AI for Oil & Gas

C3.ai
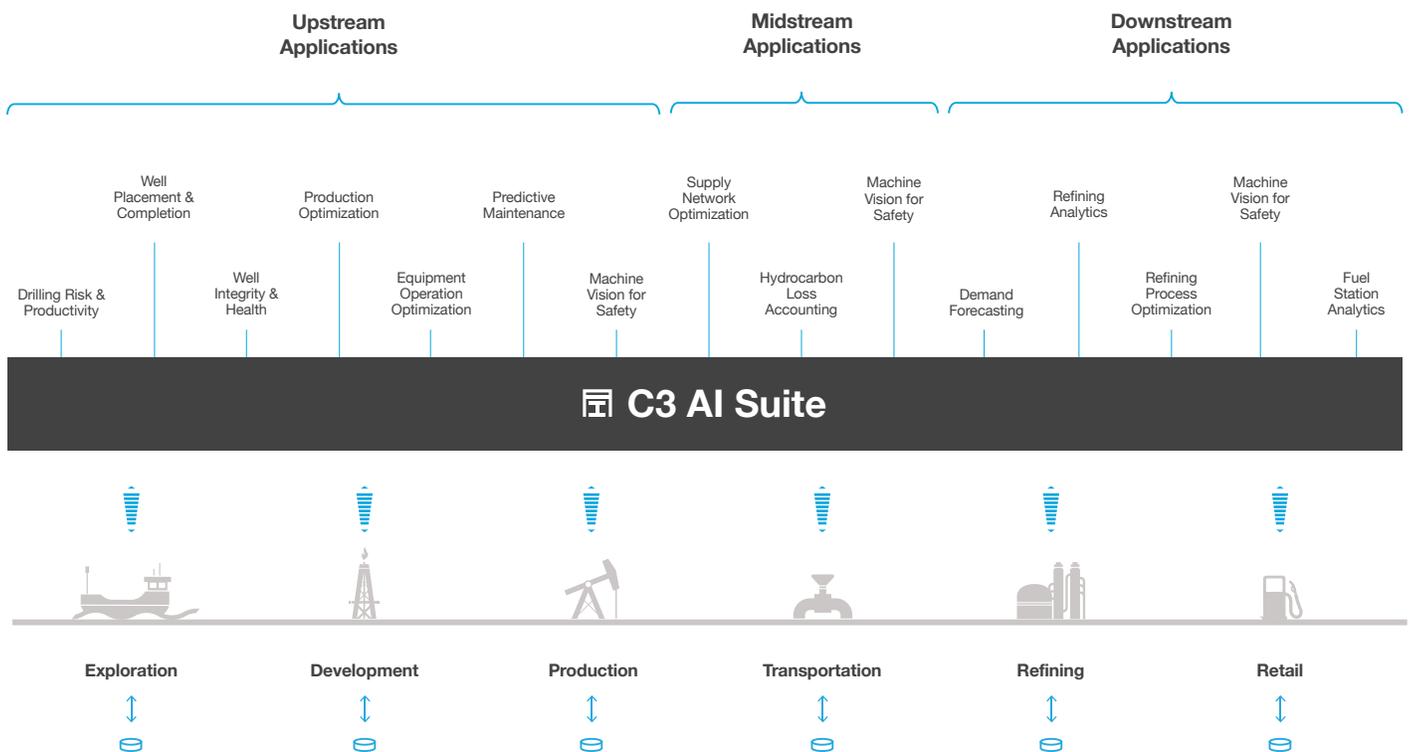
Use the power of enterprise-scale AI to improve uptime and reliability, increase production output, mitigate risk, and optimize processes

Oil & gas companies face a dynamic market with tighter margins, critical safety and operational improvement imperatives, and unprecedented regulatory and compliance requirements. Leading global oil & gas companies are exploring the transformative possibilities of AI and IoT but are constrained by data segregated in disparate, rigid IT systems built over many years. Until now, efforts to integrate this data, build analytics, or generate actionable insights have proven expensive and difficult to maintain. Oil & gas companies today need an operating platform to rapidly enable IoT and AI solutions while meeting governance, IT, and operational requirements.

The C3 AI Suite™ provides the necessary and comprehensive services to build enterprise-scale AI applications up to 40x faster than alternative approaches. The C3 AI Suite uses all relevant data sources to rapidly generate predictive insights; enhance asset monitoring; improve operations; and optimize production, reliability, yield, and safety. A recent study of the value chain at a global oil & gas producer demonstrated that the economic value of the C3 AI Suite used enterprise-wide could exceed $100 million annually.

