



ARIYATECH

AI ENGINEERING

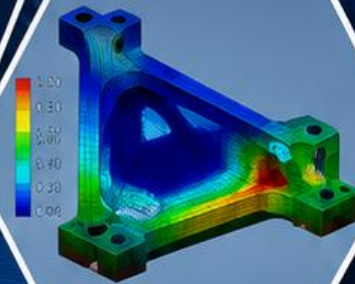
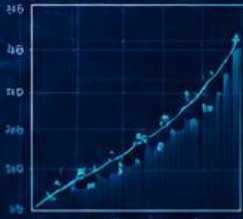
SERVICE CATALOG

Advanced Computational Engineering
for Reliable Technical Decisions

Computational Engineering &
Applied AI Consultancy

$$Ku = f$$

$$\rho \frac{\partial u}{\partial t} = \nabla \cdot \sigma + b$$



```
import numpy as np
from scipy.optimize import minimize

def objective(x):
    return np.sum((model(x)-data)**2)

res = minimize(objective, x0)
print(res.x)
```



AriyaTech AI Engineering LLC



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ENGINEERING INTELLIGENCE. | COMPUTATIONAL PRECISION. | REAL-WORLD IMPACT.



Physics-Based
Modelling



Scientific Computing
& Automation



Applied AI &
Data Analytics



Reliable Results
& Engineering Insight

SERVICE ARCHITECTURE & OVERVIEW

AriyaTech AI Engineering provides specialist computational engineering services through three integrated pillars. Our approach combines engineering domain knowledge with numerical simulation, scientific computing and applied AI, allowing each engagement to be structured around the technical problem, required engineering outcome and project-specific requirements.

CORE SERVICE ARCHITECTURE



ENGINEERING
SIMULATION



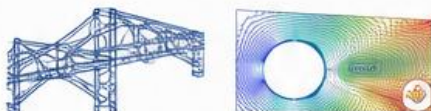
SCIENTIFIC COMPUTING
& APPLIED AI



TECHNICAL R&D
CONSULTING

THREE INTEGRATED PILLARS

01 ENGINEERING SIMULATION



Physics-based numerical modelling and simulation for engineering assessment, troubleshooting, validation and computational investigation.

- FEA
- CFD
- Nonlinear Analysis
- Structural Response
- Fracture & Fatigue
- Parametric Studies
- Verification & Validation

02 SCIENTIFIC COMPUTING & APPLIED AI



Scientific programming, automation, data analytics and applied AI for efficient, reproducible and data-informed technical workflows.

- Scientific Computing
- Engineering Automation
- Data Processing
- Machine Learning
- Surrogate Modelling
- Optimization
- Explainable AI

03 TECHNICAL R&D CONSULTING



Computational R&D support for methodology development, validation strategy, independent technical review and complex engineering investigations.

- Computational Methodology
- Model Strategy
- V&V Planning
- Independent Technical Review
- R&D Workflow Development
- Engineering Decision Support

FIVE CORE SERVICES

Service	Primary client need
01  Engineering Simulation Audit & Model Review	Independent review, troubleshooting and reliability assessment of existing engineering models.
02  Engineering Simulation Solutions	Development, correction or extension of numerical models to address defined engineering questions and analysis requirements.
03  Scientific Python & Engineering Automation	Automation of repetitive engineering calculations, simulation processing and computational workflows.
04  Engineering Data Analytics & Applied AI	Prediction, surrogate modelling, optimization and interpretable engineering insight from technical data.
05  Technical R&D Consulting	Computational methodology, validation strategy, independent technical review and complex engineering R&D decision support.



ENGAGEMENT PRINCIPLE

Services may be engaged independently or combined within an integrated technical workflow. A focused audit, computational task or consultation can expand into a broader simulation, automation, data analytics, applied AI or R&D engagement when additional engineering value is identified.



ASSESS



ANALYZE



DEVELOP



DELIVER



ADD VALUE

01 Engineering Simulation Audit & Model Review

Independent technical review of an existing engineering model to assess physical consistency, modelling assumptions, numerical reliability and validation evidence, and to identify issues that may affect the credibility of the resulting analysis.

WHEN THIS SERVICE IS NEEDED

- Simulation results are unstable, inconsistent or difficult to explain.
- Convergence, stability or solver behaviour raises technical concern.
- Boundary conditions, loading, material definitions or modelling assumptions are uncertain.
- Mesh or discretization choices require independent assessment.
- Verification, validation or sensitivity evidence is weak, incomplete or unavailable.
- An existing model requires troubleshooting, correction, extension or an independent technical second opinion.

