

HCL ERS SOLUTIONS

Creating business impact...

Traditionally, in a product centric world, R&D has always been perceived as Intellectual Property and hence treated with utmost confidentiality. There was no room for collaborative or complementary R&D. However, of late, there is a shift away from products alone, to an ecosystem of services around the product focusing on end user experience. There is a need for development of the product, associated platforms, and industry and geo specific variants for companies to go to market. Global competition and reducing product lifecycles are forcing companies to leverage their value chains to retain market share.

Cost and labor arbitrage are no longer the primary drivers and many engineering engagements are being recast as win-win partnerships to leverage collaborative growth opportunities. Many OEMs and ISVs are collaborating with engineering service providers to accelerate time to market, extend product lifecycles, develop platforms, enter emerging and adjacent markets, and optimize R&D operations.

Successful product and technology companies will drive higher engineering experiences, which in turn, will create significant business impact through accelerated product launches, and drive value through innovation and improved engineering efficiencies, all by leveraging and adopting new and disruptive technologies.

HCL is India's #1 Engineering Services Provider and among the top 5 globally. We are not only involved in engineering complex and critical products for some of the largest corporations in the world, but are also constantly pushing the boundaries of technologies and defining new differentiated ways to offer our services. One such differentiation is our catalog of solutions, which takes HCL developed best practices, IPs and accelerated frameworks and packages them into service offerings that solve critical and relevant business problems for our customers.

This handbook introduces nine such ground breaking solutions. Looking forward to future engagement.

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Pangea

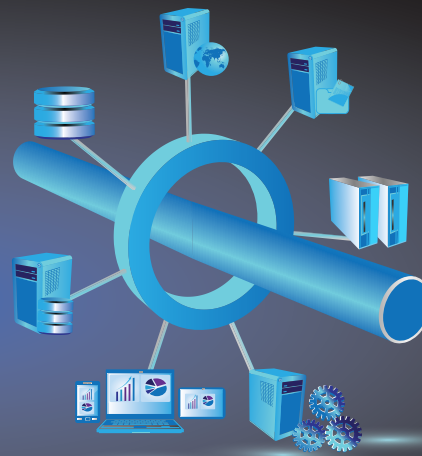
Simplify



ACCELERATION



PLATFORM ACCELERATION SUITE (PAS)



Platform Acceleration Suite (PAS) is a powerful software platform from HCL that provides the necessary building blocks for building next generation software/services faster. PAS brings together packaged application frameworks, re-usable software components, automation tools for developers & testers, support for best of breed architectural patterns, and best practice templates to provide acceleration to the development of software/platforms.

MARKET CHALLENGE

- Without a “reuse/foundation” approach to software, organizations end up having significant redundancies in infrastructure, licenses, people, and processes, thus leading to an inefficient delivery of services.
- Creating a Platform that can act as a foundation to launch business services requires significant investments in terms of cost, skill and time.
- A global service creates different code base of comparable functionalities, thus leading to increased cost of maintenance of these applications
- With high pressure on cost and time to market, it is difficult to approach software as a “wholistic” solution. Tactical decisions always take priority over strategic ones in most cases.

