Persistent

Whitepaper

The How of Digital Transformation

To stay relevant, enterprises will have to adopt a 'transformation by design' philosophy. And software is a key driver for transformation. The question is — how do you build a digital experience platform that will enable continuous transformation for your enterprise?

Jiten Patil
Chief Architect, Digital Platform & Solutions

Contents

Background

We're all witnessing digital transformation in our lives. From cars like Tesla that enable API-driven management and monitoring, to our homes, where companies like Nest track our energy usage and use it to provide energy saving tips to consumers.

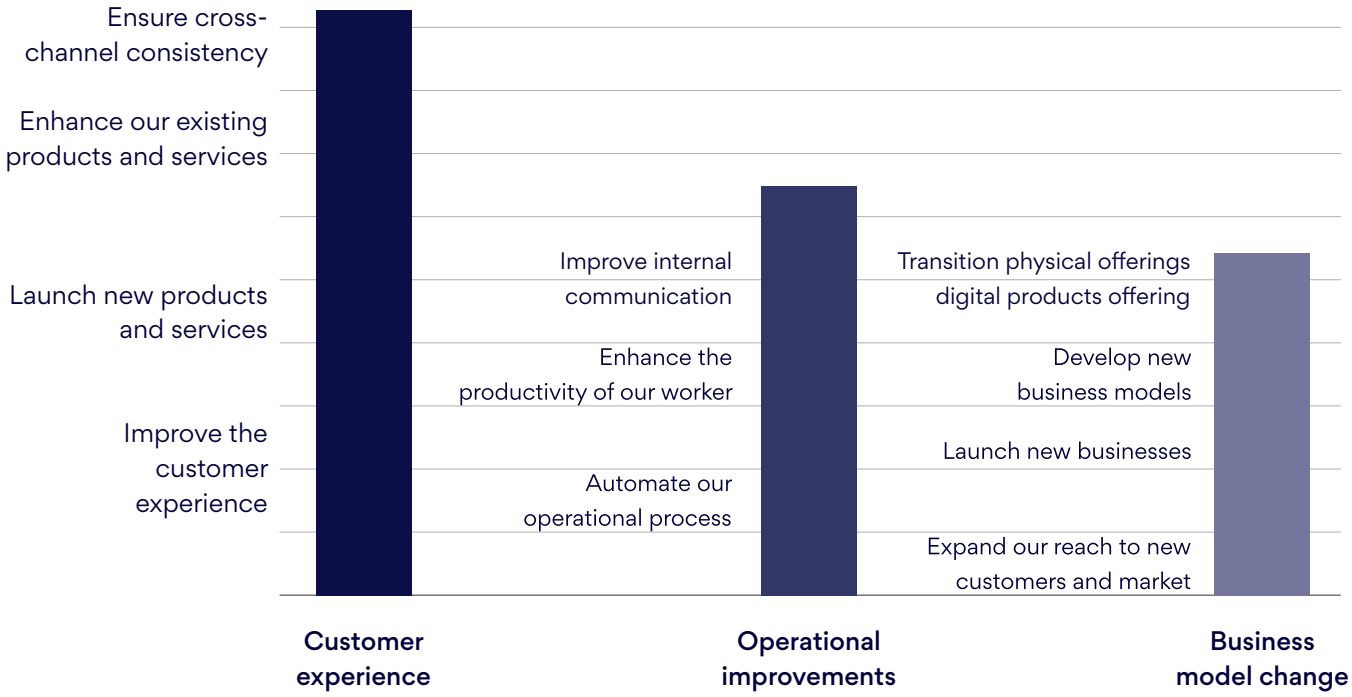
And at work, biometric tracking from wearables, like a heart print and finger print, is transforming security at the workplace. Banks are transforming the banking experience with the ability to check deposits from a smartphone, and are launching automated smart branches. Digital consumer experiences are everywhere!

Car | Home | Cities | Banks | Healthcare | Wearables

"Every industry and every organization will have to transform itself in the next few years. What is coming at us is bigger than the original internet and you need to understand it, get on board with it and figure out how to transform your business."

Tim O'Reilly
Founder and CEO, O'Reilly Media

Digital consumer experiences make it imperative for every enterprise to transform themselves.



(MIT Sloan Digital Transformation Global Exec Study and Research)

Investments in digital primarily impact 3 areas

First is the **customer experience**, where delivering an omni-channel experience is going to be key. Second, **operational improvements**, including leveraging technologies such as cloud computing to streamline the IT environment, using big data for actionable insights that improve customer experience or deliver better business outcomes, and exploiting the IoT appropriately. Finally, b**usiness model transformation** requires deep domain knowledge, a good understanding of market trends, and an ability to invest in transformative bets.

According to Forrester, only 27% of today's businesses have a coherent digital strategy that sets out how the firm will create customer value as a digital business. Gartner reports that 125,000 large organizations are launching digital business initiatives now and that CEOs expect their digital revenue to increase by more than 80% by 2020. IDC expects that the percentage of enterprises creating advanced digital transformation initiatives will more than double by 2020, from today's 22% to almost 50%.

CEOs are making a concerted effort to integrate the various digital initiatives across the business and create a clear digital vision that shows how the business will deliver revenue-generating digital experiences. B2B industries will start to close the digital gap with their B2C peers as they too are confronting rapidly rising customer expectations. By 2018, 67% of the CEOs of Global 2000 enterprises will have digital transformation at the center of their corporate strategy.

"Industrial companies are in the information business whether they want to be or not."

Jeff Immelt
General Electric Chairman and CEO

Becoming a software-driven business, by design

"Software is eating the world."