TYPICAL DELIVERABLES

- Executive summary of key findings and technical risks.
- Structured technical findings and identified modelling or numerical issues.
- Prioritized corrective-action recommendations.
- Selected plots, tables or annotated model evidence supporting key findings.
- Concise technical audit report.
- Limited rerun, correction or validation evidence only where explicitly included in the agreed scope.

BEST SUITED FOR



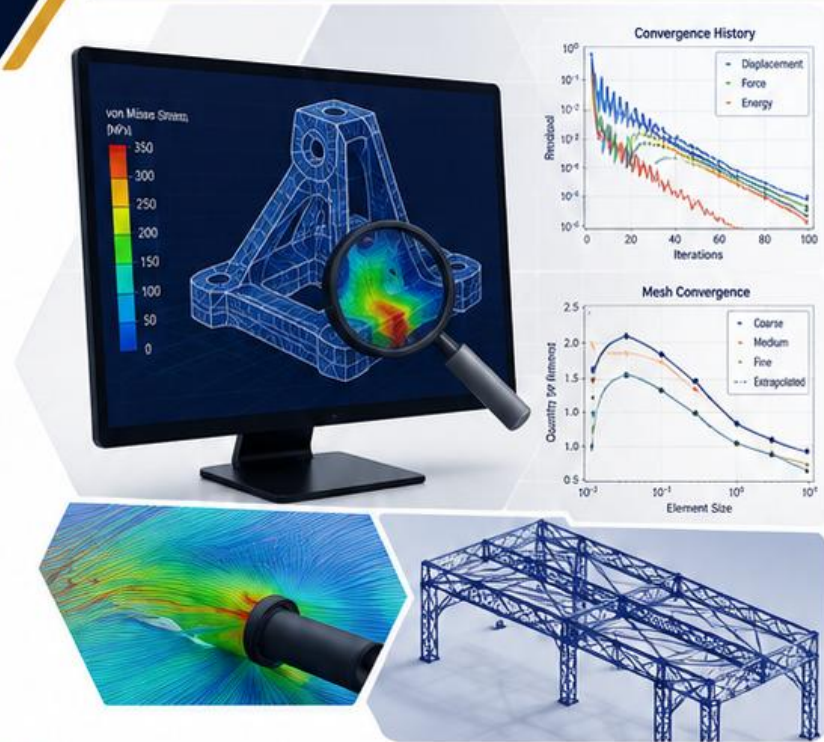
Engineering companies, technical teams, independent consultants, research organizations and technical professionals with an existing computational model that requires troubleshooting, independent review or increased confidence before further analysis or engineering use.

SCOPE OF SUPPORT

Review area	Typical review activities
 Model formulation	Assessment of modelling assumptions, dimensionality, idealizations, governing formulations and consistency with the engineering question.
 Geometry & discretization	Review of geometry representation, mesh/discretization strategy, element or numerical resolution and local refinement where applicable.
 Materials & boundary conditions	Assessment of material definitions, constitutive assumptions, loading, constraints, interfaces and initial/boundary conditions.
 Solver & numerical setup	Review of solver settings, nonlinear controls, convergence behaviour, stabilization and overall numerical suitability.
 Results & interpretation	Assessment of result plausibility, numerical artefacts, singularities, sensitivity, consistency with expected physical behaviour and engineering interpretation.
 Verification & validation	Review of available verification, convergence, benchmark, sensitivity and validation evidence where applicable and supported by the available data.

TYPICAL CLIENT INPUTS

Model/input files; geometry or CAD where relevant; material and constitutive data; loading and boundary conditions; solver settings; existing results; available validation or reference data; relevant technical documentation; and a description of the specific concern or decision the review must support.



NEXT STEP

Share your model files, available results and the specific technical concern you want independently reviewed for an initial scope assessment.



02 Engineering Simulation Solutions

Custom numerical simulation developed, corrected or extended to address a defined engineering question with documented methodology, appropriate numerical checks and decision-relevant results.



WHEN THIS SERVICE IS NEEDED

- ✓ A new engineering analysis or computational model is required.
- ✓ An existing model must be corrected, extended or developed into a more reliable and reproducible computational workflow.
- ✓ The problem involves nonlinear response, fracture/fatigue, CFD, structural response or thermal/fluid behaviour.
- ✓ Multiple cases, parametric studies or sensitivity analysis are required.
- ✓ Independent simulation capacity is needed for overflow or specialist technical work.
- ✓ The project requires proportionate verification, validation or documented engineering interpretation.