FEATURES

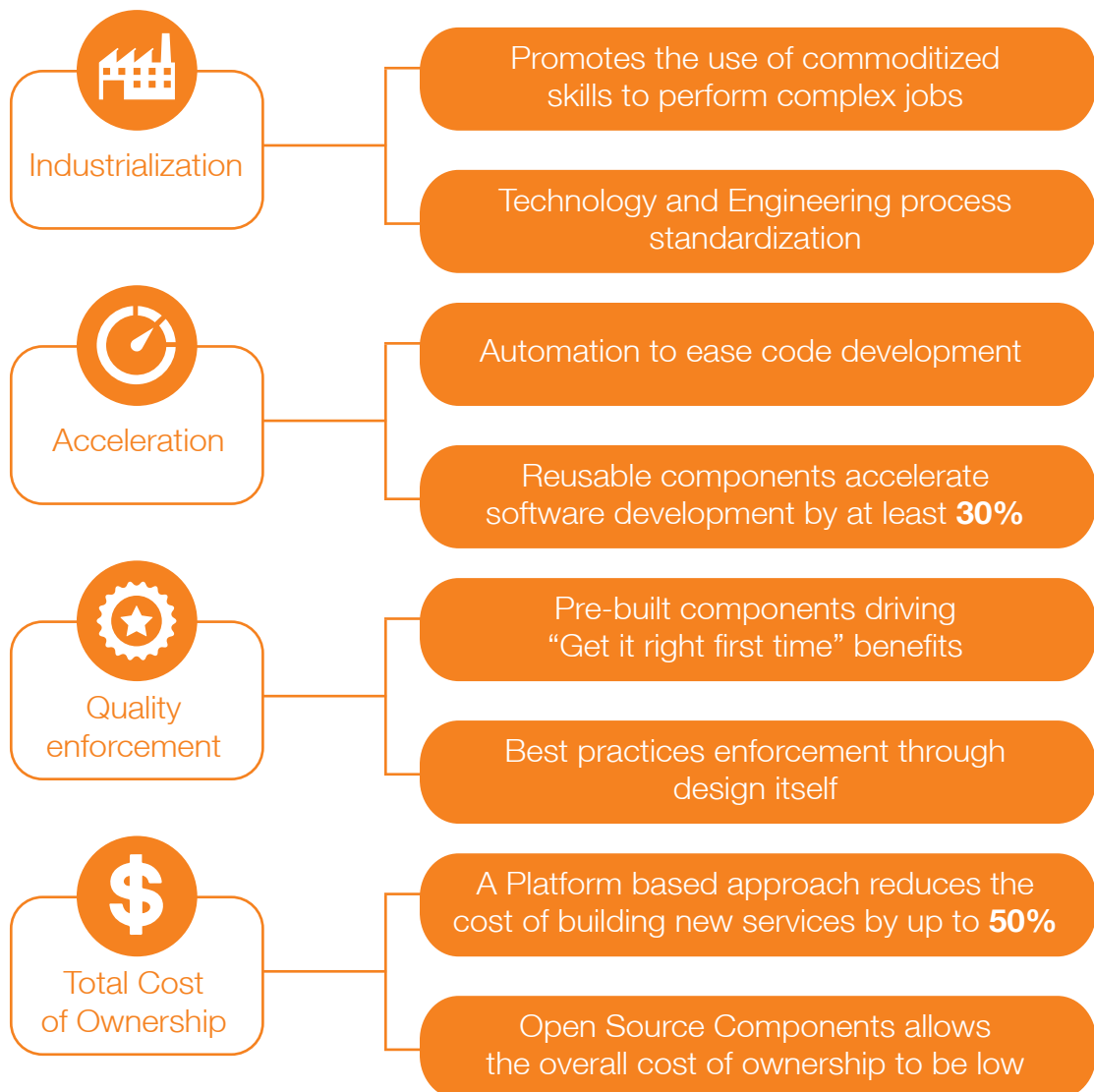
- Standardized and Integrated Best of breed technology stack
- Data Management to store, retrieve, encrypt, import, and export data
- State of the art built in security for preventing attacks and ensuring compliance
- Built in Internationalization, Edition Management and a Metadata Engine for customization
- Built in archetypes for API, UI, Hybrid and, Batch services
- Support for multiple architectural patterns, including Event Driven, N-Tier, and Microservices.
- Integrated Plugins for code generation for domain models, template based UI, Unit Tests and, Automation Scripts.

DIFFERENTIATORS

- In-built tools, workflows, rule engines, libraries, etc. enable rapid creation of multi-tenant apps and the conversion of single tenant apps to multi-tenant apps
- Easy on-boarding of new countries/entities by simple to use configuration without any additional development effort
- Uniform platform to support different stakeholders
- Extensibility to address data model extensions specific to country/brand/branch
- Configurability to alter workflows, business rules, validations specific to country/brand/branch
- Access control to enable fine grained control to different functions of the application
- Support for single instance and distributed deployment models.

