, improve operational efficiencies, and drive innovation. L7's mission is to revolutionize how scientific data is managed, analyzed, and utilized, facilitating breakthroughs in research, drug discovery, development, and manufacturing.

FOUNDED	2011			
HQ	Austin, TX			
EMPLOYEES	170+	SCIENTISTS	ENGINEERS	OTHER
PRODUCT	L7|ESP Enterprise Science Platform™			
SOLUTIONS	Precision Therapeutics	Precision Medicine	Precision Diagnostics	Precision Research	Precision Agriculture
INDUSTRIES	Life Sciences	Healthcare	Crop and Animal Sciences		

Gartner 'Cool Vendor' 2020

In 2020, L7 was one of only five companies recognized in the Gartner Cool Vendors in Life Sciences report that technology leaders should watch to help accelerate life science business results.

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Deloitte Technology 'FAST 500' 2021

With a 3-year growth of 8,288%, L7 Informatics is ranked #26 and #1 Life Sciences Software.

Deloitte Technology 'FAST 500' 2022

Honored that L7 Informatics made the list again with another impressive 3-year growth of 1,543%.
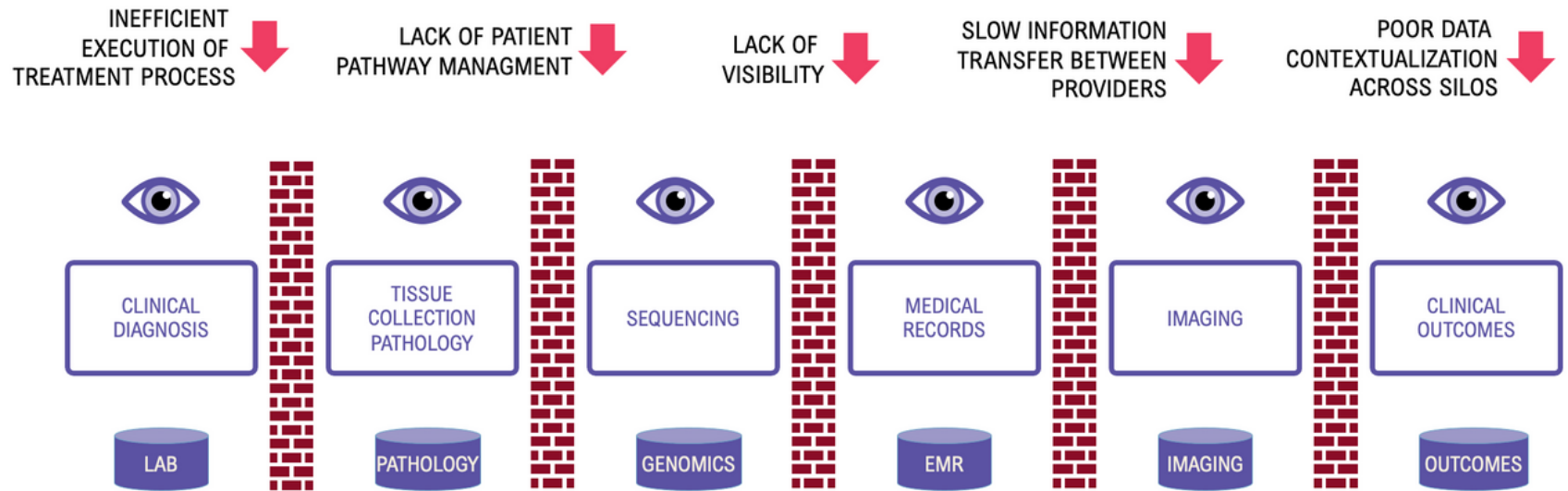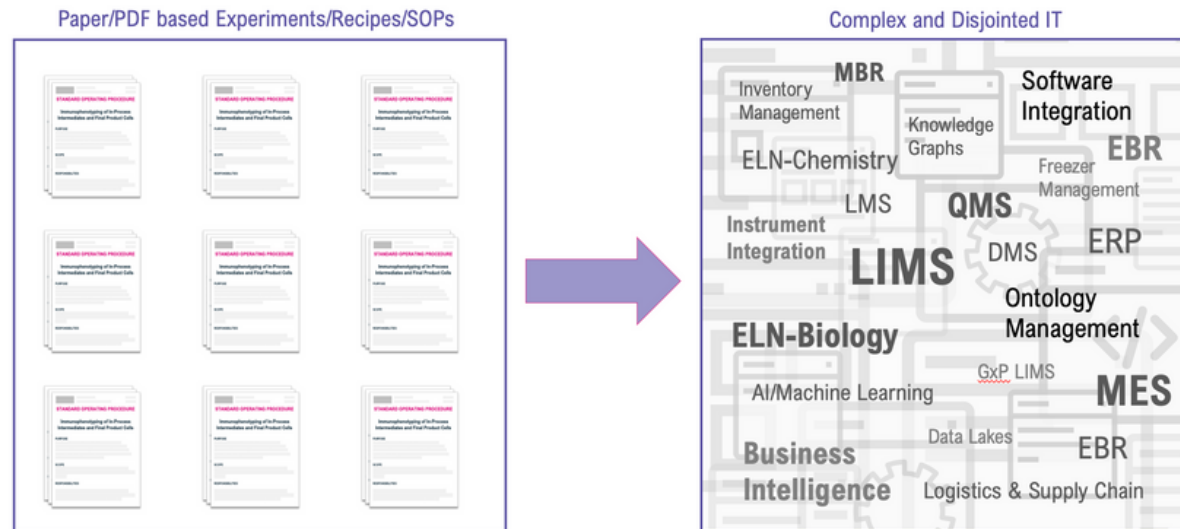
Deloitte Technology 'FAST 500' 2023

For a third consecutive year, we made the list again, and celebrate a significant 3-year revenue growth of 2047%.