TYPICAL DELIVERABLES

- ✓ Model/input files as agreed.
- ✓ Documented assumptions, modelling approach and methodology.
- ✓ Relevant numerical and engineering quality checks.
- ✓ Selected plots, tables and technical interpretation.
- ✓ Technical report or structured results package.
- ✓ Defined clarification/revision allowance consistent with the agreed scope.



BEST SUITED FOR



Engineering companies, technical teams, startups, consultants and research organizations requiring specialist numerical modelling, independent computational capacity or project-specific simulation support.



SCOPE OF SUPPORT

Technical activity	Typical scope
 Problem definition & modelling strategy	Clarify the engineering question, governing assumptions, required modelling fidelity, available inputs, constraints and decision-relevant outputs.
 Model development	Geometry/model setup, materials, loads, boundary conditions, interactions and computational configuration.
 Numerical analysis	FEA, CFD, nonlinear, structural, fracture/fatigue, thermal or related analysis appropriate to scope.
 Parametric / multi-case studies	Structured evaluation of design variables, operating conditions or sensitivity to key assumptions.
 Verification & validation	Apply convergence, discretization, benchmark, sensitivity or validation checks as appropriate to the problem, available evidence and agreed scope.
 Engineering interpretation	Transform computational output into decision-relevant plots, tables, observations, limitations and technically supported conclusions.



TYPICAL CLIENT INPUTS



Engineering objective; geometry/CAD where available; material and constitutive properties; loading or operating conditions; design constraints; reference or validation data; required outputs; and applicable standards or internal requirements.



NEXT STEP

Send the engineering problem, available inputs and required outputs for an initial scope assessment and, where suitable, a scoped simulation proposal.



03 Scientific Python & Engineering Automation

Custom scientific programming and engineering automation that converts repetitive, manual or fragmented analysis into efficient, traceable and reproducible computational workflows.



WHEN THIS SERVICE IS NEEDED

- ✓ Engineering calculations or post-processing are repetitive, manual or time-consuming.
- ✓ Large simulation batches require automated execution or processing.
- ✓ Simulation outputs must be extracted, transformed, compared or visualized efficiently.
- ✓ A custom scientific script or computational tool is required for a specific engineering workflow.
- ✓ Existing analysis steps are disconnected and need a repeatable end-to-end process.
- ✓ A technical workflow requires controlled inputs, repeatable calculations, consistency checks and standardized outputs.



TYPICAL DELIVERABLES

- ✓ Documented Python scripts or custom computational tools.
- ✓ Defined input/output structure and workflow logic.
- ✓ Automated processing, batch or post-processing routines.
- ✓ Validation or consistency checks where applicable.
- ✓ Usage notes and concise technical documentation.
- ✓ Reproducible project structure appropriate to the engagement.



SCOPE OF SUPPORT

Technical activity	Typical scope
 Scientific programming	Engineering calculations, numerical algorithms, data transformation and project-specific scientific scripts with documented computational logic.
 Workflow automation	Automation of repetitive calculations, simulation execution where supported, file handling, data exchange and processing steps.
 Batch processing	Structured execution and processing of multiple cases, datasets or simulation scenarios.
 Post-processing	Automated extraction, filtering, comparison, visualization and reporting of computational outputs.
 Custom engineering tools	Project-specific utilities, calculators or lightweight computational tools with documented I/O logic.
 Reproducible workflow design	Organized code, dependencies, parameter structure, validation checks and usage documentation appropriate to the agreed scope.



BEST SUITED FOR



Engineering teams, consultants, R&D groups and technical professionals with repetitive calculations, data-processing tasks, batch simulations or project-specific numerical requirements.



TYPICAL CLIENT INPUTS



Current workflow; representative input/output files; calculation or algorithm logic; data formats; expected outputs; required automation level; platform or software constraints; and representative test cases.



NEXT STEP

Describe the workflow or calculation you want automated and provide representative inputs, expected outputs and current process constraints.



04 Engineering Data Analytics & Applied AI

Engineering-focused data analytics and applied machine learning for prediction, surrogate modelling, optimization support and interpretable technical insight.

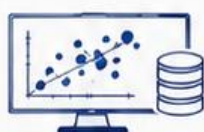
WHEN THIS SERVICE IS NEEDED

- ✓ Simulation, experimental or operational data are available but not yet translated into actionable engineering insight.
- ✓ Prediction, regression or classification is required for an engineering decision-support problem.
- ✓ A surrogate model is needed to approximate a computationally expensive engineering model.
- ✓ Multiple modelling approaches must be compared and selected objectively.
- ✓ Optimization support, sensitivity insight or efficient design-space exploration is required from a data-driven workflow.
- ✓ Interpretability or physics-aware analysis is required rather than a black-box prediction alone.