CUSTOMER BENEFITS

PAS brings in the following benefits while taking to a platform based approach for software development.

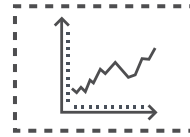


PROOF POINTS

#1 : For a global medical company, launched Integrated Device Services, thereby achieving the following benefits:



4820 devices additionally sold



Improvement in device uptime by **27%**



Eliminate paper record storage



Reduction in field visit costs by **18%**

#2 : Launched Global PHI based services for a leading incontinence care products vendor & achieved the following results:



Infrastructure Cost reduced by **40%** because of multi tenant deployment



Support Cost reduced by **60%** because of centralized management of the platform

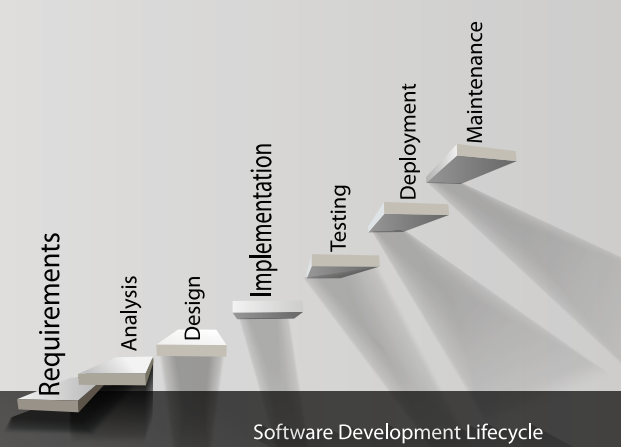


30% license cost saved by removing multiple deployments.

CONTACTS

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INTEGRATED LIFECYCLE MANAGEMENT (iLCM)



Integrated Lifecycle Management (iLCM) is an analytics-driven process automation and acceleration platform for effective and efficient planning, execution, and resource management.

MARKET CHALLENGE

- Delayed insight into Issues and problems because of disparate tools & processes
- Uncertainty of ramp ups and ramp downs
- Under-utilization of Workforce & skills

One liner about how the SLU helps to meet above market needs

iLCM integrates People, Process & Technology to address operational inefficiencies & gaps in planning

FEATURES

Real-time consolidated dashboards & reports required for operational & strategic planning

- Analytics-led operational & engineering data correlation for Intelligent & proactive decision-making
- Core-flex Model support – Sharing of Work force with different skill sets and experience
- Process & workflow automation of non value added activities

DIFFERENTIATORS

- Real-time project and program tracking
- Role-based dashboards providing right information at right time
- Analytics driven decision making

CUSTOMER BENEFITS



5-10% improvement in resource utilization



Near-zero variance in schedule, effort & process adherence



Improved systematic risk identification



30-50% reduction in program management effort



5-10% Productivity enhancement due to process automation

PROOF POINTS

For a test engagement with high testing complexity with continuous daily tests of multiple application versions and **4000+** test cases within a short test window of few hours for end to end testing, iLCM was deployed to achieve following benefits for a leading online major,



Achieved **16 percent** reduction in test cycle time per shift by

Optimized work allocation time taken by test leads

Time-savings in testers' reporting time by enabling simultaneous reporting while testing



Reduced overall effort by **5%** through test workflow automation, of few non-value add activities in end to end testing lifecycle

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SOFTWARE TESTING

TEST AUTOMATION FRAMEWORK (TAF)



HCL's Test Automation Framework is a test automation services delivery platform aimed at accelerating & optimizing the test automation lifecycle. It helps in improving an automation engineer's productivity and simplifies the tracking of an automation initiative a test manager, leading to better quality test automation.