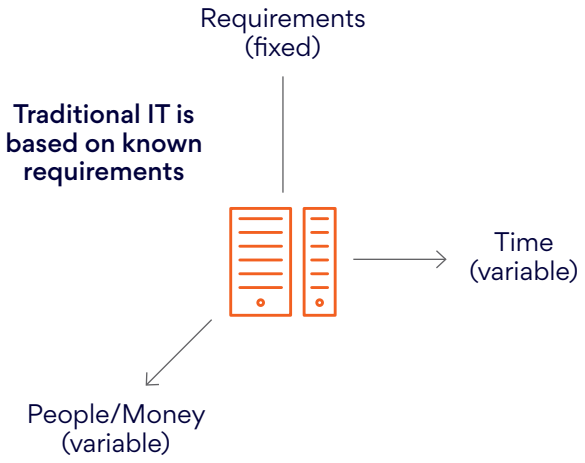
Marc Andreessen
American Entrepreneur, Investor, Founder of Andreessen Horowitz

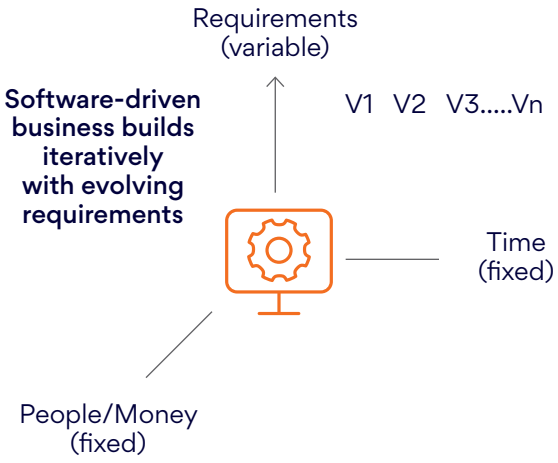
Digital transformation has to be software driven. Digital native companies like Uber, Airbnb & Netflix aren't really in the software business in the traditional sense of the term, but they are driven entirely by software. Even a pizza company like Dominos can today claim to be in the software business.

The only way to compete with digital natives is by relying on software-driven business models and consumer experiences. The software-driven business is about having the ability to make the sharpest turns with predictable bursts of speed.

Traditional IT is based on known requirements and driven to a specific outcome. The supply of resources here: time, people, and money is variable.

This approach ignores the variability of requirements until the goals are met, creating a lag between what is needed and what is delivered.





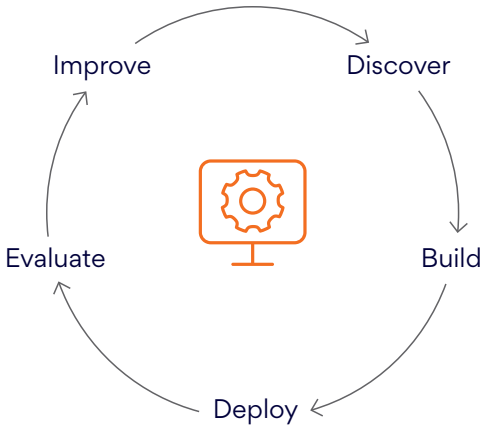
By contrast, the software-driven business works in short, intense bursts, allowing the business to continuously respond and adapt to market changes and customer needs.

Speed where it matters

> "Speed is the new currency of business."
>
> Marc Benioff
> Chairman and CEO, Salesforce

Today, users expect IT to be able to work at the speed of business.

It's up to the business to continuously discover and improve experiences or discontinue them. With apps and experiences being almost disposable in the eyes of a user, the new imperative requires speed to create, build, deploy and evaluate those experiences. To become software-driven, a platform designed for speed must be part of any transformation; one-time transformations will get left behind.



In an era where experiences are short lived; one needs a platform that will help innovate, create and deploy at speed.

Speed to digital
The steps are obvious but the path is lost in chaos

> "It's no longer the big beating the small, but the fast beating the slow."
>
> Eric Pearson
> CIO, International Hotel Group (IHG)

What's required to become a software-driven business is clear: access to data from across the enterprise, the ability to rapidly bring new experiences to market, engage business users with delivery of insight to action and creating the environment for innovation.

Access Data

Connect APIs to enable the enterprise and leverage the value of legacy data

Build Experiences

Deploy, measure, analyze, and iterate

Engage Users

Deliver omni-channel experiences along the customer journey

Innovate

Create, integrate, and extend experiences for new business models

"Financial institutions must be able to deliver an easy to navigate, seamless digital platform that goes far beyond a miniaturized online banking offering."

Jim Marous
Co-Publisher of The Financial Brand and Publisher of The Digital Banking Report

However, the path to digital is lost in chaos

Chaos is blocking the path to digital transformation. Complex legacy systems, point-to-point data pipes, heterogeneous technologies, siloed systems, disparate security, and more are preventing enterprises from making rapid progress on the digital transformation journey. There is no solution for speed unless we solve for this chaos. The challenge is **HOW** to get there. This is where our focus on the '**how**' of digital comes in.

Public APIs | Contact Center | Smartphone Apps | Tablet Apps | Website Apps | Store/ Branch/PoS

How of digital
Steps to build your digital experience platform

"You can't delegate Digital Transformation for your company... you and your executives have to own it! Executives need to engage, embrace and adopt new ways of working with the latest and emerging technologies."

Barry Ross
CEO and Co-Founder, Ross & Ross International

There are six recommended steps you need to take to design and build your enterprise platform for speed to continuously discover, design and deploy new experiences.

Step 1
Isolate the Slow from Fast

Step 2
Adopt to the Proven Platform Blueprint

Step 3
Devise your Core Platform Strategy

Step 4
Data Integration and Curation

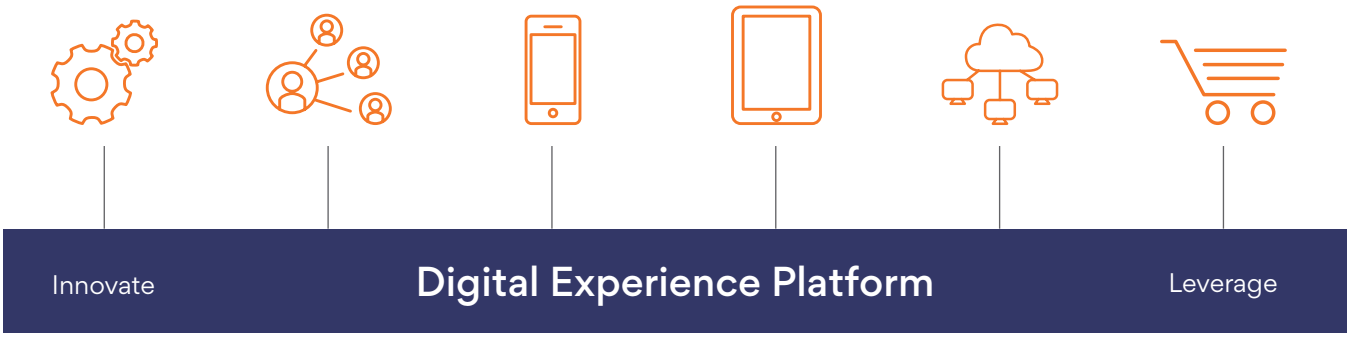
Step 5
Think APIs and Manage them well

Step 6
Develop Experience Creation Strategy

Step 1: Isolate slow from fast

How do you make sense of chaos and use data in a way that impacts the business?