TYPICAL DELIVERABLES

- ✓ Data audit/processing workflow.
- ✓ Reproducible modelling code and model outputs.
- ✓ Validation strategy and transparent performance metrics.
- ✓ Model comparison and selection evidence where applicable.
- ✓ Visualizations and interpretability outputs.
- ✓ Engineering interpretation and concise technical report.

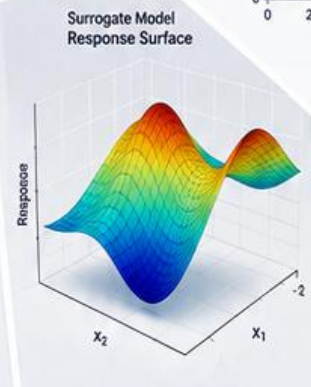
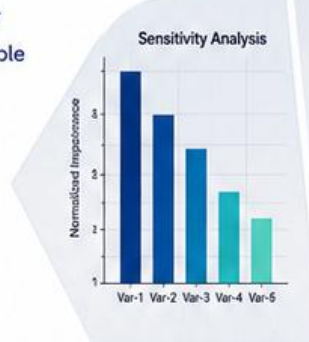
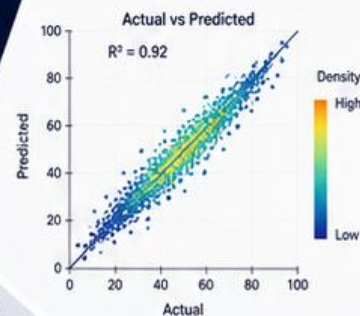
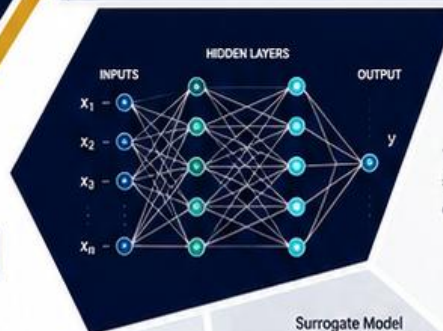
BEST SUITED FOR



Engineering companies, R&D teams, consultants and technical professionals with simulation, experimental, operational or other engineering data suitable for prediction, surrogate modelling, optimization support or decision-making.

NEXT STEP

Share representative data, the engineering objective and target output for an initial technical feasibility assessment.



SCOPE OF SUPPORT

Technical activity	Typical scope
Data assessment & preparation	Review data structure, provenance, quality, target definition, preprocessing requirements, sample adequacy and potential leakage risks.
Model development	Engineering-focused regression, classification, surrogate or other predictive modelling selected according to the technical objective and available data.
Validation strategy	Define train/validation/test logic, cross-validation where appropriate, performance metrics, baseline comparisons and reproducibility controls.
Model comparison	Comparison of candidate approaches with attention to predictive performance, interpretability and computational cost.
Optimization & surrogate workflows	Develop data-driven approximation, sensitivity or optimization-support workflows where technically justified and consistent with the available evidence.
Interpretation	Provide feature importance, explainability, uncertainty-aware observations and physics-aware interpretation where relevant to engineering decision-making.

TYPICAL CLIENT INPUTS



Dataset(s); variable definitions and units; engineering objective; target output; operating or physical context; available metadata; expected use of the model; performance requirements; and relevant technical constraints.

05 Technical R&D Consulting

Focused computational R&D support for methodology development, validation strategy, independent technical review and complex engineering or applied-research decisions.

WHEN THIS SERVICE IS NEEDED

- ✓ The computational methodology is unclear, incomplete or difficult to defend.
- ✓ Verification and validation strategy requires strengthening.
- ✓ A complex numerical workflow needs clearer structure and integration.
- ✓ Independent technical judgement is required to evaluate modelling alternatives, evidence or R&D decisions.
- ✓ A research-grade method must be translated into a practical engineering workflow.
- ✓ A computational investigation requires technical review, methodology refinement or supporting analysis.

TYPICAL DELIVERABLES

- ✓ Technical consultation or independent review.
- ✓ Methodology recommendations and computational action plan.
- ✓ Verification/validation strategy.
- ✓ Structured assessment of modelling alternatives or workflow gaps.
- ✓ Supporting analysis where explicitly included in scope.
- ✓ Concise technical documentation for engineering or R&D decision-making.

BEST SUITED FOR

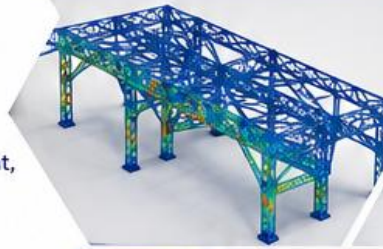


Engineering companies, research teams, independent consultants, R&D organizations and technical professionals requiring computational methodology support, independent review or specialist technical judgement.