The Problem

Legacy data silos and processes hinder Precision Medicine pathways, increasing the risk for business and patients.
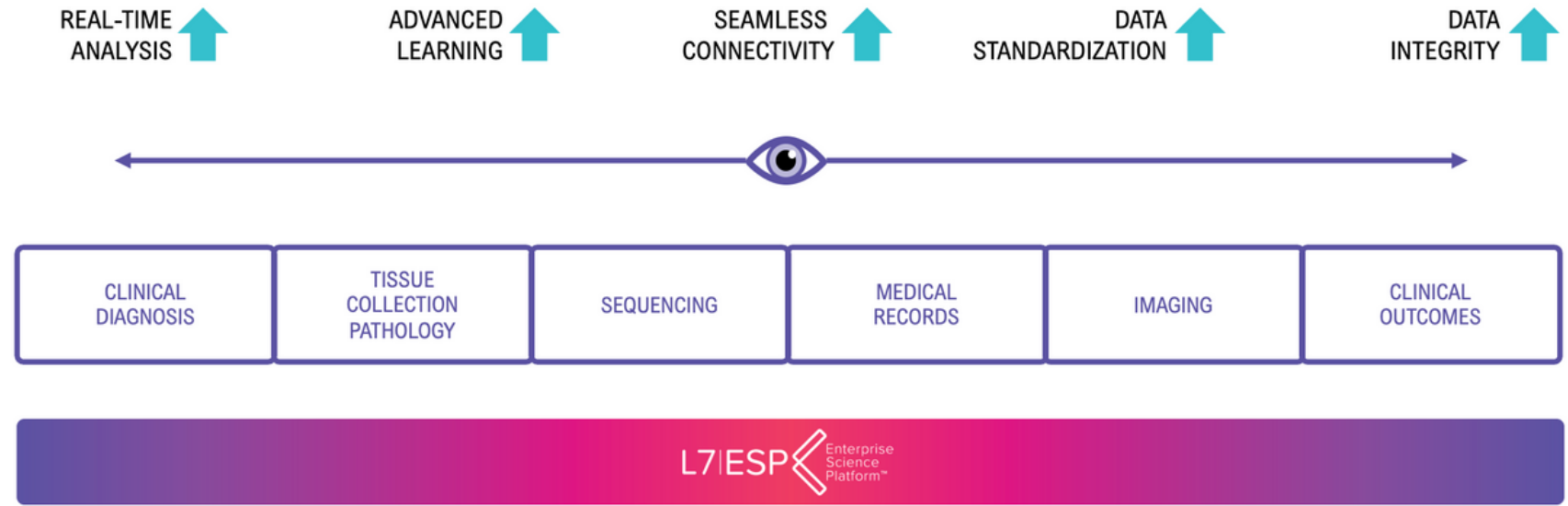
INEFFICIENT EXECUTION OF TREATMENT PROCESS

LACK OF PATIENT PATHWAY MANAGMENT

LACK OF VISIBILITY

SLOW INFORMATION TRANSFER BETWEEN PROVIDERS

POOR DATA CONTEXTUALIZATION ACROSS SILOS

CLINICAL DIAGNOSIS

TISSUE COLLECTION PATHOLOGY

SEQUENCING

MEDICAL RECORDS

IMAGING

CLINICAL OUTCOMES

LAB

PATHOLOGY

GENOMICS

EMR

IMAGING

OUTCOMES

Paper-based "Standard Operating Procedures" implemented across siloed IT systems make digitalization and validation of systems difficult and reduce the velocity of the business and create data integrity problems