MARKET CHALLENGE

- Inadequate RoI on Automation investments
- Application functionality changing too frequently
- Unavailability of right set of test automation tools
- Lack of skilled and experienced automation resources
- Maintaining automation scripts is a cumbersome task

One liner about how the SLU helps to meet above market needs
TAF helps in accelerating and optimizing test automation

FEATURES

Test design acceleration & productivity improvement:

- Support for Behaviour driven testing tools like Cucumber and JBehave
- Keyword-driven script development for Selenium and Appium
- Automated boiler-plate test script generation for multiple scripting types : Unit/ Python

Test execution acceleration :

- Integration with test automation engines for testing across web , Mobile, desktop applications
- Remote/parallel/sequential execution across test environments
- Test result aggregation from multiple test execution environments and auto-defect and test results posting

DIFFERENTIATORS

- Exhaustive keywords and BDD approach for TAF enables high automation RoI and ensures maintainability of test Automation scripts
- With pre-built connectors, TAF integrates seamlessly into customer's existing testing ecosystem minimizing changes in existing processes
- Analytics for faster test execution by run-time prioritization and elimination of redundant test execution

CUSTOMER BENEFITS

Savings of **10 – 30%** across test automation life cycle by



Reducing script generation effort and improving test script quality



Reducing test automation execution cycle time by enabling continuous testing by integrating into continuous integration environments



Reduces effort for test lifecycle management



Faster test result interpretation and auto-defect posting



Reduces triage effort by minimizing duplicate defects

PROOF POINTS

Using TAF created a comprehensive testing solution to support customer's plan to globally launch a Medical device used in Diabetes care.

Automation on large device matrix and cross platform support (iOS & Android)

Achieve reusability of test scripts across multiple languages to support localization testing of the application

Integrated to customers ALM Tools and processes (Regulatory & Organizational)

QA Support for release of Product across multiple geos with multi-lingual support



BENEFITS

- Reduction in overall testing costs by **34%** and reduction in test cycle time by **70%**
- Increased platform coverage by **30%** by including more test environments and devices

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VALUE





INTELLIGENT SUSTENANCE ENGINEERING (ISE)

HCL's Intelligent Sustenance Engineering (ISE) uses the power of intelligence to ensure that product sustenance and testing is efficient, responsive, cost effective, and provides accelerated Time-To-Market.

MARKET CHALLENGE

Increase in cost and complexity of sustenance engineering with high Turn-around time and increased test burden and test cycles

One liner about how the SLU helps to meet above market needs

Reduction in cost and MTTR with its analytics capabilities with minimal effort and easy integration

FEATURES

- Defect localization & Clustering
- Similar defects
- Regression optimization & test step optimization
- Resource grading
- Test burden estimation
- Dynamic dash boards

Industries served

ISV, Telecom, OEM, Aero, and Medical

DIFFERENTIATORS

- Industry's 1st analytics based approach to Software engineering
- Leverages HCL's engineering execution excellence
- An easy-to-use SaaS framework with convenient API for integration
- Leverages proven Analytics –driven algorithms for data Extraction & mining
- Lesser implementation time with built in connectors

CUSTOMER BENEFITS



Improves over all productivity by **10%**



Reduces bug fix time by **50%**

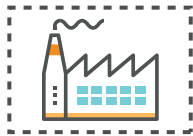


Reduces test planning time by **10%** and regression test time by **15%**



Reduces the time required for transition by at least **50%**

PROOF POINTS



A leading network equipment manufacturer :

- Issue identification consumes **1 to 2 days** and investigation of root cause analysis consumes **3 to 4 days** and testing by multiple teams results in duplicate defects and causes lot of effort lost in triaging and identifying duplicate defects
- ISE brought in disparate tools and databases data in a single view and User adoption was made easy by integrating with Customer Defect Management System through Browser plugin. This resulted in improved customer satisfaction and exceeded product metrics goals.
- The ability to look into relevant code and find all other commits that modified a defect helps optimize code analysis time during Root Cause Analysis and quickly narrow down on source of Customer Found Regression. This helped to cut down analysis time by **60%** - reducing a **2 day effort to less than a day.**

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INTELLIGENT TECH SUPPORT (ITS)



HCL's Intelligent Tech Support (ITS) solution brings to you the next revolution in tech support, and increases the scope of tech support functions and ensures greater operational efficiency benefits from your existing infrastructure.