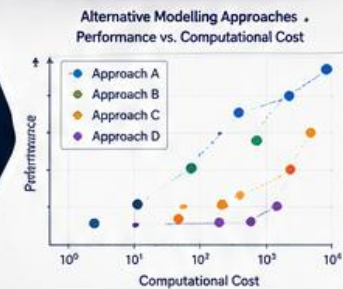
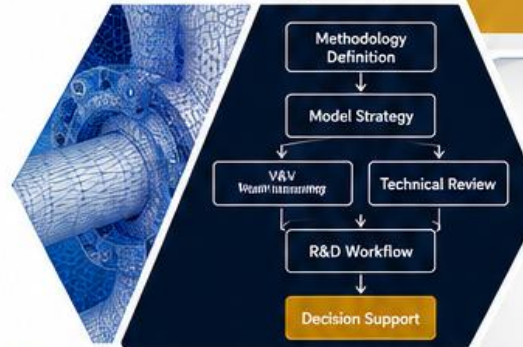
NEXT STEP

Share the technical question, current methodology, available evidence and the decision or deliverable you need to strengthen.

R&D WORKFLOW



VALIDATION STRATEGY



SCOPE OF SUPPORT

Technical activity	Typical scope
Methodology design	Define or refine computational methodology, modelling sequence, assumptions, outputs, acceptance logic and supporting evidence requirements.
Model strategy	Assess alternative modelling approaches, fidelity, numerical methods and computational trade-offs.
Verification & validation planning	Develop a proportionate plan for verification, convergence, sensitivity, benchmarking and validation based on project risk, available evidence and intended use.
Independent technical review	Review modelling choices, computational evidence, workflow consistency, limitations and overall technical defensibility.
R&D workflow development	Structure multi-stage computational studies, data/simulation integration and reproducible technical workflows.
Research-to-engineering translation	Convert advanced computational or research methods into practical engineering analysis workflows.

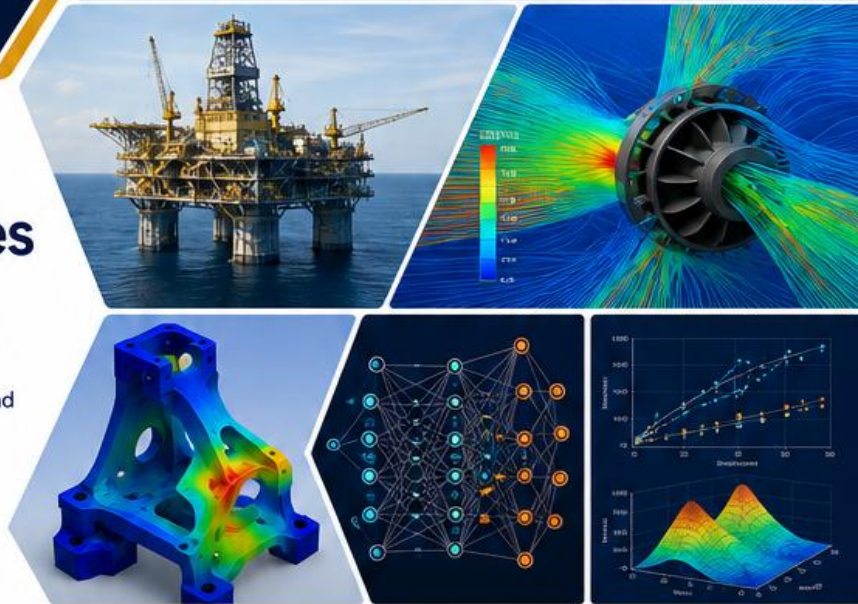
TYPICAL CLIENT INPUTS



Technical question; existing methodology; model and/or data status; available evidence; project constraints; intended use; required decision or deliverable; and applicable engineering, regulatory or research requirements.

Integrated Computational Capabilities

AriyaTech's services are designed to connect across the computational engineering lifecycle. Methods, modelling fidelity and computational tools are selected from the engineering question, available evidence and intended use—not from a predetermined software package.