Paper/PDF based Experiments/Recipes/SOPs

Complex and Disjointed IT

Inventory Management
MBR
Knowledge Graphs
Software Integration
ELN-Chemistry
LMS
QMS
EBR
Freezer Management
Instrument Integration
LIMS
DMS
ERP
ELN-Biology
Ontology Management
AI/Machine Learning
GxP LIMS
MES
Business Intelligence
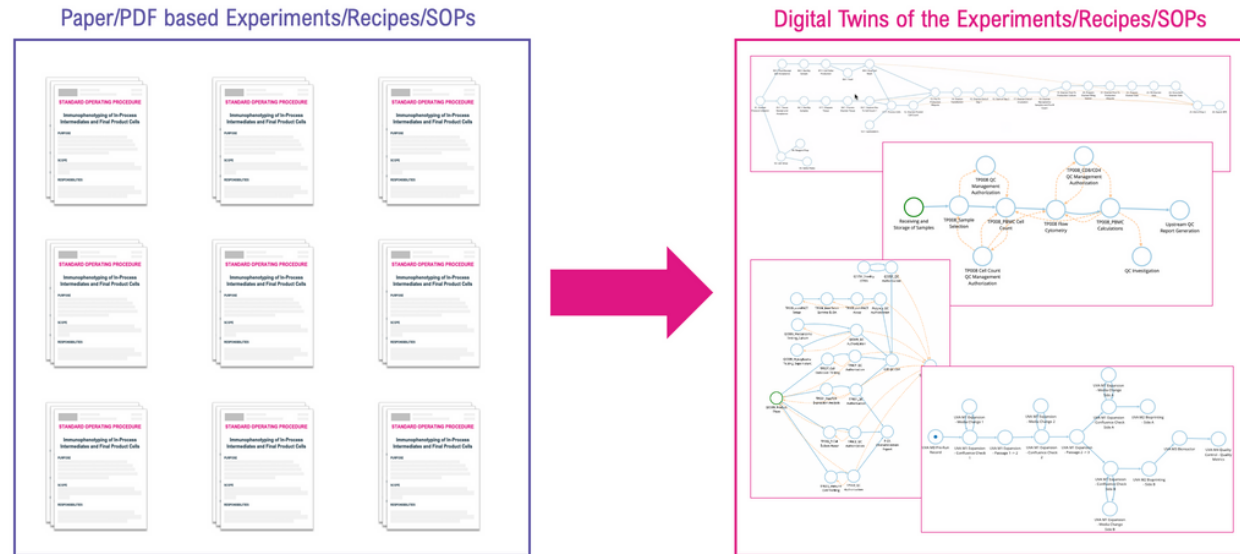Data Lakes
EBR
Logistics & Supply Chain

The Solution

L7|ESP accelerates Precision Medicine requirements for integrated data + intelligence, improving efficiency, velocity, and science, and reducing risk for business and patients

REAL-TIME ANALYSIS ADVANCED LEARNING SEAMLESS CONNECTIVITY DATA STANDARDIZATION DATA INTEGRITY

| CLINICAL DIAGNOSIS | TISSUE COLLECTION PATHOLOGY | SEQUENCING | MEDICAL RECORDS | IMAGING | CLINICAL OUTCOMES |

L7|ESP — Enterprise Science Platform™

L7|ESP creates digitalized twins of Experiments, Recipes and SOPs, making the validation of systems easier, increasing the velocity of the business, and reducing data integrity problems.

Paper/PDF based Experiments/Recipes/SOPs

Digital Twins of the Experiments/Recipes/SOPs

Unified Platforms for Precision Medicine Pathway Management [Scales to Other Disease States]

CANCER

Patient Consent & Phenotype — Tumor/Normal Biopsy collection + Sample Prep — Sequencing Bio-Informatics Analysis — Interpretation · Reporting · Molecular Tumor Board — Treatment Decisions · Therapeutics — Treatment and monitor RWD/RWE (outcomes)

RARE DISEASE

Patient Consent & Phenotype — Sample collection + prep — Sequencing Bioinformatics Analysis — Interpretation/ · Diagnosis · Variant Reporting — Treatment Decisions · Therapeutics — Treatment and monitor RWD/RWE (outcomes)

UNIFIED PLATFORM

L7|ESP Enterprise Science Platform™

INSTRUMENTS   EMR   PACS LIS PATH   IOT

L7|ESP - A Unified Platform Built on Industry 4.0 Principles

Industry 4.0 Principles

LEVEL 6 Self-optimization
- How can the system react and self correct?

Self-Optimization

LEVEL 5 Predictability with AI
- What is going to happen?

Predictability

LEVEL 4 Transparency with business intelligence
- Why is it happening? A library of business Intelligence dashboards

Transparency

LEVEL 3 Visibility with Applications
- What is happening? A robust suite of best-in-class applications

Visibility

LEVEL 2 Connectivity and Workflows
- Digitalized Process Models (Process integration, Integrated instruments, equipment, people, other software systems)

Connectivity

LEVEL 1 Information models and metadata
- Integrated Digitalized information models (samples, locations, inventory, instruments, results, experiments, Assets, batches)