MARKET CHALLENGE

Customers are demanding a more proactive, intelligent, and intuitive support experience

- Support organizations are focused on time and cost efficiencies, leading to reduced quality and CSAT due to increase in support cost and rise in call volumes
- Unstructured methodology for product support

One liner about how the SLU helps to meet above market needs

Reduction in cost and MTTR with its analytics capabilities with minimal effort and easy integration

FEATURES

- Intelligent self help modules
- Insight extraction and domain specific sentiment analysis
- Preventive & Proactive Diagnosis
- Robust dynamic visualization & dashboards
- Cross-sell/Upsell

Different industries served by the SLU

ISV, Telecom, OEM, Aero, and Medical

DIFFERENTIATORS

- Industry's 1st Value centric approach to Tech Support
- Predictive Analytics drive measurement of VPI (Value-Per Interaction)
- Leverages HCL's tech support and business process outsourcing excellence
- APIs for easy integration
- Leverages sophisticated Big Data Mining technology to generate insights

CUSTOMER BENEFITS



Reduces ticket volume by **30%**



Improves productivity up to **10-15%**



Improves the MRT (Mean response time) and MTTR by **10-15%**



Assign the ticket to the right resource faster & accurately

PROOF POINTS

1

A leading network equipment manufacturer was facing problems in identifying complex issues from available resources. These were not accurate and were time consuming. Also, most of the times, it required multiple iterations to find real issues. The engineer needed to refer to multiple data sources for fixing the issues.

2

Connectors developed for clients ticketing system, defects tracking system and documentation to retrieve information from data sources on a periodic basis. The extracted data using connector is then pushed to ITS engine for creating analytical models for prediction and recommendations for the end users which improved MTTR and productivity.

3

A leading software vendor in the enterprise router space was facing increase in call volumes and fall in CSAT. After deploying our ITS solution to their tech support division, the volume of calls fell by close to **60%** in a span of **3 months**.

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HCL's eDAT automates the arduous manual test processes of electronic devices to increase test coverage, reduce time to market, and reduce costs. It enables test automation using a black-box approach through hardware and software accelerators.

MARKET CHALLENGE

- Long time to market due to labor-intensive and time-intensive manual testing processes
- Expensive manual testing costs for embedded devices
- Multi-lingual and manual testing requires domain skills and high investment in resources
- When product revisions happen regularly, the code coverage during testing becomes limited. These induce side effects and increase instability.

FEATURES

- Applicability in all domains that require black-box testing of software controlled electronics
- One-time Device-Under-Test (DUT) configuration
Remote testing capabilities in conjunction with video & audio based testing
- Input simulation testing for devices like keyboard, mouse, joystick, etc.
- Support for plug-ins for test management tools
- Automated GUI testing and touchscreen simulation
- Report generation engine for test results and test progress
- Multiple low-level hardware and communication interfaces supported

DIFFERENTIATORS

- Focused on device testing - Hardware, embedded and application black-box testing
- Resource de-skilling - No special programming skills required
- Maximize Return on Investment - Pay for and use exactly what you want, scale it when you are ready
- Powerful capabilities for smart devices – GUI testing, touchscreen simulation, sound testing, signal testing etc.
- Quicker yet effective release cycles – eDAT pinpoints bugs for analysis through objective test reports
- Multiple interfaces - eDAT supports most common hardware and communication interfaces such as Bluetooth, USB, serial port, Ethernet, CAN bus, SPI, touchscreen simulation, digital and analog I/O, etc.