NUMERICAL & COMPUTATIONAL ENGINEERING

- Finite Element Analysis (FEA)
- Computational Fluid Dynamics (CFD)
- Nonlinear Analysis
- Structural Response Analysis
- Fracture & Fatigue Assessment
- Thermal & Thermomechanical Analysis
- Parametric & Sensitivity Studies
- Verification & Validation
- Numerical Model Assessment

SCIENTIFIC COMPUTING

- Numerical Methods & Engineering Computation
- Scientific Programming
- Engineering Calculations
- Data Processing & Transformation
- Batch Processing
- Simulation Automation
- Automated Post-Processing
- Custom Computational Tools
- Reproducible Computational Workflows

APPLIED AI FOR ENGINEERING

- Machine Learning
- Deep Learning, where technically appropriate
- Engineering Data Analytics
- Predictive Modelling
- Surrogate Modelling
- Model Comparison & Selection
- Optimization
- Explainable AI
- Physics-Aware Interpretation

CAPABILITY PRINCIPLE

The engineering problem drives the selection of methods, modelling fidelity, computational tools and validation strategy. Project-specific proposals define the exact technical approach, evidence requirements and deliverables.

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    graph LR
      A[Problem Driven] --> B[Evidence Based]
      B --> C[Decision Focused]
  
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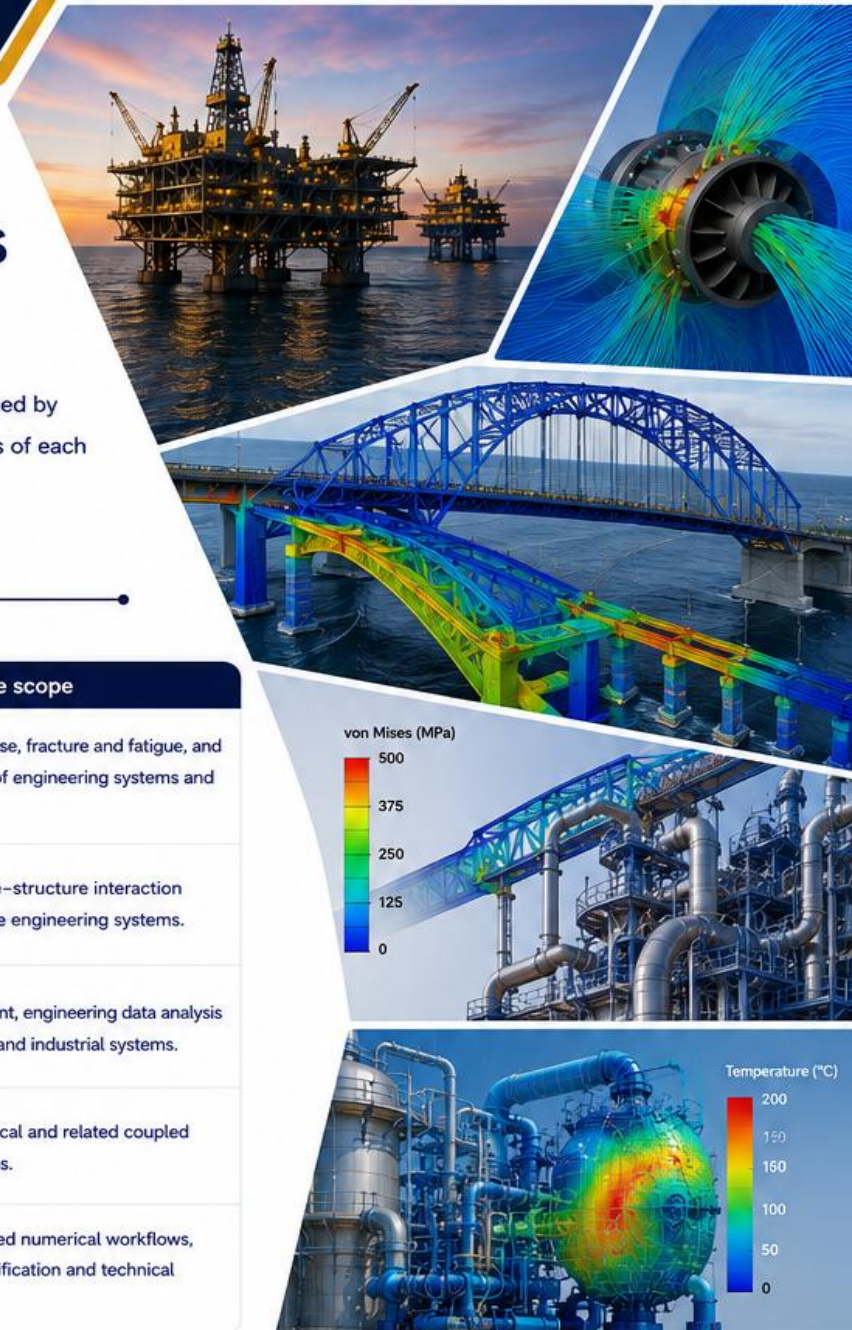
Application Areas & Computational Platforms

AriyaTech applies its computational capabilities across selected engineering and R&D domains. Application scope is defined by technical fit, available evidence, required fidelity and the objectives of each assignment.



