DIGITAL EXPERIENCE PLATFORMS – AN OVERVIEW

ONE PLATFORM TO MANAGE ALL CUSTOMER INTERACTIONS

Abstract

Today, digital technologies such as portals, content management systems (CMS), analytics, and search are converging into one digital experience platform (DXP). DXPs are equipped to play a differentiating role in the customer digital experience. They promise a unified platform consisting of core digital technologies, on which an extensible platform can be built to meet business needs and support innovation. Digital product vendors offer these platforms and a well-defined DXP roadmap for the long term. In this paper, we discuss the various aspects of DXP from multiple dimensions such as the customer, business, and operations. We will also discuss a reference architecture, key tenets, and value proposition of the DXP.

This white paper is intended to benefit digital enthusiasts and the digital community at large.

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The name of the game: Customer engagement

Businesses use an array of technologies to primarily serve one purpose – active customer engagement. To engage customers, they need to know the context and customer preferences / interests, aggregate content, track activities, provide personalized content, and serve inspiring and compelling content. Until now, they relied on various digital products to achieve this: portals for content aggregation and personalization, CMS for content management, search for information discovery, analytics for tracking, campaign management for targeted campaigns, and so on. Through DXPs various technologies converge to enable businesses to effectively engage customers at all touchpoints throughout the user journey.

Components

A DXP provides a platform to develop and manage personalized user experience across all channels, devices, and touchpoints throughout the user journey. It provides an integrated set of technologies and services to build responsive applications. It provides an integrated and unified view to all its users across various applications and enables a seamless flow of business processes for its users. It enables developers to use modern web technologies to develop rich, interactive, and responsive web experiences.

Business drivers

Wide Web 2.0 technologies adoption, rising customer expectations, and process optimizations are compelling businesses to move toward experience platforms. Key drivers include:

- Active customer engagement on all devices throughout the user journey.
- Increased customer stickiness and loyalty.

- A unified view of all customer interactions, activities, and data across multiple applications, user journeys, interactions, touchpoints, and channels.
- Greater insights into customer behavior, interests, transaction history, helping target the content, and campaigns using this information.
- Enhanced productivity through self-service and information discovery.
- Ability to develop platforms for agile delivery with faster time to market.

Key tenets

Let us look at the key transitions made possible by DXP:

- Product to platform
  In traditional digital scenarios, multiple digital products would be needed to build a digital solution, whereas DXP

provides ready-to-use capabilities out of the box.

- **Heavyweight solutions to lean model**
DXPs provide lightweight portals, which are based on lean models. Lean architecture is one of the core themes of DXP solutions. A lean model is used in presentation and integration.

- **Information silos to unified experience**
DXP aims to unify customer data, user experience, and business data. This is achieved through a pre-integrated stack, seamless integration adaptor with all business systems, analytics, and monitoring components.

- **Short-term transactions to long-term relationships**
Generally, traditional digital applications aim to fulfill the customer's immediate needs. DXP aims to go many steps ahead in anticipating customer needs, recommending relevant content, personalizing the experience, and rewarding loyalty to create long-term relationships. Accordingly, the tracked and monitored metrics would vary. For instance, a customer's lifetime value would be a more important metric as against the average order value.
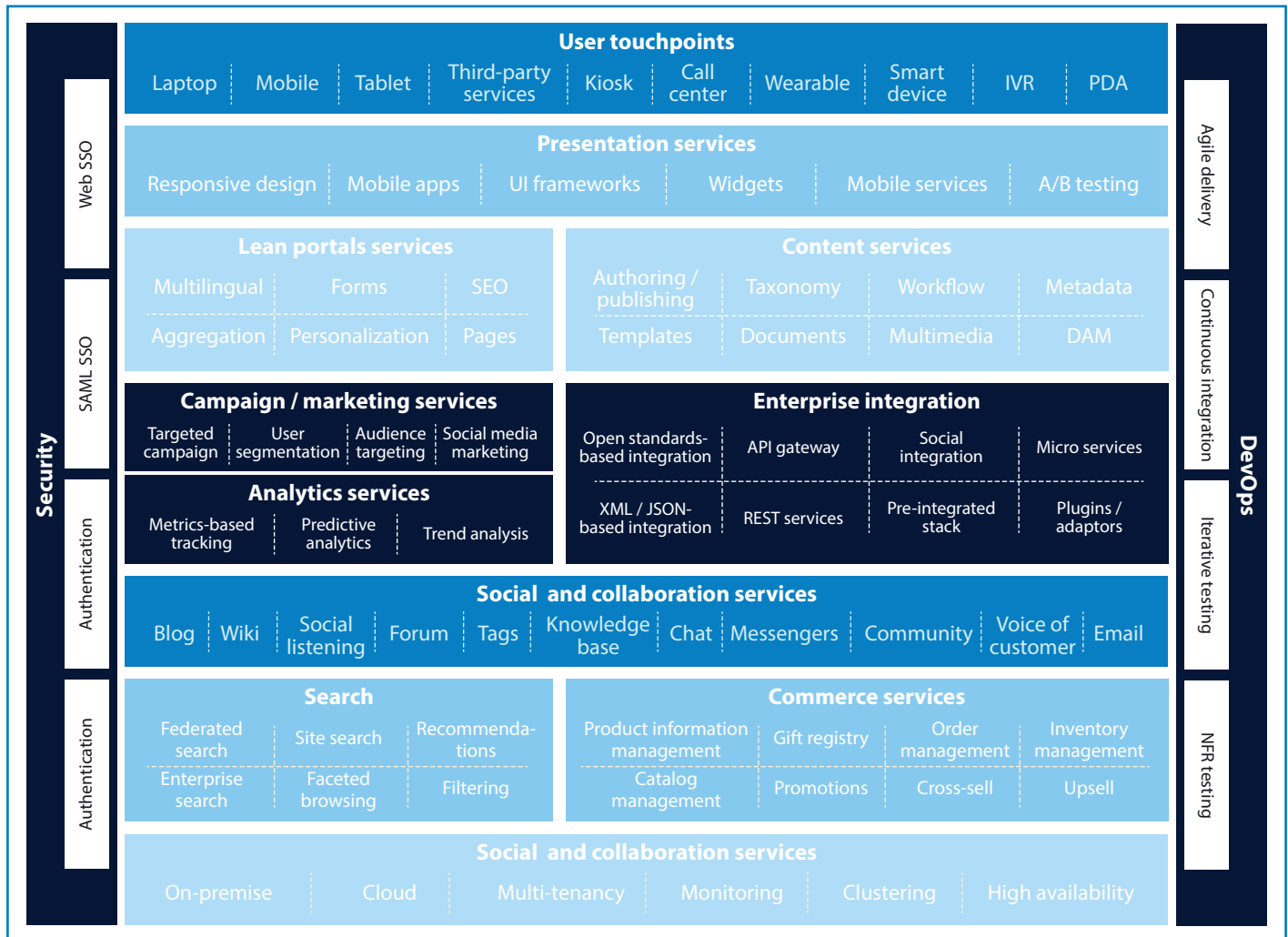
- **Rich experience with touchpoint optimization**
DXP provides end-to-end touchpoint optimization and personalized experience across all customer interactions.