CUSTOMER BENEFITS



Up to **50-60%** coverage even in regulated industries meeting compliance parameters



Up to **30%** of effort and cost of ownership savings compared to existing solutions



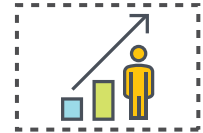
Scalable - One eDAT setup can test multiple devices under test



Improved productivity of test infrastructure and personnel



Reduced defect leakage



Objective evidence in the form of reports generated in multiple formats.

PROOF POINTS



Automated testing of instrument clusters and head-up displays for a tier-one auto supplier



Built custom interface to capture images from the display for testing



Reduced testing cost by **66%** and testing cycle time by **79%**.



Automated testing of infusion pumps for leading medical devices company



Simulated touchscreen inputs for testing



Reduced testing cost by **47%** and testing cycle time by **68%**.



Testing of Smart TV video app for leading ISV



Leveraged OCR to capture text from display images for testing

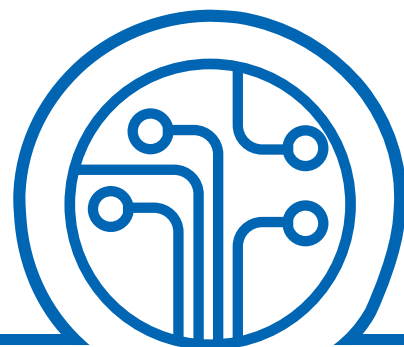


Reduced testing costs by **36%** and testing cycle times by **57%**.

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TECHNOLOGY





DDx

HCL's DDx is a set of device centric solutions consisting of reusable components, Engineering accelerators (HW and SW), best practices & knowledge base in areas which can provide significant savings in engineering effort and/or time to market to HCL's customers or delivery teams.

MARKET CHALLENGE

- Time to market new products.
- Connecting devices to Internet without impacting bottom line.
- Lack of expertise in use of latest technologies.
- Intense competition.
- Device Security in connected ecosystem.

FEATURES

- Customizable reference HW and SW platforms for IoT Applications
- Security Framework for Embedded Devices
- Solution to connect, secure and manage device operations
- Video Surveillance solution
- HW Platform Accelerators

Different industries served by the SLU
Consumer, Medical, Industrial

DIFFERENTIATORS

- Robust Solution with integrated Security features
- Customizable reference IoT enabler solutions for any legacy embedded device.
- Flexibility of customization as per customer requirement

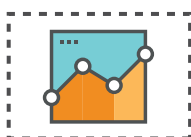
CUSTOMER BENEFITS



Reduced Time to Market



Up to **30%** of effort and cost of ownership savings



Reduced defects



Secure devices

PROOF POINTS

Mining Company



To enable communication and ensure miners safety in efficient and cost effective manner by

Protecting miners from physical injury by alerting them of approaching vehicles and machinery

Automating the roll call process after mining blast

Providing a hands free way of communication

Our solutions help reduce implementation time by **50%**

Home automation



Customer was selling a legacy solution. With the help of HCL IOT Gateway, a next generation solution was developed to provide:

Wireless connectivity to home devices/appliances (lights, ACs, doors, curtains, security cameras etc.)

Remote monitoring and Control from tablets and mobile phones

Support for legacy home devices by developing connectors/bridges

HCL Solution helped cut down time to market by **60%** and cost by **50%**

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PANGEA

PANGEA is a distributed and collaborative analytics platform built on industry leading big data technologies that brings the power of machine learning to simplify the complexities in deriving insights from disparate data sources

MARKET CHALLENGE

- Make informed business decisions from reams of available data
- Quickly operationalize analytics to ride on new business opportunities
- Accelerate the process of building, sharing and deploying models
- Address the existing gap in skilled resources such as data scientists

One liner about how the SLU helps to meet above market needs

PANGEA is a collaborative platform that addresses the end to end analytics needs using a comprehensive zero coding approach