Upstream Applications **Midstream Applications** **Downstream Applications**

Well Placement & Completion | Production Optimization | Predictive Maintenance | Supply Network Optimization | Machine Vision for Safety | Refining Analytics | Machine Vision for Safety

Drilling Risk & Productivity | Well Integrity & Health | Equipment Operation Optimization | Machine Vision for Safety | Hydrocarbon Loss Accounting | Demand Forecasting | Refining Process Optimization | Fuel Station Analytics

⊞ C3 AI Suite

Exploration **Development** **Production** **Transportation** **Refining** **Retail**

C3.ai Applications for Oil & Gas

C3.ai oil & gas applications use AI at scale to provide actionable insights for business-critical challenges. These preconfigured applications include:

C3 Predictive Maintenance for Asset Health™

Identify high-risk assets, recommend prescriptive actions before failures occur, and improve asset uptime. C3 Predictive Maintenance seamlessly integrates with existing work order management and business systems, enabling operators to prioritize maintenance schedules and optimize expenditures.

C3 Production Optimization™

Generate operational recommendations for drilling new wells and for optimizing production from existing wells. Integrate operational data and reservoir geophysical models for comprehensive AI-enabled recommendations, leveraging near real-time analytics on drilling and network data to determine operational parameters.

C3 Integrity™

Identify corrosion risks and inspection targets, and predict wall-loss events with recommended interventions for assets at risk. AI-enabled predictions seamlessly integrate with ionic modeling and engineering simulations to support efforts to remain compliant with American Petroleum Institute requirements to maximize safety and prevent loss of containment incidents.

C3 Process Optimization™

Reduce waste, maximize value-added products, and identify process degradation such as fouling and coking. Integrated near-real-time data, machine learning algorithms, and engineering models provide unit-based and plant-wide performance optimization and continual feedback based on actual operational parameters. Actionable recommendations prioritize safety, production, and runtime.

C3 Network and Flow Monitoring™

Automate back-allocation and material-balance calculations using sensor data in an end-to-end process application. Identify operational deviations from predicted flows, generate alerts, and reduce bottlenecks. Aggregated results at the well, field, and network level enable users to automate production-loss analysis and investigate operational time series data and events.