Existing data and sources of truth, like an ERP or legacy database, are hard to extend and leverage to meet the needs of digital transformation. Inherently, they change slowly. However, data locked within these systems is critical to enable transformational experiences. Therefore, you need to develop a layer that creates an abstraction over these slow moving systems. That way you have access to the value embedded within, avoiding the need to change them, while the platform can support fast occurring innovations.



"In today's era of volatility, there is no other way but to re-invent. The only sustainable advantage you can have over others is agility, that's it. Because nothing else is sustainable, everything else you create, somebody else will replicate."

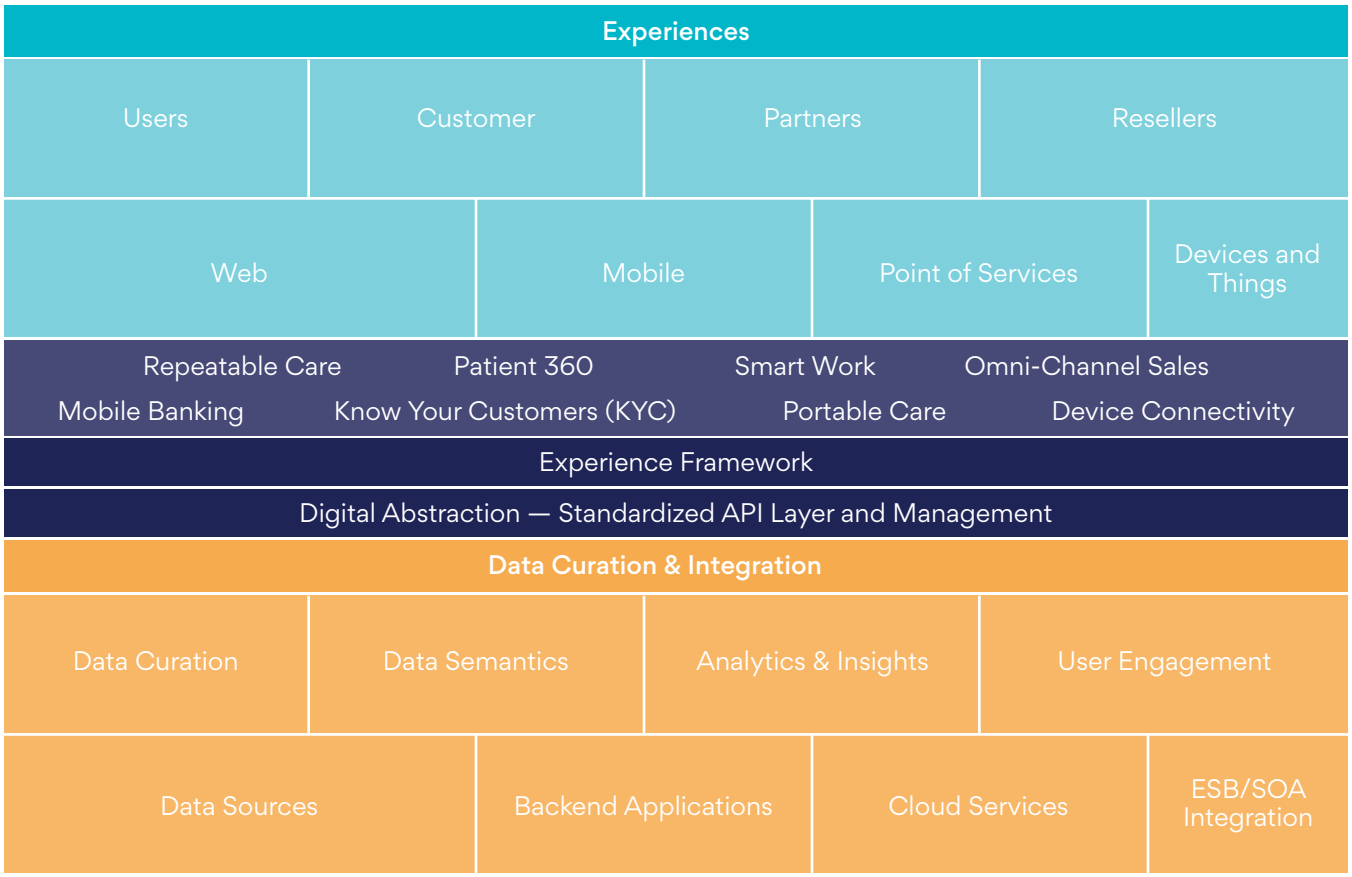
Jeff Bezos
Founder, Amazon

Step 2: adopt to the proven platform blueprint

The platform blueprint that you see below is an outcome of various transformation programs we have run across different industry verticals successfully. We call it a digital experience platform reference architecture.

Often, data is locked away in multiple systems. Most companies are already managing some sets of their applications and services via cloud-based solutions. Third party data sources (like social media, partner data, public data, IoT) just increases the variety of data sources.

Companies seeking tangible results have to run the gamut of data sources with varying levels of control and quality. To connect and access all these sources requires a robust data integration strategy.



The above approach enables the ability to create experiences that span multiple data sources, workflows, and processes.

"The digital strategy of a healthcare organization must be aligned with everyday consumer experiences in other industries."

David Chou
Healthcare CIO

If you refer to the lower layer of this framework, this is where we can create value from the data with robust data cleansing, curation, and aggregation, before making it available to consumers.

Next, in the middle layer, we gain insights and analytics then apply and expose these insights as APIs used to inform the experience framework. Finally, in the top layer, for customer facing experiences, the output of the APIs is presented in a manner that engages the customer in the most contextual and personal way.

All this infrastructure that accesses, curates, and analyzes information should be accessible on the Internet through secure APIs that provide easy-to-use information packets, in as uniform a way as possible. It's in this API management layer where scalability, metering, caching, and other services can be applied to enable rapid and flexible experience creation and delivery across all channels possible and for all personas possible.

Organizations have to address many audiences, both internal and external, including customers, employees, partners and resellers, all overlapping in terms of information they need, tasks they need to perform, and insights a company needs to gain from their interactions.