Information

Business Value potential increases with each step

Step-wise Digitalization: Each Step is Foundational to Next

L7|ESP - A Unified Platform for Life Sciences
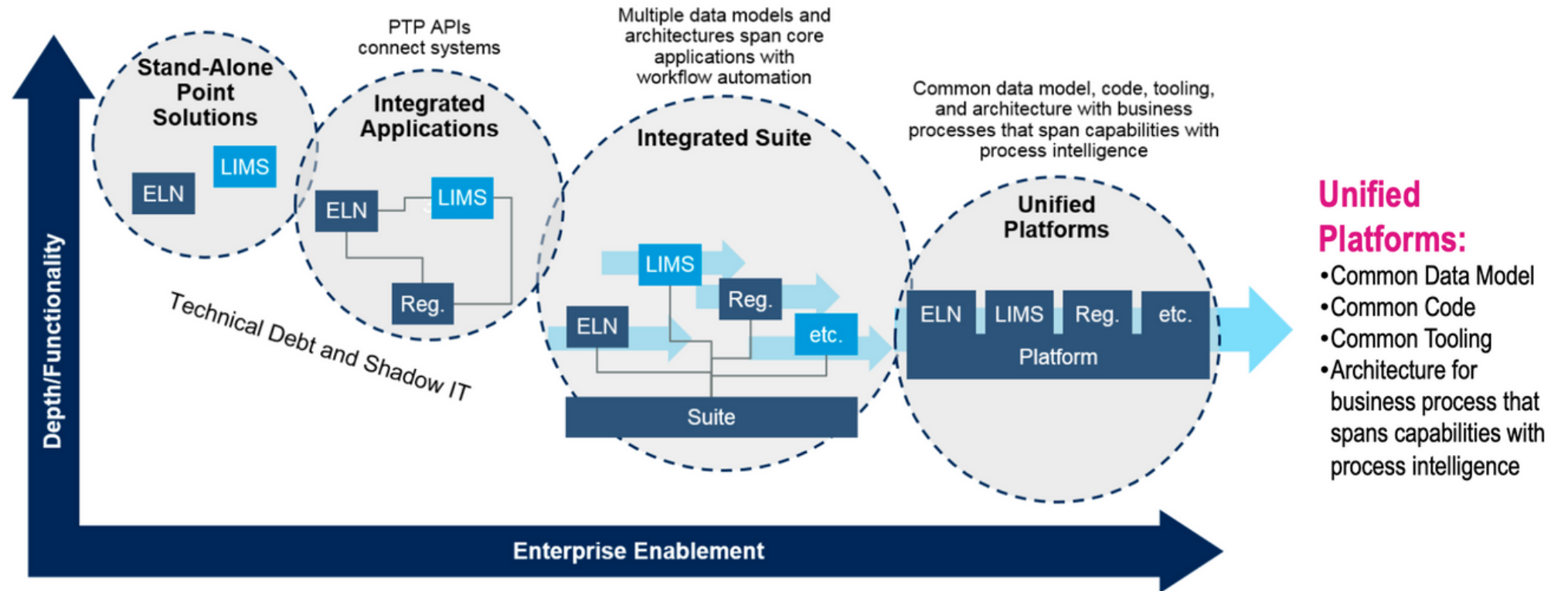
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Composable Platforms Built of 'Primitives'

COMPOSITE MODELS vs PRIMITIVE MODELS

Composite models are fixed functionality and difficult to modify

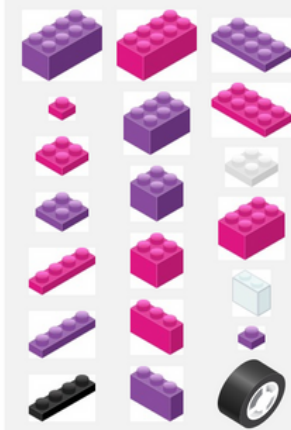Primitive models provide quick assembly, modification, and reusability
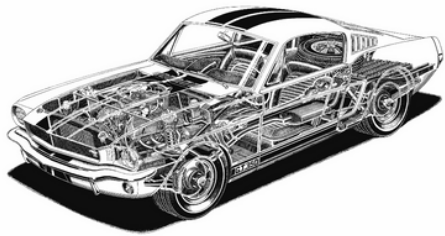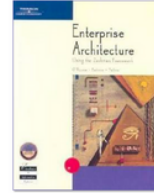
Enterprise Architecture using the Zachman Framework

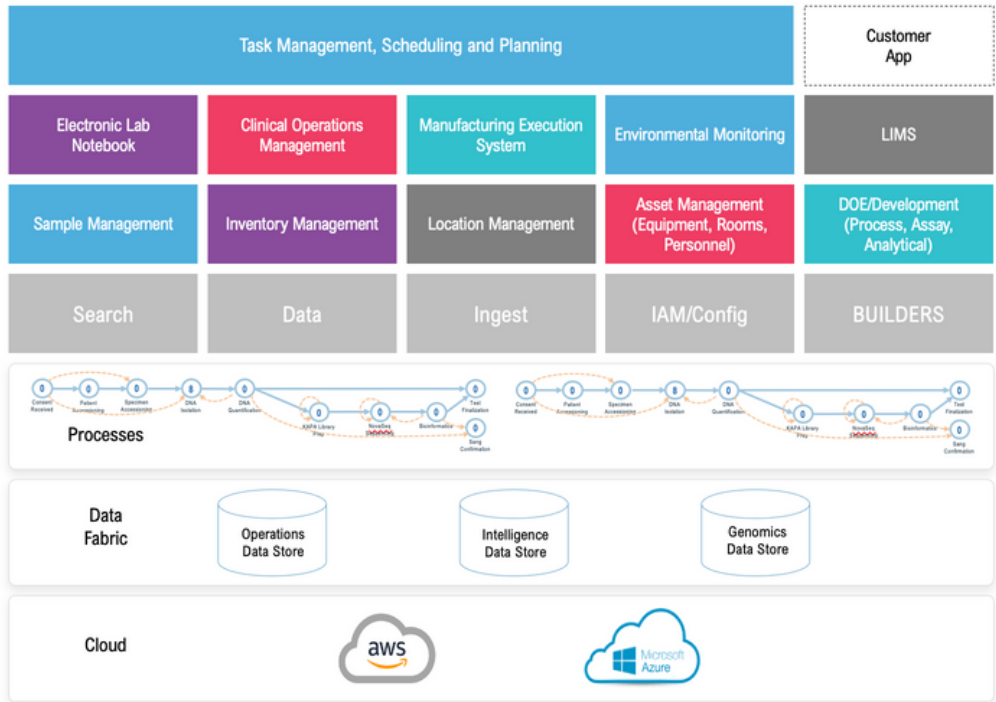PRIMITIVE MODELS PROVIDE QUICK ASSEMBLY, MODIFICATION, CUSTOMIZATION, AND REUSABILITY
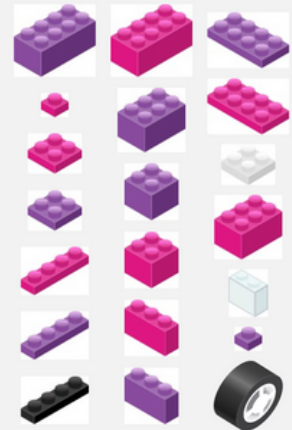
L7|HUB "STORE"