- **Holistic visibility of customer data**
DXP breaks the barriers created by application and unit silos, and provides insights on customer behavior, activities, and actions across all devices.

- **Modular structure**
DXP offers plug-and-play modular components that can be used as needed. The integration too is based on modular services.

- **Platform approach for solutions**
DXP enables developers to create a modular and flexible platform for future needs. It enhances platform extension and reusability.

- **Agile approach**
DXP leverages lean architecture with pluggable and modular components to develop an extensible platform. Leveraging DevOps best practices such as iterative delivery further improves the time to market.

DXP is at a sweet spot for addressing many concerns related to business, technology, operations, and digital user experience.

Reference architecture

Security			User touchpoints											DevOps
	Web SSO		Laptop	Mobile	Tablet	Third-party services	Kiosk	Call center	Wearable	Smart device	IVR	PDA		Agile delivery

User touchpoints

Laptop	Mobile	Tablet	Third-party services	Kiosk	Call center	Wearable	Smart device	IVR	PDA

Presentation services

Responsive design	Mobile apps	UI frameworks	Widgets	Mobile services	A/B testing

Lean portals services			**Content services**			
Multilingual	Forms	SEO	Authoring / publishing	Taxonomy	Workflow	Metadata
Aggregation	Personalization	Pages	Templates	Documents	Multimedia	DAM

Campaign / marketing services				**Enterprise integration**			
Targeted campaign	User segmentation	Audience targeting	Social media marketing	Open standards-based integration	API gateway	Social integration	Micro services
Analytics services				XML / JSON-based integration	REST services	Pre-integrated stack	Plugins / adaptors
Metrics-based tracking	Predictive analytics	Trend analysis					

Social and collaboration services

Blog	Wiki	Social listening	Forum	Tags	Knowledge base	Chat	Messengers	Community	Voice of customer	Email

Search			**Commerce services**			
Federated search	Site search	Recommenda-tions	Product information management	Gift registry	Order management	Inventory management
Enterprise search	Faceted browsing	Filtering	Catalog management	Promotions	Cross-sell	Upsell

Social and collaboration services

On-premise	Cloud	Multi-tenancy	Monitoring	Clustering	High availability

Security column (left): Web SSO, SAML SSO, Authentication, Authentication

DevOps column (right): Agile delivery, Continuous integration, Iterative testing, NFR testing

The core components of a typical DXP platform

- **Presentation services**
  This includes various experience components, such as responsive design, adaptive content, mobile apps, widgets, and mobile services. A/B testing can be used to test the effectiveness of multiple variants.

- **Lean portals**
  Lightweight portals complement presentation services by offering personalization and information aggregation capabilities. Portals also provide forms, pages, page layouts, and multilingual capabilities.

- **Content services**
  Web content is widely used in digital platforms and hence, a content management system is needed to provide authoring, publishing, workflow, and content template services.
  Digital assets such as rich media and images need a digital asset repository. Documents are managed through document management services.