FEATURES

- Comprehensive zero coding approach to deliver end to end analytics (Business problem identification to Data prep, model building, deployment and monitoring)
- Distributed analytics at scale
- Single common platform for Cross team collaboration
- Deploy models on- premise or cloud or edge

Different industries served by the SLU
Industrial, Medical, Telecom

DIFFERENTIATORS

- Collaboration Platform: Offers common collaboration platform to make operational interaction between teams much smoother
- Accelerated Development: Simplified and accelerated development of predictive models enabled through zero coding
- Flexible Deployment: Deploy models on cloud or on premise or edge
- Platform Agnostic: Cross-Platform vendor-neutral deployment of models enabled through PMML
- Data & Model Governance
- Versioning of device and associated models for quick re-use
- Monitor model performance post deployment for any further refinement required

CUSTOMER BENEFITS

1

Reduced time to produce accurate insights by over **70%**

2

Simplified accelerated development of predictive models enabled through zero coding

3

Cross-Platform vendor-neutral deployment of models enabled through PMML

4

Transform the business by creating new business models and diversified revenue streams

5

Product Innovation: Identify new product opportunities and reengineer products for better performance

6

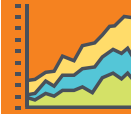
Competitive Edge: Time to generate insights is now reduced from months to days to enable businesses come up with quick service offerings

PROOF POINTS



Vibration Monitoring Solution:

Analyze the vibrational data acquired from the bearings of rotating machinery and predict the faults early on using advanced algorithms and signal processing techniques



Thermal Imaging Solution:

Thermal images of given equipment are processed and analyzed using advanced analytical models to identify any significant temperature variations that could lead to equipment failure or damage



Ultrasonic Monitoring Solution:

The ultrasonic signals of the operating machinery are smoothed with the help of signal processing techniques and possible failures are predicted using advanced algorithms.



Human Activity Recognition:

This solution uses data coming from smartphone sensors to analyze human activities such as walking, sitting, climbing stairs etc. This data is processed and passed to analytical model to predict user state and necessary action to be taken

CONTACTS

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SIMPLIFY

Simplify encapsulates Knowledge Management/Compliance, Skill Mgmt., collaboration, Training & Onboarding which can enable engagement in enhancing the productivity. Availability over cloud ensures that we have anytime anywhere secure access to knowledge.

MARKET CHALLENGE

- Knowledge drain due to attrition
- Slow Ramp-up on project/technology because of people dependency.
- Poor quality and Scattered knowledge across organization

One liner about how the SLU helps to meet above market needs
Productivity enhancement using the effective knowledge & training/onboarding based features.

FEATURES

- Centralized knowledge repository categorized for faster search.
- Knowledge Approval WF ensuring relevant knowledge.
- Ensures compliance of knowledge in Projects.
- Skill Mgmt. to keep tab on skill levels available in team.
- Training & Onboarding(TAO) Module.
- Availability over secure cloud or in HCL/customer network.
- Automatic Knowledge acquiring engine.

Industries served

Can be used in any industry. Already deployed for telecom, Medical, Aero

DIFFERENTIATORS

- Unique KM Portal that helps in relevant & faster search based on tagging & Categorization.
- Secure authentication for portal based on Active directory.
- Availability in various environment including Cloud, HCL Network & Client Network.

CUSTOMER BENEFITS



Productivity improvement
~5-10%



Reduces impact of Attrition/
Resource movement.



Ramp-up effort reduction
~5%



Ensure continuity of project as
moving away from people to
Process driven

PROOF POINTS



Leading Aero equipment manufacturer:

consuming Simplify for managing all knowledge centrally & able to reduce the ramp-up time significantly.



Leading Telecom company:

Using simplify effectively for onboarding the new team & for continuous trainings.



Telecom equipment manufacturer:

Using simplify to connect to their existing data repositories & display result on single window for users. Managing workforce more effectively using Skill Matrix module. Also consuming training & onboarding module to bridge any gaps in skills.

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BEYOND THE CONTRACT

HCL