Unified Platforms

Meet all of your data and process needs with a single solution, L7's unified platform, L7|ESP, equipping your business with a comprehensive operating environment and software stack that adapts to your unique requirements while preserving data provenance and integrity.

L7|ESP Enterprise Science Platform™

ERP – CRM - HCM Suites					
CUSTOMERS VENDORS PRODUCTS	ORDER MGMT.	FINANCIAL PLANNING	MANUFACTURING PLANNING	DISTRIBUTION PLANNING	PROCUREMENT

BUSINESS MASTER DATA

L7|ESP APPS for <Industry+Solution>

ELN	MES/EBR	LIMS	INVENTORY	LOCATION	ANALYSIS	EM	CLIN OPS	SAMPLE

OPERATIONAL MASTER DATA + PROCESS DATA

SENSOR / IOT DATA

INSTRUMENTS	EQUIPMENT	CRO / LAB, CDMO	BMS / SENSORS	SCADA / HMI	PARTNER DATA

Better Execution Data-Quality for Planning

DATA+INTELLIGENCE

Improved Utilization & Efficiency

Task Management, Scheduling and Planning — Customer App

Electronic Lab Notebook	Clinical Operations Management	Manufacturing Execution System	Environmental Monitoring	LIMS
Sample Management	Inventory Management	Location Management	Asset Management (Equipment, Rooms, Personnel)	DOE/Development (Process, Assay, Analytical)
Search	Data	Ingest	IAM/Config	BUILDERS

Processes

Data Fabric — Operations Data Store — Intelligence Data Store — Genomics Data Store

Cloud — aws — Microsoft Azure

Business Apps
- Clinical Operations
- Electronic Batch Records
- Electronic Lab Notebook
- Environmental Monitoring
- Inventory
- LIMS
- Locations
- Manufacturing Scheduling
- Stability Testing
- See roadmap

Standard Apps
- Assets
- Dashboards
- Reports
- Data
- Entities
- Ingest
- Projects
- Samples
- Search

Configuration Apps
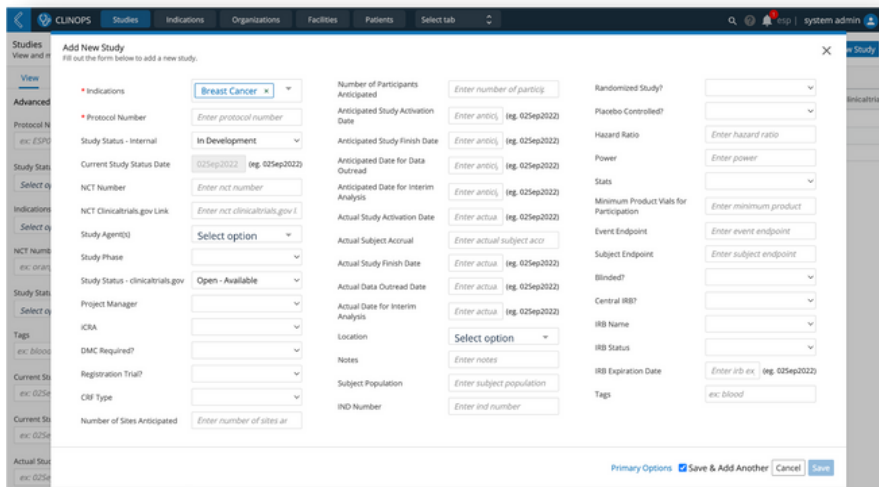- Applets
- Master (Builders)
- IAM