APPLICATION AREAS

Application area	Representative scope
 Civil & Structural Engineering	Structural analysis, nonlinear response, fracture and fatigue, and related computational assessment of engineering systems and components.
 Offshore & Marine Engineering	Structural, hydrodynamic and wave-structure interaction applications for offshore and marine engineering systems.
 Energy & Industrial Systems	Simulation, computational assessment, engineering data analysis and technical workflows for energy and industrial systems.
 Fluid & Thermal Systems	Fluid-flow, thermal, thermomechanical and related coupled computational engineering problems.
 Computational Engineering R&D	Methodology development, advanced numerical workflows, scientific computing, applied AI, verification and technical validation for engineering R&D.



REPRESENTATIVE COMPUTATIONAL TOOLS & PLATFORMS



Tool and platform selection is project-dependent and guided by the engineering problem, required methodology, interoperability needs and delivery objectives.



Software supports the technical solution; it does not define it.



SCOPE AWARENESS

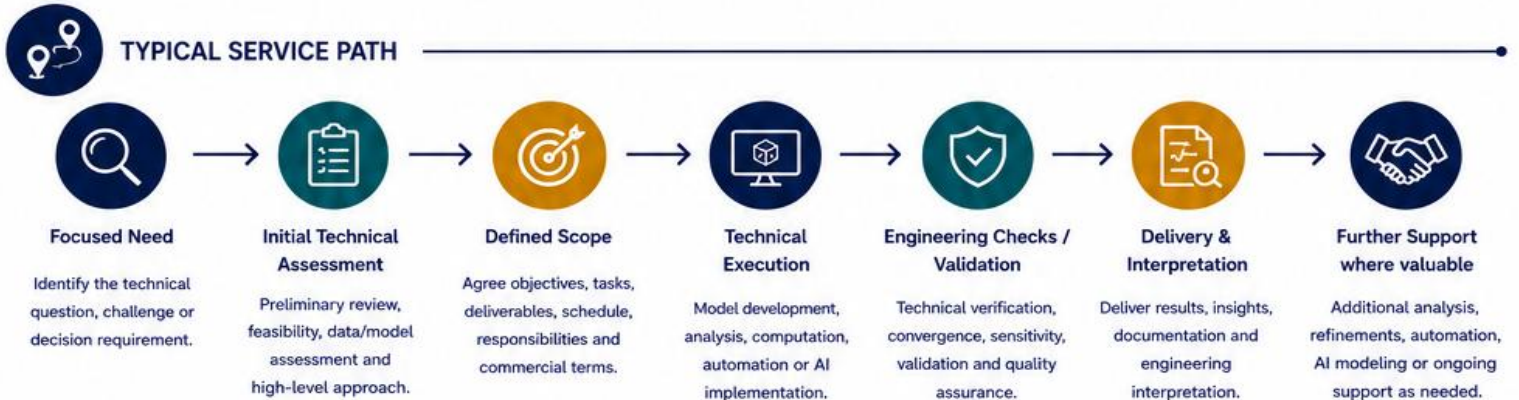
The presence of a capability or platform in this catalog does not imply universal applicability to every project. Each engagement is assessed for technical fit, required fidelity, available data and evidence, applicable standards or regulatory context, and verification/validation needs before scope is confirmed.



Engagement Options & Service Path

AriyaTech supports both focused technical assignments and broader computational projects. The engagement model is selected according to technical complexity, project risk, required outputs, schedule and the client's operating needs.

Engagement model	Typical use
 Focused Technical Task	Audit, consultation, custom script, model review or tightly defined technical analysis.
 Fixed-Scope Project	Clearly defined technical objectives, deliverables, milestones and acceptance criteria.
 Custom Engineering Project	Advanced or multidisciplinary computational work requiring a project-specific methodology and delivery structure.
 Ongoing Technical Support	Recurring analysis, model development, computational automation or specialist support under an agreed recurring or call-off arrangement.



HOW SCOPE IS DEFINED

- Engineering question and required decision/output.
- Available models, datasets, drawings, documentation and client inputs.
- Required modelling fidelity and computational approach.
- Included tasks and explicit exclusions.
- Deliverables, milestones and acceptance criteria.
- Schedule, review/clarification allowance, responsibilities and commercial terms.
- Verification/validation requirements and available evidence.