This reference architecture makes it possible to apply role-based access, and the customization and personalization that is very critical to engage the right persona with the right set of experiences.

Step 3: Devise your core platform strategy

"At least 40% of all businesses will die in the next 10 years... if they don't figure out how to change their entire company to accommodate new technologies."

John Chambers
Executive Chairman, Cisco System

Building a digital experience platform needs a product engineering mindset and core strategy in terms of how the platform will be built and the way to navigate the journey for quick results.

Some of the key questions you need to ask before starting the journey are as follows.

1\ **Where do you want to start from?**
From our experience we've seen that journey towards becoming a software driven company is best kicked off with small, measured steps.

You can start to discover and build digital experiences that derive business value – this could be rapid prototyping, running hackathons, and digital sandboxes. Some of the enterprises we have worked with prefer to start with the API layer by designing the APIs and API management that is crucial for speed in digital transformation. Digital transformation consultants can help discover and build experiences for your organization, by deploying a specific minimal viable platform (MVP). You can start building a digital experience platform starting with the reference architecture and building blocks that are already in place. Whichever way you start, you need to focus on speed and continuous transformation by design.

2\ **Do you want to build and maintain it?**
Building a platform from scratch on your own is always an option. The question is, how much time and investment can you afford to do it yourself? Also, do you have skills and mindset required for building a digital platform that is future ready?

Your IT team may need to be re-skilled to host and manage such a platform because traditional approaches for hosting and maintaining it will not help you derive the best value from your platform investments. Apart from that, managing end to end security, audits, governance, and compliances for data, infrastructure and processes will become critical as well.

3\ **What components and engines do you already have and what else do you need?**
It is important to evaluate which existing investments can be re-used or re-purposed to build towards platform blueprint. For example, you might already have a good data integration platform, and data curation can be an add-on to complete the data integration and curation layer.

Evaluating what you already have, its fitment and what other components and engines are required, is an important step towards devising your digital experience platform strategy. While leveraging existing investments for better ROI is important, evaluating it as an enabler of your future ready digital platform is critical.

4\ **Cloud-native, on-premise or hybrid?**
There are options in terms of how you can deploy your platform — build off the cloud provider infrastructure such as Amazon AWS, Microsoft Azure, Google Cloud and IBM Cloud or build using your on-premise infrastructure (data center). If you have extra capacity and manageability, on-premise approach may help optimize that, although you may need to worry about future scale and hence the need to procure more infrastructure in future.

Public cloud platforms offer many productive offerings and services that can help engineer your digital experience platform quickly, without you having to worry about infrastructure, security and keeping the lights on yourself. Public cloud services providers also offer services such as storage, data processing, DR, etc. that can add direct value to the digital platform.

The third option is to leverage extra capacity and tooling from on-premise infrastructure while using public cloud platform for managing scale and to bring speed to the platform delivery.

5\ **What if you can subscribe to the platform?**
Building a platform from the ground up and putting structure and processes to manage and maintain it will not be easy for every enterprise. Besides, you may not have the expertise in house to build such a future ready digital platform. Is it then wiser to think of a pay-as-you-go (subscription-based) model?

A subscription model will not only help you start on your journey quickly, but also provide a ground to validate and implement digital initiatives without having to make a long term investment commitments at the beginning itself.

Also, a subscription model could be used for partial platform features such as data visualization, experience creation and delivery, etc. So, how and where subscription models help and how they can be best tied to the rest of the platform pieces you have, is not only a technology decision, but a strategic business/GTM decision as well!

6\ **Which approach do you want to take — Data-first, API-first or Experience-first?**
Building a digital experience platform is a journey and should be looked upon as a roadmap for continuous transformations in future too. How and where to kick it off from is an important decision to take. The criteria remains the same – speed and the leverage you can create for business and stakeholders.

If your data is disparate and siloed across systems and organization boundaries, then it is a good idea to start from a data-first approach. And that essentially means you focus on how you integrate data, process it, manage quality of data, etc.

If you have been good at managing and augmenting data and its capabilities, how are you bringing meaning to it from a people and process perspective? How do you expose it and control who does what with your data? This is where an API-first approach can bring transformation opportunities to fruition quickly.

How do your stakeholders find value in data, when they want it or need it most? How do they feel and touch the data you care about to make their lives better? If these are the priority concerns you are trying to address, then you should definitely be thinking about an experience-first approach.

7\ **How do you bring flexibility to the platform?**
A digital experience platform is a working layer of productive technologies, tools and interconnections. There could be parts that are moving at different speed and interventions. However, to produce cohesive results at speed, inbuilt flexibility is important.

Flexibility in such a platform is about providing native options in terms of experience creation possibilities (native for mobile, hybrid, web), supporting multiple data integration technologies (Mulesoft, Mirth, Ensemble, Boomi), data curation (tools for discovery, ingestion, processing, visualization), API management platforms (Apigee, Mulesoft, Bluemix, Azure), and supporting multiple deployment models using the likes of Microsoft Azure, Amazon AWS, IBM Bluemix, Docker, etc.

Flexibility also includes how you manage all interconnected components and experiences via common ops, frameworks, sandboxes, and experience templates.

You need to have a clear DevOps and sandboxing methodology in place to ensure that flexibility is not only limited to the way platform is built, but it also caters to the way it delivers the value to the business through newer use cases and ever-changing experiences. Hence, it is imperative to think about common definition of sandboxes comprising of users, components and experiences; and a centralized way to operationalize DevOps on any cloud.

8\ **How do you add agility to the platform?**
Agility for digital platform is about being adaptive, evolutionary, continuously improving, ability to make rapid changes, etc. and that too, with speed and a graceful experience.

Agility does not happen, it comes by design. Agility will come from how you setup the platform, choose and configure needed components, define experiences, the ability to connect to enterprise through connectors, integrate/ingest external data sources, the way you curate data, expose data, etc.

The ability to create engaging omni-channel experiences, distributing experiences through multiple channels, manage and control experiences through central store, deliver role-based personalized information is essential to platform agility.

User engagement mechanisms such as tracking and analyzing user behavior using built in analytics, enhancing the engagement using gamification, delivering most contextual information using rules engines, etc. need to be core to the platform strategy.

Setup agile processes to constantly monitor and measure business results and impacts. Deliver constant improvements and enhancements and deliver new experiences on demand using agile frameworks.

Step 4: Data integration and curation

"Data is a precious thing and will last longer than the systems themselves."