L7 Business Apps - Every Application Needed for the Scientific Enterprise
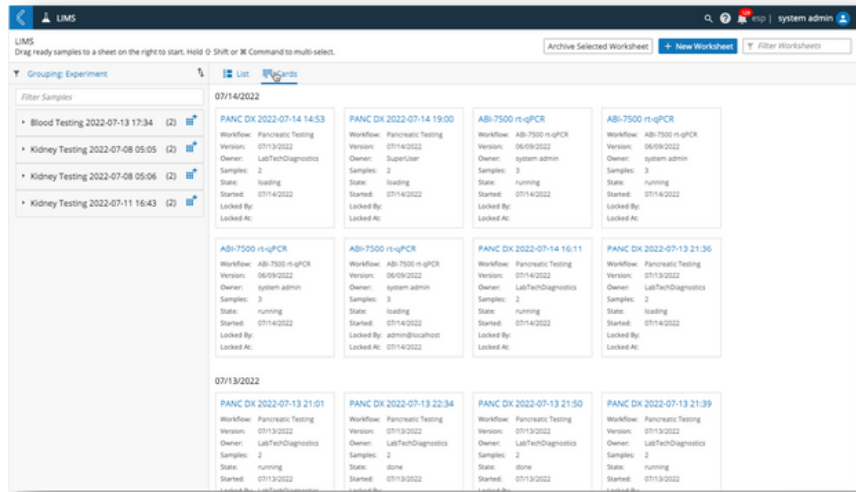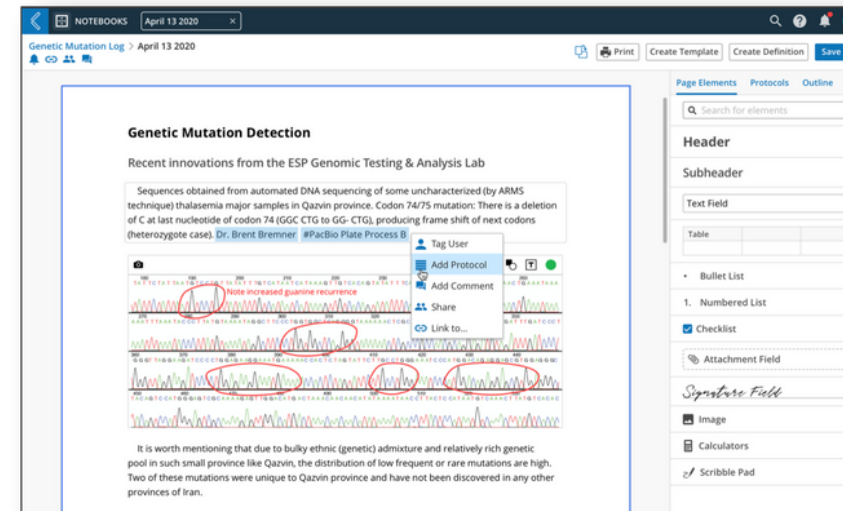

Integrated LIMS + LES (GMP/GLP/GCP compliant)
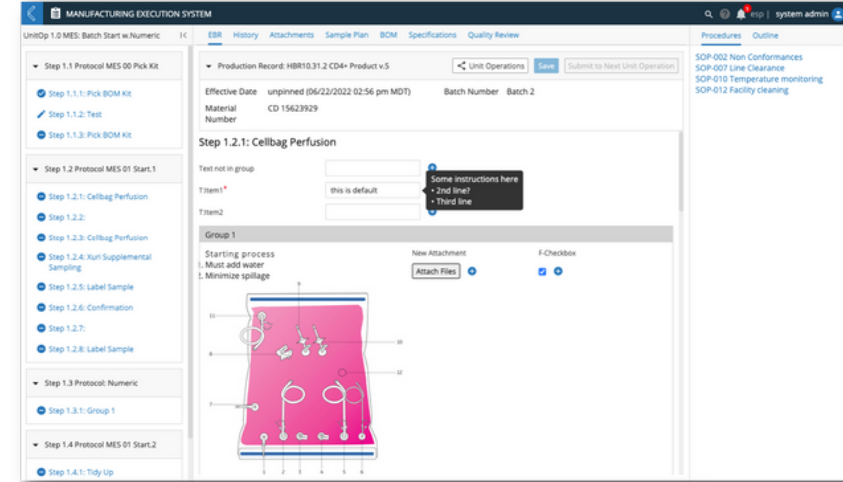
Manufacturing Execution System

Clinical Operations

Electronic Lab Notebook

L7 Business Apps (continued)

Environmental Monitoring

Scheduling

Inventory

Location

Digitalization Lifecycle

Design > Publish > Execute > Monitor + Mine > Optimize

Design:
L7|MASTER

Store Digital Content:
L7|HUB

PUBLISH

EXECUTE

OPTIMIZE + REDESIGN PROCESSES & OPERATIONS

MONITOR + MINE

Monitor and Mine:
L7|INTELLIGENCE

Execute Process:
L7|ESP + APPS

L7 Informatics Customers

Agriculture and Agri-Food Canada

ATCC

BENSON HILL

Biobot Analytics

CELLARES

Cellipont BIOSERVICES

CIBUS

CReATe Fertility Centre

Contamination Source Identification CSI-Dx

Dana-Farber Cancer Institute

GEiC Genome Engineering & iPSC Center

GeneDx

Genome Technology Access Center @MCDONNELL GENOME INSTITUTE

GRADALIS

Harbinger Health

nobell

QIAGEN

Quest Diagnostics

RUTGERS Cancer Institute of New Jersey RUTGERS HEALTH

The Jackson Laboratory

Think Bioscience

vernal BIOSCIENCES

Washington University in St.Louis SCHOOL OF MEDICINE

WRIGHTLABS

CASE STUDIES

Hereditary Disease Diagnostics in a CAP/CLIA Clinical Setting

DNA sequencing workflows to identify and diagnose hereditary diseases in unborn babies (embryo & fetus)

CReATe
Fertility Centre

SITUATION

A paper-based process to execute and generate clinical diagnostic reports to provide actionable hereditary disease insights. No structured database for research.