SCOPE CONTROL

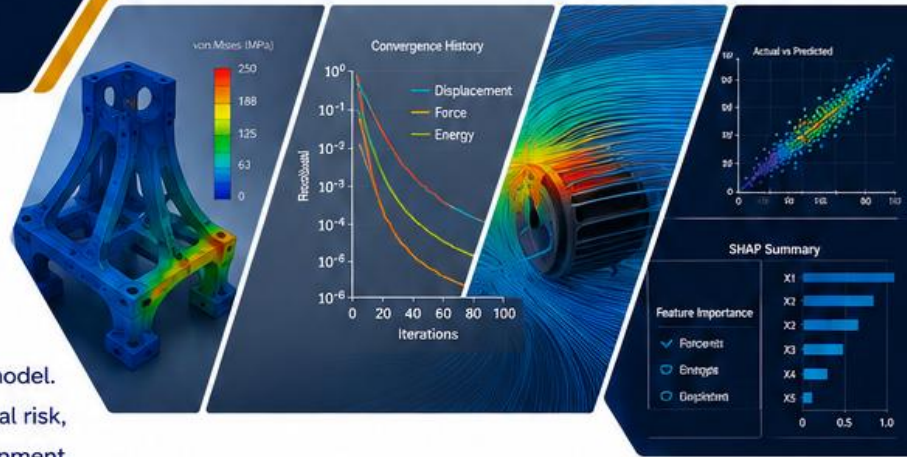
Materially new inputs, altered requirements, additional operating cases, expanded deliverables or new analysis introduced after scope confirmation are treated as scope changes unless explicitly included in the agreed engagement.



Scope changes are documented, evaluated and approved before work proceeds.

Technical Delivery & Quality Framework

Technical reliability is a core part of AriyaTech's delivery model. Quality controls are applied proportionately to the technical risk, complexity, intended use and agreed scope of each assignment.



Quality area	Typical control
 Requirements Definition	Document the engineering objective, available inputs, required outputs, assumptions, constraints, responsibilities and acceptance criteria.
 Physical Plausibility	Check whether model setup, boundary/initial conditions, materials and outputs are consistent with the underlying engineering problem.
 Model / Code Integrity	Maintain organized files, units, parameters, dependencies, version awareness and a reproducible project structure appropriate to scope.
 Numerical Adequacy	Assess convergence/stability, mesh or discretization adequacy and sensitivity to key assumptions where warranted by the method and project risk.
 Verification & Validation	Use relevant analytical checks, benchmarks, convergence evidence, sensitivity analysis or validation data where applicable and available within scope.
 Data / AI Validation	Apply leakage controls, appropriate data partitioning, cross-validation where justified, baseline comparison, transparent metrics and reproducibility controls.
 Engineering Interpretation	Distinguish meaningful engineering behaviour from numerical artefacts, singularities, uncertainty, extrapolation risk and model limitations.
 Documentation	Concise methodology, assumptions, limitations, figures/tables and decision-relevant conclusions.
 Client Communication	Material technical risks and required scope changes are communicated early and documented.



DELIVERY PRINCIPLES



Deliver files and reports in a structured, reproducible form appropriate to the engagement.



Use concise summaries for decision-makers and sufficient technical detail for engineering review.



Protect client confidentiality and do not publish client names, models or results without permission.



Use NDA provisions where requested and appropriate.



Clearly distinguish clarification of delivered work from additional scope.



QUALITY OBJECTIVE

Reliable technical delivery is built on clear problem definition, appropriate methods, transparent assumptions, proportionate verification and validation, reproducible workflows and engineering interpretation of the final results.



Start a Technical Conversation



Have a simulation, engineering data, automation or computational R&D challenge?

Share your technical problem, existing model, engineering data or project requirements for an initial review. AriyaTech can assess technical fit, identify an appropriate next step and, where suitable, prepare a scoped proposal covering the recommended approach, deliverables, responsibilities, schedule and commercial terms.



Define the Problem



Share the Data



Assess the Fit



Propose the Approach



Deliver Results



WHAT TO SHARE

01



Technical problem

Describe the engineering question, current issue and required decision or output.

02



Available inputs

Provide relevant models, data, drawings, documentation, operating conditions or representative files.

03



Required result

Clarify the deliverable, performance question, analysis objective or technical decision the work must support.

04



Constraints

Identify schedule, platform, confidentiality, applicable standards or regulatory requirements, and other project-specific constraints where relevant.



CONTACT



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Service coverage

Serving international clients



COMMERCIAL NOTE

Detailed scope, schedule, pricing and contractual terms are defined separately for each engagement through a proposal, quotation or statement of work.