Sir Tim Berners-Lee
Computer Scientist and Inventor of the World Wide Web

The following questions will help you devise your strategy for data integration and curation — that is the bottom layer in the blueprint.

1\ **What data is needed for which experiences?**
Experience is a digital touch point for the user and data is pivotal to the whole experience. For example, in a healthcare enterprise such as hospitals, care givers (consultants and nurses) need to have access to patients' history and treatments s/he has been receiving from the past, which is critical to how s/he gets treated in the current context of health issues.
On the other hand, hospital management is more concerned about the overall care efficiencies, optimal use of resources (staff, beds, OT), and identifying gaps in the continuum of care they provide to patients.

In both cases, data requirement to deliver effective experiences to users varies significantly. At the same time, respective datasets are critical to help them meet their goals.

2\ **Is data coming from diverse, disparate sources?**
In case of most enterprise scenarios, data won't be available at one place unless it is planned that way. Often data that is required to derive value and deliver experiences will need to come from diverse and disparate sources. How do you plan to handle this?

Data integration mechanism is key to achieve above and it involves multiple steps:

- Deployment of integration engine such as Mirth, Ensemble, Boomi, Mulesoft, etc.
- Ability to customize and add scripts and connectors. A script is an interface setup and API for consumption.
- Creating a catalog of scripts and connectors using a partner such as Catalyze. A connector is a network pipe — VPN, configuration and security.
- Support data pipeline creation — for a system of engagement pattern, for a real time messaging pattern, and for a data warehouse pattern.

3\ **Is data multi-form, multi-structured?**
Multi-form indicates how a data entity (say a patient in a given use case of an application and a parent in another use case of that application) changes form and shape depending on the application context. It is a kind of data lineage and formation that must be addressable. Different datasets coming in from disparate sources may have different structure. For example, SMS messages, Flat files (CSV, etc.), Stock market data, HL7 EMR data, databases, external applications and web services will structure data differently. You will need packaged connectors that suit the source structure. Access to this data could be different as well, such as Messaging, APIs, File, etc. This needs custom configurations.

Processing multi-structured data requires different parsing and transformation, routing and orchestration. You will need to have a common repository of scripts and utilities, typically pre-templated, and standardized for a given domain.

4\ **What are the quality, cleansing needs of the sourced data?**
Data coming in from different sources may not be complete, accurate, or relevant. For example,

the zip code could be missing or incorrect in the patient's address, short codes are differently spelled such as St and Str for Street. Data inconsistencies or errors could be caused during data entry, data processing, storage or it could be because of data corruption while in transit.

So different datasets may have different quality issues, and hence different cleansing needs such as data auditing to detect anomalies and contradictions, data corrections through modification or replacement, data formatting, data deletion, cross-checking with reference data, harmonization to standardizing terms and words, enhanced data integrity, etc. Without identifying your data quality requirements and appropriate cleansing approach and tools, delivering the desired service quality to stakeholders is at risk.

5\ **What are the data profiling and semantic modelling needs?**
Data will become available by finding and locating datasets from disparate silos. Free form search for superior discovery of metadata and hidden data is required to profile the data further. You will need a way to infer and recommend business data types based on pattern recognition, text analytics. You also need the ability to apply business ontology to enrich and align data discovery experience.

Semantic modelling will help you:

- Discover and recommend semantically related data sets
- Provide guided data unification process irrespective of its form and structure
- Enable/develop graphically represented, virtual data model
- Provision and publish the data model/mart for standard tools to consume and operate

There are tools such as Attivio DSD, Oracle Big Data Discovery and Waterline Data which can help in the above.

6\ **Is interactive search, navigation and filtering needed over data sets?**
The type of enterprise data search required will help decide what kind of search tools you will need to deploy and connect with data sources. Interactive search may help find more meaningful information to the individual.
For data with many attributes and relationship with different datasets, you need a way to set filters and navigate from one search to another deep dive search.

Attivio, for example, provides a flexible way to manage enterprise data search use cases.

7\ **Is data curation and preparation needed?**
Data curation is about managing the collected and integrated data in such a way that value of data is enhanced and maintained further. This needs active management and methodologies in place so that curated data is used productively in the context of business.
For example, how you collect, extract and process scientific information from research work, and then convert it into a biological database as a digital format, which can be queried, mapped and used when required.

Data preparation and enrichment will help in addressing:

- User (e.g. Data scientist) context specific data enrichment
- Self-service data set planning and provisioning
- Deriving and internalizing intelligence from user interaction
- Capabilities like data pivoting, de-duplication, aggregation

Tools such as Talend, Paxada, IBM DataWorks can help in data preparation and enrichment. However, overall curation needs a much broader methodology and toolchain to deliver value. Techniques such as machine learning (ML) can leverage the prepared data to help implement advanced use cases to get systems to work without being explicitly programmed for (artificial intelligence use cases).

8\ **What kind of data governance needs are you required to fulfill?**
For the data availability, integrity, usability and security of data, enterprise will need to identify and prioritize governance needs such as:

- Data and user operations auditing
- Data access and processing rules, policies and controls
- Data encryption, user authentication
- Metadata management
- Data quality profiling, cleansing

Data operations management also becomes critical for better governance and control.

Some of the tools that help taking care of data governance are Waterline Data, IBM Information Server, Apache Falcon, Atlas and Apache Knox.

9\ **What data insights and analysis do you need to derive and publish?**
Knowing the kind of insights and the type of analysis you need will help in deciding on the steps and tools to derive it, such as:

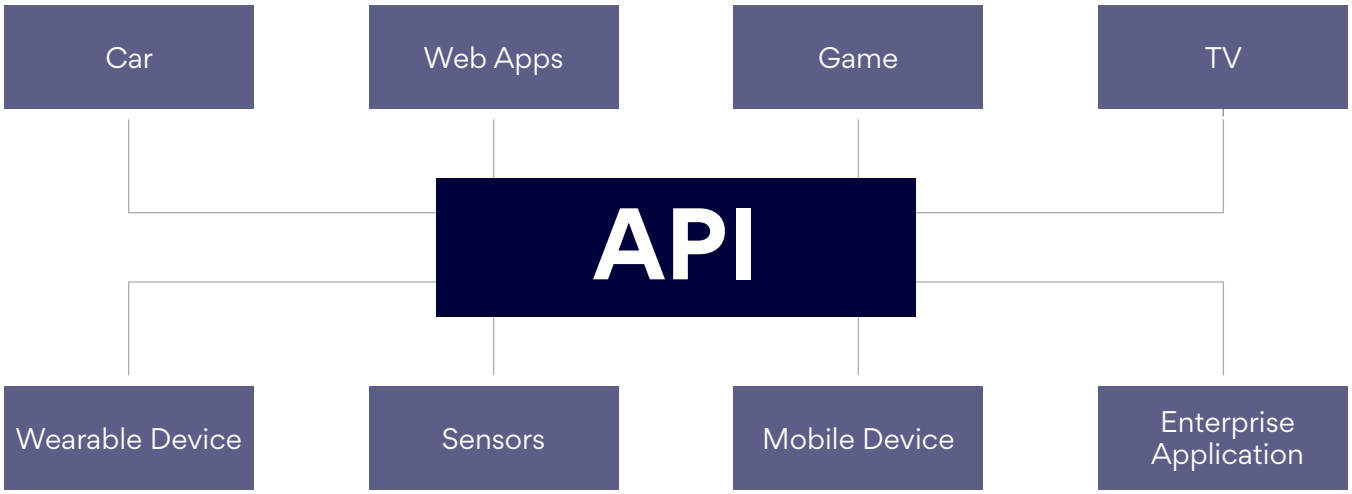
- Descriptive analytics for reporting current trends
- Diagnostic insights for causal analysis
- Machine learning techniques for predictive analytics
- Prescriptive analytics to provide remedial insights
- Dashboards, charting tools to visualize and interact the insights

R, Weka, Apache Storm, Spark, Tableau, Spotfire, Qlik, Twigkit and Persistent ShareInsights are some of the tools that will help deriving insights from the data.

10\ **How do you add agility to the platform?**
In the digital context, the process of obtaining or importing the data for immediate use is referred as data ingestion.

If you have real time data, then streaming techniques are required. For data which is not real time, it can be ingested through batches. While ingesting data, you will also need to think about change capture / incremental ingestion, interpret and fetch diverse data formats and through APIs, data acquisition orchestration, etc. There are various platform/tools that will help with data ingestion like Mulesoft, Sqoop, Flume, Streamsets, Dell Boomi, enConnect, etc. Deciding what fits in your context best needs some deep dive technical evaluation.

Step 5: Think APIs and manage them well



"APIs are at the heart of digital business and are enabler for turning a business or organization into a platform for transformation."

Gartner

Netflix is able to stream to over 200 different device types because of their APIs. 60% of eBay's listings are done through their API. 50% of Salesforce transactions are done through their API. Twitter receives over 13 billion API calls daily. Things are not very different for enterprises as they have to address many audiences, both internal and external including customers, employees, partners and resellers, all overlapping in terms of information they need, tasks that they need to perform, and insights that a company needs to gain from their interactions.

It's in the API management layer where scalability, metering, caching, and other services can be applied to enable rapid and flexible experience creation and delivery across all channels possible and for all personas possible.

Following considerations will help drive your API strategy and unleash the value from data to uncover new opportunities.

1\ **Who will use the API?**
Knowing who will benefit from APIs goes a long way in identifying what they already have, what they are expecting going forward and how their experiences can be bettered.

Taking an example of a retail/ecommerce business, people who will benefit from APIs are buyers, sellers, various employees managing the retail/ecommerce operations and partners who extend the reach into different markets.

Some of the APIs will help enrich the user experience through one or many of the touch points they may have such as mobile, web and kiosk while other APIs may help partners/ channels to pull in the order information from their systems.

Some APIs will address internal needs, while others will address customer, 3rd party or public needs.

Some APIs will provide point/discrete information about specific task (e.g. status), while some APIs will help aggregate / mashup larger business context such as demographic of consumers buying specific types of goods (say, protein supplements).

2\ **How do you track APIs?**
APIs need to be tracked for usage, overage, failures, changes, access, and for performance as well. You need to have a way to monitor all of this from a central dashboard to get insights into APIs.

Unless these behaviors are captured at all times, tracking won't be effective. To have the right level of tracking and insights presented, analytics on the API tracking parameters play an important role.

Customizable dashboards and custom reports help provide the user-centric tracking information on API calls, latency, error rates and performance metrics.

3\ **Who gets access to APIs?**
Controlling access to APIs and hence setting up the security for APIs is the first step towards ensuring that APIs deliver value to the intended parties. Different users will need different levels of access.

You need to classify different users and what business services they need access to. Level of access also means what they can do with the API they are allowed to use.

Based on the need and commitments, you should able to define the rate limits and have a mechanism to alert in case of overages.

Developers are the key users of API tools, they will want to use the APIs to deliver new solutions and experiences. You need to have the ability to add or invite developers who need to develop with the APIs you are providing.

Policies can help manage and control what every type of user can do with APIs and to limit their usage. Different authentication patterns will need to be supported such as API Keys, OAuth, OpenID, SAML, 3rd party IDM integration, etc.

Monitoring, mediation and traffic management are the other key aspects to ensure that API users are served better.

4\ **Is the API layer scalable?**
API scalability can be implemented at various levels — using microservices and container-based backed deployments, using server-less computing frameworks, auto-scaling of underlying infrastructure, and also controlling / throttling APIs at the management layer.

APIs are the primary interfaces to end user experiences delivered through web, mobile and other devices, and that demands that the API layer be highly scalable.

Ability to provision your API layer on demand across different geographies, and throttling APIs based on the load is required to make it fully scalable.

5\ **What type of applications?**
Knowing what type of applications your teams, customer or 3rd parties are going to build using APIs will help you decide what types of APIs you need. Given below are examples of the types of applications:

- To perform specific tasks (such as update order information, health records)
- To perform a group of coordinated functions (workflows types interdependent functions)
- To share company/business/user data (such as credit card defaulters of the month)
- To share insights and outcomes (management dashboards about the performance)
- To provide aggregated data in the context of the product or user (product movement compared to competition, other mashups)
- To trigger jobs and activities (such as triggering risk modelling or predictive models to run on financial data of a specific entity)
- Management activities such as tracking (alerts and notifications)

Your end customer/consumers will need access to service data, usage data or past records such as old or returned orders. Partners will need to access order and fulfillment data if they are your extended channel into different territories. Employees will need access to scheduling and billing/invoicing data for the customers they are serving. HR will need access to employee performance data. Management will need access to insights and tracking dashboards for the key business KPIs. Sales and marketing will need access to intelligence such as seasonal patterns, slow moving products, geographies having frequent service quality issues, demand for new products.