SOLUTION

CreateIVF implemented the L7|ESP platform to automate the entire patient sample to clinical report process that begins with a Patient, and a dynamic (i.e. user defined on the fly) number of children samples. The children samples include Embryos or Fetuses, Blood and/or Buccal Swabs collected from extended family and/or ova/ sperm donors. DNA is extracted from these samples and are used for different diagnostic tools, such as Sureplex, Repli-g, Karyomapping, SNaPShot, Sanger, Nanopore MINion, Veriseq, Identifiler, etc. As the technicians process these samples, they record critical sample metadata that is used to better assist the patient in becoming pregnant. Finally, a CLIA compliant clinical report is generated and digitally signed.

WORKFLOW

QC of Early Phase Cell Therapy Trials

Dana-Farber Cancer Institute

A regulatory-compliant platform to digitalize all manufacturing and QC operations

SITUATION

Cell Manipulation Core Facility (CMCF) at DFCI seeks to implement quality control of their Cellular Therapy Products to Ensure Quality, and Purity using L7|ESP pre-built workflows and integrations. CMCF also wanted eliminate all paper batch records.

SOLUTION

Implementing L7|ESP a single unified "validated" platform to digitalize all operations starting with QC for early phase cell therapies. Digitalizing and Automating 31 QC Processes (Workflow Chains) with over 90 unit-lab-operations

WORKFLOW CHAINS

WORKFLOW CHAINS

FLOW CYTOMETRY PANELS

01. 6Color Lymphocyte Panel	13. INKT ENRICHMENT Flow Panel
02. ARC-T Panel	14. INKT EXPANSION Flow Panel
03. BCMA Panel	15. INKT TETRAMER Flow Panel
04. Sponsor BCMA Panel	16. iPSC Characterization Panel
05. CAR TEAM-E Flow Panel	17. iPSC Differentiation Panel
06. CAR79B19 Flow Panel	18. LITTMUS Treg Flow Panel
07. CD34 Enumeration Panel	19. ROR1 Panel
08. CD34 Dual Platform Panel	20. Sponsor TREG Flow Panel
09. Duraclone Panel	21. Sponsor TREG Flow Panel
10. EGFR CAR Flow Panel	22. TCRαβ Flow Panel
11. EVE LYMPH Panel	23. TREG Panel
12. EVE TREG Panel	24. TriPRIL Flow Panel

AUTOMATED AND MANUAL ASSAYS

01. ABO/Rh Typing
02. Appearance Test
03. Automated Cell Counts
04. BacT 14-day Sterility
05. CFU
06. CFU Gene Therapy
07. ELISA
08. Endotoxin Testing
09. Manual Gram Stain
10. Manual Sterility
11. Mycoplasma
12. Trypan Blue Viability

OTHER WORKFLOW CHAINS

01. Client Receipt
02. Product Pooling
03. Product Receipt
04. Product Issue/Disposition
05. Product Splitting
06. Sampling Process
07. Sampling Receipt
08. Subject Association

VALUE COMPARISON OF THE L7|ESP UNIFIED PLATFORM VS INTEGRATED POINT SOLUTIONS → TCO

INVESTMENT	L7|ESP	INTEGRATED POINT SOLUTIONS
Licenses	Annual License Model: Core License + Additional Packages (Lab Operations, Research, etc...). Updates to the latest release are included.	Multiple licenses for multiple solutions (ELN, LIMS, Inventory Management, Freezer Management, Instrument Integration, Data Management, Reporting, etc...). Upgrades to the latest release may incur additional license fees.
Maintenance Fees	Maintenance is included in the annual license.	Typically 20% - 22% of the license fee for each solution.
Integration	Because L7|ESP is a unified platform and leverages a single data fabric, no integration is required to enable an end-to-end process other than, for example, an ordering portal or ERP system (as required).	Multiple point solutions require multiple integration points, leading to higher costs and preventing full contextualization of the overall data model, making it extremely difficult or even impossible to obtain meaningful insights.
IT Resources	Only a single set of common skills (Python, HTML, and JavaScript) are required to maintain and extend all aspects of research, development, and lab operations. Fewer IT resources are required to maintain such a unified platform.	Multiple solutions require multiple technical skillsets to maintain the solutions, thus requiring additional IT resources and cost.