C3 Machine Vision for Safety™

Detect safety hazards in near real time using machine vision to analyze video and image-based data sources. Throughout upstream, midstream, and downstream operations, remotely validate well-site operations security, detect asset integrity, and monitor retail safety hazards like consumers smoking. Advanced object detection can be deployed for in-field rapid processing and response time.
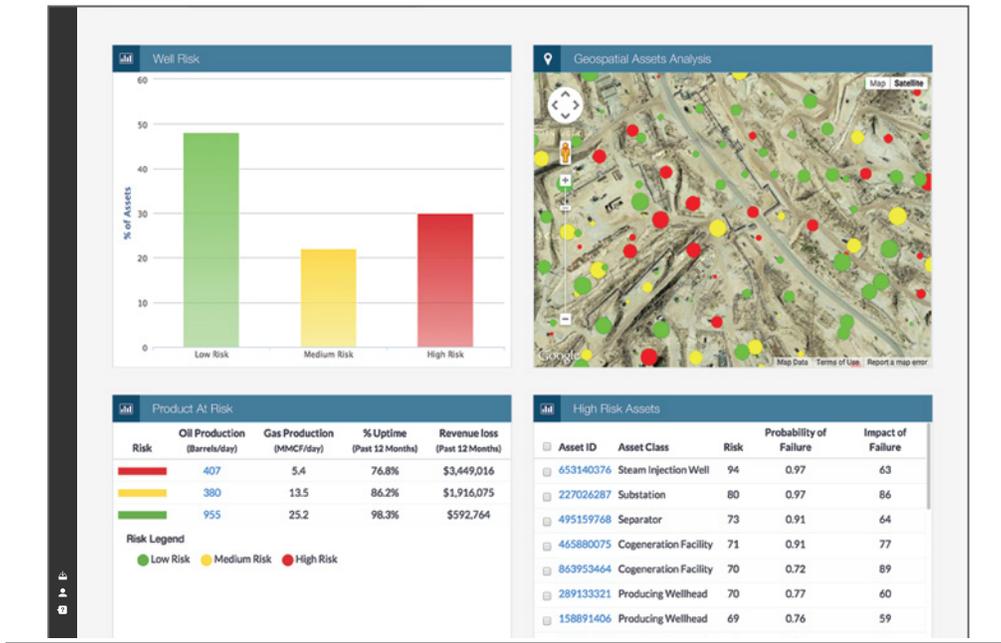
C3 AI Suite: Deploy Preconfigured Applications and Build Custom Applications
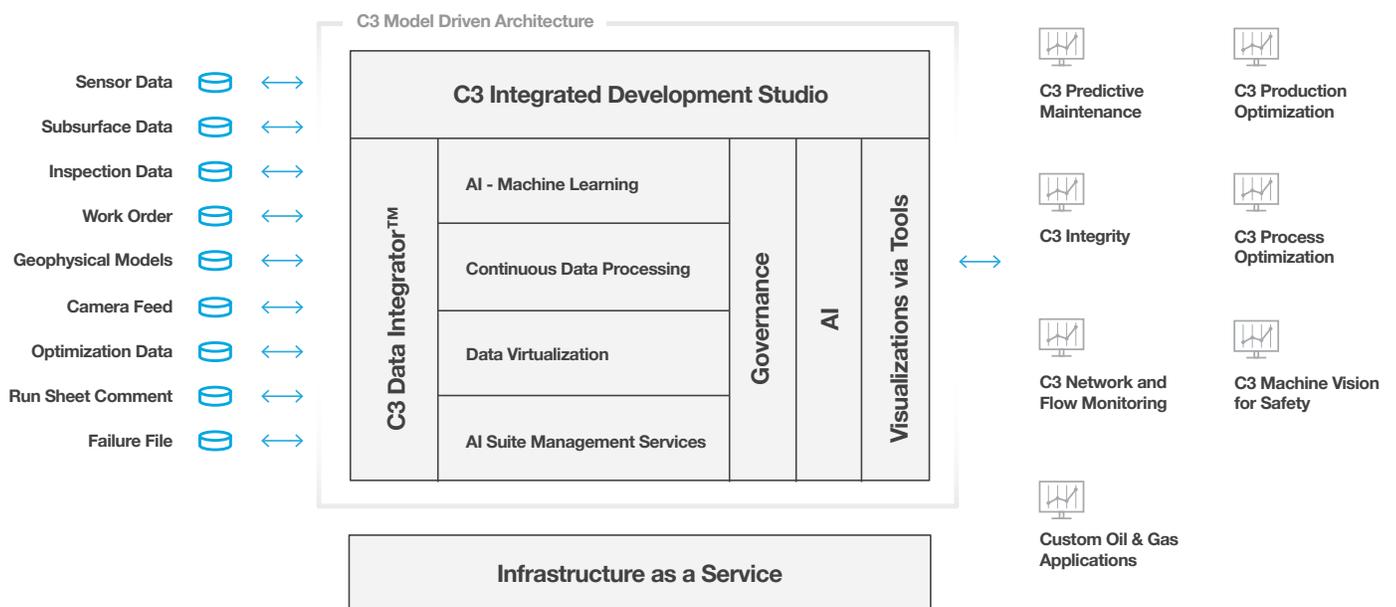
Solution Showcase:
C3 Predictive Maintenance of Progressive Cavity Pumps (PCPs)

Unconventional Gas Producer Improves Uptime and Reliability: The Australian natural gas division of one of the world's largest oil & gas producers deployed C3 Predictive Maintenance for PCPs. The company's PCPs were a leading cause of well failures and the second largest annual operational spend. C3.ai and the customer ingested a year of historical data from 545 LNG wells, consisting of 10 billion rows of data, into a unified federated data image. C3.ai built seven machine learning models to predict three types of failure 30 to 45 days in advance. The application delivered 88% accuracy in predicting a failure up to 50 days ahead of onset, enabling the company to prepare replacement parts and plan crew dispatches in advance, and perform early intervention to reduce production deferment.

10	7	↑ 86%	$60-80M
Billion rows of data	**Machine learning**	**Accuracy**	**Estimated**
	algorithms to predict three types of failures	(AUC)	**Annual Value**

Benefits of C3 Predictive Maintenance in Oil & Gas

- **Reduced downtime** due to early identification and resolution of equipment at high risk of failure.

- **Reduced operational costs** by shifting reactive maintenance to predictive maintenance. Streamlined workflow by defining maintenance packages that enable maintenance planners to effectively bundle high-priority work and schedule it at the right time in the equipment operating cycle.

- **Reduced capital expenditures** by driving asset replacement decisions using asset risk scores.

- **Reduced inventory costs** by anticipating the need for replacement parts.