These data assets can originate from consumer facing mobile apps/websites, corporate applications, or assets external to company, such as public database containing sales information about the competition.

6\ **How do you secure your APIs?**
APIs are a critical part of your digital strategy and hence API security is pivotal to the overall digital roadmap.

This demands that you have a way to define security policies and enforce controls such as which end users, experiences and applications can use the API, how many calls they can make, when they can make the calls, and what permissions and roles they have on APIs (to perform GET, POST, PUT, DELETE operations).

You need to have a way to track how unauthorized users are trying to access the APIs and what challenges authorized users are facing in accessing the API.

You should have a way to leverage enterprise IAM credentials to define and authenticate users for API usage. And in the context of Internet applications, consider having a need to integrate with public identity provider such as Facebook or Amazon and providers with OpenID, OAuth, SAML providers.

Designing for data/message security when in transit and threat protection will help boost the security level.

Real time monitoring of API metrics, alerting, intelligent routing (based on the message content-identity, headers), supporting bi-directional protocol transformation, aggregating multiple API calls within single API (orchestration/ mediation), will help secure your APIs.

7\ **How will the developers discover APIs?**

API documentation is critical to help developers start understanding and using APIs in their experiences and applications. However, discovery of APIs is a primary step to identify what APIs are available and how to get access to them.

So having a way to create a catalog of APIs and publish them to the developers (internal and external community) helps them discover APIs. You will need to provide a Developer Portal to help developers search, explore and understand APIs. Additionally, API creators/publishers can deploy development and educational tools to boost the developer productivity.

A Developer Portal can help on-board new developers, create communities and online forums for social publishing as well.

8\ **Do you have pre-built APIs?**

If you have any pre-built APIs in the context of your business or vertical, then these APIs can be reviewed and re-used to speed up the API strategy.

API Management vendors who help manage the entire API life cycle, such as Apigee, provide pre-built APIs such as FHIR compliant APIs for healthcare. Persistent has pre-built APIs such as for security and identity management in various customer deployments.

Newer architecture patterns such as microservices and server-less computing are also fostering the API economy by driving many technology as well as enterprise players to invest in building API assets that can be shared or opened for mass usage.

Partnering with vertical specific APIs and service providers, integrating them into your APIs can help rollout your API strategy sooner. Of course, not one size fits all, and hence developing deep understanding about what you have and what you can augment from 3rd parties; and evaluating all of these in the context of your digital strategy needs a digital experience platform approach.

9\ **How do you monetize APIs?**

APIs can help monetize your technology, data and business content. However, you need a way to achieve this in an easy and flexible way.

You need a way to define how you will charge developers for using APIs or enable models such as revenue sharing. You need to have a way to model flexible pricing plans and rating rules that will suit different developer needs. Ability to define API packages, create usage plans (such as fixed plan, pre-paid plan, variable plans), and impose overage charges, etc. provide a way to rollout monetization models.

You will need a way to track usages against different plans, make adjustments, and do the billing to rollout monetization mechanism.

Step 6: Experience creation strategy

They are web-based apps, portals, native mobile apps, hybrid apps accessed from web and mobile browsers, watches, devices and things. Experiences help in various ways such as improving the operational efficiency, enhancing user experience, opening new channels, rolling out new business models, thus help creating a very positive impact on margins, brand and revenue. Asking the following questions will help you detail out the experience creation strategy.

Digital experiences are the touch points you deliver and maintain for the users to be able to interact with content, insights and help them take actions.

"You've got to start with the customer experience and work back toward the technology, not the other way around."

Steve Jobs

1\ **Do you need role-based experiences?**
Digital experiences need to be meaningful, enjoyable, consistent and most importantly, contextual.

Different people perform different roles in the context of business and personal life. For example, supplier and buyer / consumer are key roles in an e-commerce scenario. The supplier's experience deals with how s/he can track the demands and understand buyer demographics and seasonal patterns. The buyer is more concerned with how s/he can discover the products, compare them, get recommendations, track orders, provide reviews, etc. So there is a fundamental difference in their profiles and expectations, which demands different experience creation strategy for both. Similar is the case with patients, nurses, consultants, frontdesk staff, inventory in-charge, etc. in healthcare business. They all have different point of interests to help navigate their roles better, and hence the need for role-based experiences. If you can identify what different roles you, as a business, care about and what the general profile and expectations of these roles are, deciding if you need role-based experiences will be easy.

2\ **What channels do you need to support?**
Digitizing end to end customer (and other stakeholder) experience means reaching out to them through the channels they prefer to be using at different times as well as for the different purpose they have at that moment. In certain use cases such as approvals and appointments, users prefer to take actions through their mobile, while for detailed dashboards and complex data reviews, they may prefer to be using web channels such as portals and web apps. Devices such as wrist watches and fitness bands can improve experience for actions such as reminders and alerts. Identifying which channels you want to support to consistently deliver improved and joyful user experience will help prioritize what type of experiences you need to design and build.

3\ Do you want an iterative process?

An iterative process helps building and delivering digital experiences through repeated cycles.

This enables enterprises to quickly engage users of the experiences to touch and feel and develop perspective of how would they work and collaborate digitally in the new world. This process enables seeking immediate feedback and testing the hypothesis in succession.

Experience developers also get an opportunity to learn from the experience creation process in these short iterations and use that learning in subsequent ones to make experiences more effective in the context of users.

Sometime business / users are not clear about the requirements and roadmap to digital enablement. This is where an iterative process of experience creation will help adapt to the digital program quickly.

Pre-engineered digital experience frameworks (such as Genwi) enable rapid creation, customization and extension environment for building the apps, portals, and dashboards. Whichever framework you choose, it should be based on the key principles of having HTML5/CSS templates and pre-built, OOB channel-specific controllers for write once, run everywhere architecture. It needs to fully support native iOS, native android, native Windows 10, Angular JS, PhoneGap, Cordova, etc. OS and tools.

4\ How are UX designers driving the experience?

UX designers have a critical role to play in the experience creation process — they can help in enhancing the user satisfaction and making their jobs enjoyable.

Usability and accessibility are the 2 key success factors for the experiences. User profiling and mapping their journey in the context of the business and their specific role is a way to address usability and accessibility. Interaction design, information architecture and identifying human factors pertaining to the role is a next step to drive UX for experiences.