VALUE COMPARISON OF THE L7|ESP UNIFIED PLATFORM VS INTEGRATED POINT SOLUTIONS → CAPABILITIES

INVESTMENT	L7|ESP	INTEGRATED POINT SOLUTIONS
Data Model	L7|ESP offers a flexible late binding data model tailored to customer needs with the Builders no-code configuration tool. Ontology Services like SciBite ensure adherence to ontology rules across the organization. With a single data fabric, L7|ESP can collect and execute data for any end-to-end process, leading to comprehensive insights into scientific and operational data.	Some solutions require customers to adjust their data models to fit an existing structure. This can result in changes to customer processes to accommodate inflexible data models, leading to time-consuming and costly analysis of data from multiple integrated systems. This can also result in a loss of contextualization and value of the data collected.
Process Model	L7|ESP's low code/no code configuration tool allows for easy configuration of any process using both predefined and new content without requiring the customer to change any part of their current processes.	Some solutions force customers to adapt their processes to fit a predetermined structure and may not support all protocols and workflows within an end-to-end process.
Predefined and Reusable Content	L7 Informatics continually creates reusable content to enhance implementation efficiency and speed. This content includes data entity definitions, workflow components, instrument connectors, and more, which can be shared easily between departments to improve collaboration and speed to value.	Without the use of a composable architecture and unified platform, implementations tend to be more custom and deployed in silos across different departments.
Business Analytics Enablement	L7|ESP uses a single data fabric including an intelligence data store that can be used by any business intelligence tool such as Microsoft PowerBI, Tableau, etc. to enable scientific and operational insights into all processes and data within L7|ESP. With L7|ESP's single data fabric, all data is contextualized to enable deeper and more meaningful insights.	Data sourced from multiple systems typically is exported to a data lake system for analysis. However, data stored in a data lake will lose context as the different data sources are joined, which restricts the value that can be obtained from the analysis.
Communication and Visibility	Users across all groups (Biospecimen Management, Sample Management, Lab Operations, Pathologists, Bioinformatics, etc.) all work seamlessly in the same platform. All requests, status, results, reconciliations, and more are easily available.	Communication via email, internal messaging services, etc. is required to communicate requests, status, results, issues, etc. when using multiple solutions. Visibility to critical information regarding requests, status, results, reconciliations is much more difficult when using multiple solutions.
Sample Lineage and Provenance Tracking	L7|ESP tracks each sample from storage in the BSSR to use in each lab and includes tracking via couriers and external partners, as applicable. L7|ESP automatically manages and tracks all sample parent-child relationships as well as all sample movement to provide full Chain of Identity and Chain of Custody for all samples.	Using multiple systems to enable any end-to-end process increases the difficulty to not only track but also to maintain sample lineage and provenance when sample related data must be exchanged between systems, sometimes multiple times within a single process.
End-to-End Audit Trail	L7|ESP includes a complete and immutable audit trail of each change in the database including all implemented end-to-end processes.	Multiple solutions not only requires multiple audit trail exports but also mapping and assemblage of different audit trail formats to produce a single audit trail of an end-to-end process.

VALUE COMPARISON OF THE L7|ESP UNIFIED PLATFORM VS INTEGRATED POINT SOLUTIONS → IMPLEMENTATION + MAINTENANCE

INVESTMENT	L7|ESP	INTEGRATED POINT SOLUTIONS
IT Resources	Only a single set of common skills (Python, HTML, and JavaScript) are required to maintain and extend all aspects of research, development, and lab operations. Fewer IT resources are required to maintain such a unified platform.	Multiple solutions require multiple technical skillsets to maintain the solutions, thus requiring additional IT resources and cost.
Ease of Configuration	Because most of the process and data modeling changes can be performed by anyone trained in the L7|Master low code / no code configuration tool, changes can be made much more rapidly since IT resource typically do not need to be involved.	Many point solutions required IT resources to make basic changes such as extending the data model or modifying a protocol step, thus increasing costs and delays while decreasing flexibility and speed to market.
Implementation Approach and Skillsets	Uses Low Code / No Code configuration tool for Data and Process ModelingReporting, Data Processing, and Automation leverages commonly used technical skills, including Python, HTML, and JavaScript.	Multiple solutions typically require multiple technical skillsets across all the solutions from database management to configuration to coding and more with each solution potentially requiring a different set of technical skills.
Implementation SDLC	L7 Informatics' well defined customer content SDLC provide a single roadmap for a successful implementation of any end-to-end process in L7|ESP. Each customer implementation is fully documented.	Implementing multiple systems requires multiple implementation approaches and models increasing costs and time to value.
Verification and Validation	Each major release of L7|ESP is verified and validated. In addition, each customer implementation is verified by L7 Informatics' QA resources. Verification and validation documentation including test matrices, trace matrices, Verification Summary Report, Release Notes, and more are provided to each customer to support their own verification and validation efforts.	Verification and Validation is required for each system, leading to higher overall validation costs. Some vendors may provide verification and validation documentation while others may not.
Updates	L7 Informatics is a PaaS solution which means that L7|ESP updates are provided to each customer who can then implement those updates on their own schedule. Any required verification and validation related to L7|ESP updates or additional implementation phases need only be performed in one system.	Verification and validation will be required (as applicable) to each system update as well as each system impacted by additional implementation phases.

About L7 Informatics

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