# Build and Deploy Applications 40x Faster

The C3 AI Suite is comprehensive software that uses a model-driven architecture to accelerate delivery and dramatically reduce the complexities of developing AI-enabled applications.

The horizontally scalable architecture of the C3 AI Suite provides the foundation to develop next-generation AI applications that use federated data management and machine learning in a secure, scalable environment. With the C3 AI Suite, organizations can rapidly develop and operate AI applications that run on any public or private cloud environment.

The C3 AI Suite's set of visual application development and AI tools, C3 Integrated Development Studio (C3 IDS), is a low-code/no-code environment for developing, deploying, and operating enterprise AI applications. C3 IDS provides data ingestion, data modeling, machine learning feature engineering and model lifecycle management, and a metadata-driven UI development tool. With C3 IDS, application developers can configure the application user experiences and deploy AI-enabled applications. Data scientists can configure application data models and develop, train, and deploy machine learning models.

The C3 AI Suite delivers a set of services and capabilities that underpin the ability to deliver AI applications 40x faster than alternative methods. A model-driven abstraction layer; a comprehensive set of data integration, management, and processing capabilities; time series services; AI and model management; and a robust security framework speed data science and application development to accelerate delivery of AI at enterprise scale.
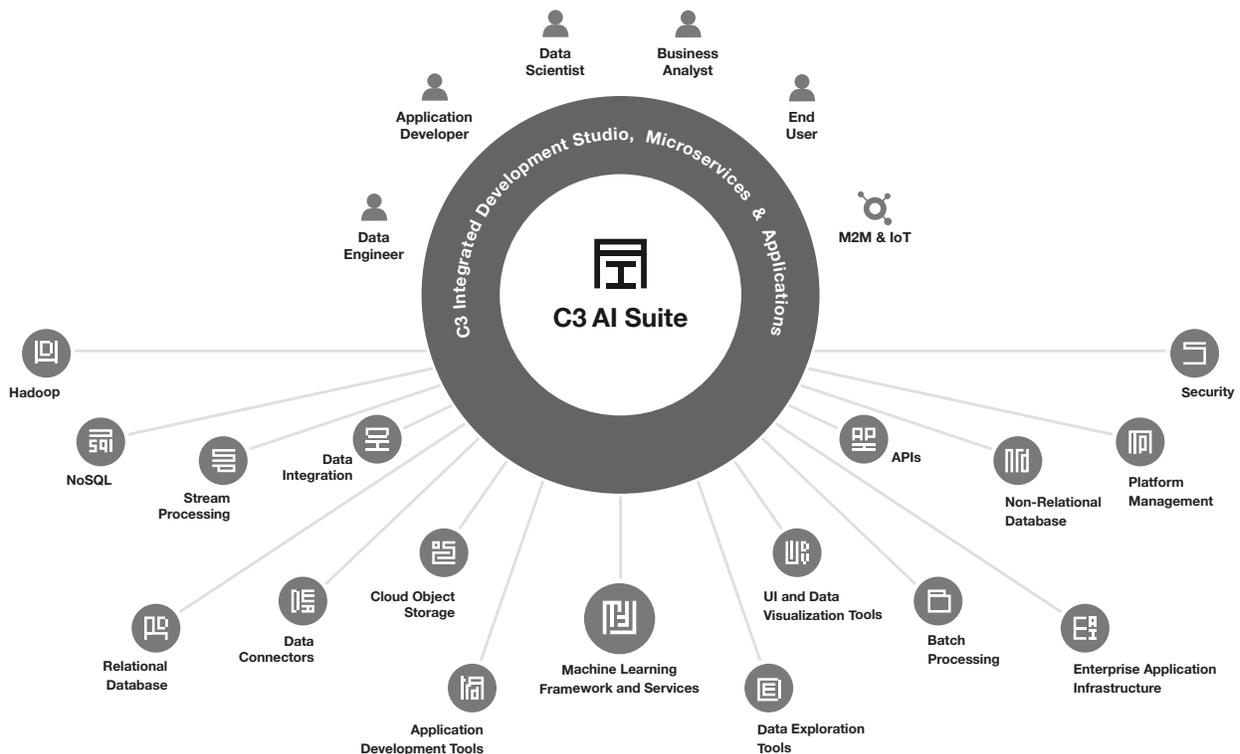
Proven Results in Weeks, Not Years

Complete a low-cost, low-risk production trial of the C3 AI Suite™ in just 8–12 weeks. Validate the economic value and other benefits to your organization before expanding into full production use. For more details, visit www.C3.ai.