Design thinking methodologies and game-based innovative tools help drive the above process very effectively. Your digital experience platform needs to inculcate these methodologies and leverage innovation tools.

5\ What controls do you need to distribute the apps?

As businesses are getting more and more digital, enterprises will have more and more user touch-point apps for various roles, use cases, departments, and for various stakeholders. Apart from web and mobile apps, more devices and apps such as wearables, controllable IoT devices, intelligent bots, VR/AR applications will add up to the organization kitty.

How are you going to manage and distribute these apps securely and in a controlled manner? You will need to control apps by users, roles, devices, time period, etc. You will need to control devices and permissions on those, app provisioning, updates, push notifications and a complete publishing process whenever a new experience is created.

Organizations will need to have a visibility into which experiences people are using, how the experience of using these apps on different devices and operating systems is, and what the potential security issues are. Some of these controls can be monitored using live dashboards, and the rest can come from logs/ traces through backend analytics and BI tools.

6\ How will users discover experiences?

Very few experiences with few users and devices can be managed by simple web catalog that lists experiences and provide directions for accessing these experiences. However, this gets very complicated and non-scalable very soon. Also the manageability and discovery process becomes troublesome when rolling out multiple versions of apps or supporting newer devices and users.

Your digital experience platform needs a robust and a very secure way for users to discover, access, review, download and install corporate approved experiences on the authorized devices.

Developers should be provided with a framework that enables experience submission, revision, approval, de-activations, etc. Based on the various controls you need on apps distribution and discovery, you will need to have a well-integrated enterprise experience store mechanism to augment most of the above capabilities.

7\ What motivates internal or external users?

User-centered innovation is the hallmark of the disruptions.

Identifying user motivations is critically important for experience creation strategy. Different users will have different motivations.

Getting instant access to data, decision making and ability to take actions to closure while on the go, and constant collaboration with coworkers, etc. could be motivations for internal users. These type of users would like to have mobile-based experiences which are simple to use and can structure/filter information for their role. They may prefer to have web dashboards for detailed information review and for finding longer patterns in business, etc. External users such as partners will value the ability to have seamless integration with capability to track demand/supply through live dashboards. And they may want critical system alerts to be delivered on a mobile. Consumers will want to have a very intuitive and omni-channel experience through different devices and things while dealing with organizations and their products.

8\ Do you want self-improving experiences?

Self-improving experiences are the ones that can capture and measure users behavior, interactions, navigational comforts, feels, and responsiveness, as a first step.

Self-improving experiences are the ones that can capture and measure users behavior, interactions, navigational comforts, feels, and responsiveness, as a first step. Captured data then can be analyzed using machine learning (ML) and predictive models can drive app behavior to suit the user's need and comfort. Digital experience frameworks can help re-deliver the self-improving experiences fairly quickly, while prebuilt ML capabilities in the platform will help measure, initiate and drive the self-improvement process of the experiences.

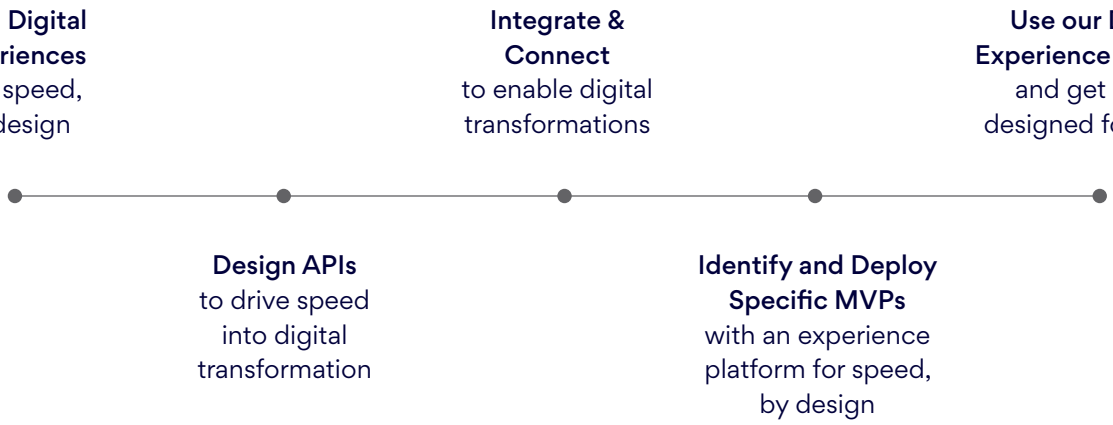
9\ How are you securing the access?

Securing the access to experiences will have to be done at different levels by controlling the experience distribution to the desired audience, for the desired time period and for the specific actions they need to take. This can be achieved by publishing experiences to a private store, defining mandatory experiences with role-based access rights, integrating with IDM solutions, and tracking download statistics, etc. Mobilebased experiences can be further secured with cutting-edge app wrapping functionality to add cut/copy/paste protection for data-leak prevention (DLP), pass codes, geo/time fencing and much more.

Endpoint security and device management capabilities will help secure and control the devices such as wearables, IOT devices, AI/VR toolsets, and mobiles enterprise users use. You will need to have an ability to centrally manage, provision, monitor, and control policies across devices such as restrict access due to suspicious access, enforce lockdown, etc.

Conclusion

Digital consumer experiences make it an imperative for every enterprise to transform themselves. Digital transformation has to be software driven so that it can deliver speed where it matters. The solution is to develop a Digital Experience Platform in the context of your enterprise by leveraging your existing assets and investments into data, software and tools.
The roadmap is not easy unless you have a proven blueprint and the right mindset. Think of building a digital experience platform with speed, starting with the reference architecture and building blocks that are already in place. Choose an API-first, data-first, or experience-first approach, whichever suits you best, and build your platform through it. And always remember, focus on speed and continuous transformation — by design.



About Persistent

Persistent Systems (BSE & NSE: PERSISTENT) builds software that drives our customers' business; enterprises and software product companies with software at the core of their digital transformation.
www.persistent.com

India
Persistent Systems Limited
Bhageerath, 402,
Senapati Bapat Road
Pune 411016.
Tel: +91 (20) 6703 0000
Fax: +91 (20) 6703 0008

USA
Persistent Systems, Inc.
2055 Laurelwood Road, Suite 210
Santa Clara, CA 95054
Tel: +1 (408) 216 7010
Fax: +1 (408) 451 9177
Email: info@persistent.com

Persistent