- **Campaign services**
  To provide digital marketing features, DXP provides robust campaign management features. It offers flexible user segmentation features based on user profile attributes, user purchase behavior, demographics, social attributes, and

other context parameters. Business users can configure campaigns and target the content / offers for the specific user segments.

- **Enterprise integration**
  The DXP stack offers pre-integrated components, which can be used for quick solution deployment. Due to its modular nature, most DXP components can be accessed via lightweight REST services or micro services. It also integrates with enterprise systems and legacy platforms through API gateway and services. As it employs lean, the integration is majorly based on the JavaScript object notation (JSON) data format.

- **Analytics services**
  Web analytics is employed to track and monitor metrics related to user navigation, downloads, page visits, and more. Insights drawn from analytics are used for predictive offerings and contextual recommendations.

- **Social and collaboration services**
  A wide variety of social and collaboration features are offered through the DXP platform, including blogs, wikis, forums, communities, audio / video chat, voice of customer (VOC), and more. The digital user can leverage the collective intelligence through these social and collaboration platforms to achieve higher productivity.

- **Search services**
  In-built search engines or search adaptors can be leveraged to provide enterprise search, site search, and other search features. Search is an important tool in information discovery and to implement self-service model.

- **Commerce services**
  DXP offers commerce modules to develop transaction capabilities. The commerce module provides features such as order / inventory management, product information management (PIM), cross-sell / upsell, promotion, and catalog management.

- **Security services**
  Include authentication, authorization, and single sign-on (SSO) services.

- **DevOps**
  To achieve operational efficiency, various DevOps initiatives, such as agile delivery, iterative testing, and continuous integration (CI) should be adopted.

- **Infrastructure services**
  DXP can be deployed on-premise or on cloud. Other infrastructure services include monitoring, clustering, and high availability services.
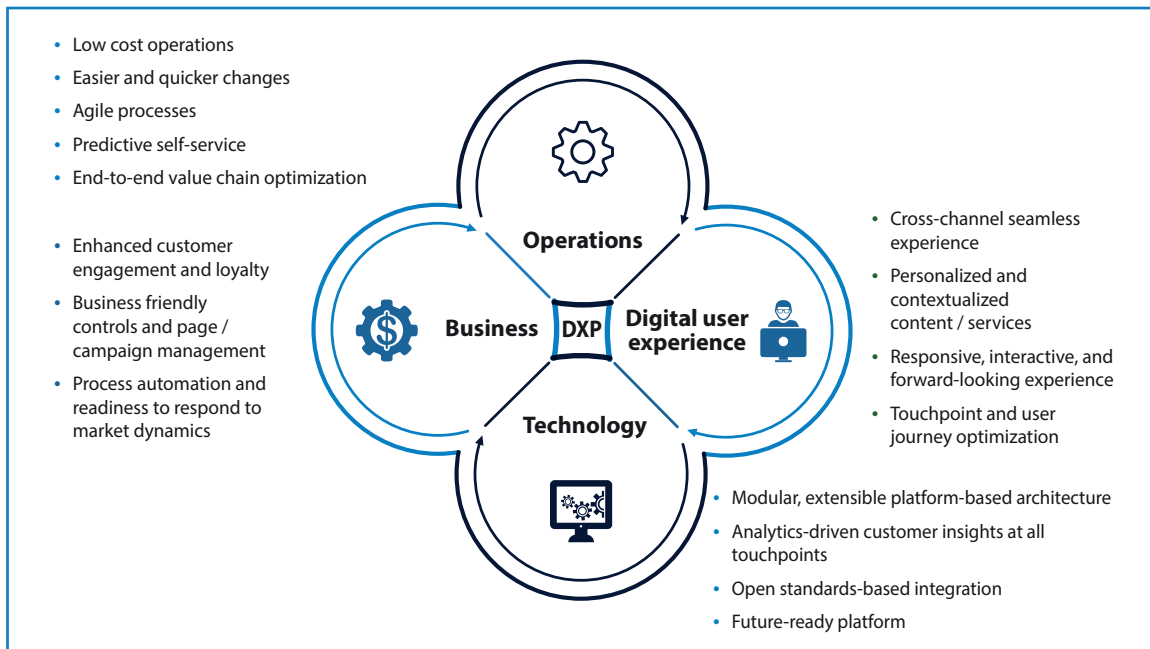
Traditional digital technologies vs. DXP

To understand the value differentiation of the DXP, let us look at the key differences between traditional digital technologies, such as horizontal portals, CMS, enterprise search, analytics and the DXP.

Category	Traditional digital technologies	DXP	Comments
Technology ecosystem	Multiple products such as enterprise portals (for presentation and integration), CMS (for content management), enterprise search (for information discovery). Additionally, includes various products, such as web analytics, campaign management system, DAM, and e-commerce on need basis.	A single pre-integrated platform, which offers all the capabilities out of the box.	DXP simplifies the architecture. It offers easy extensions to the platform. Some flavors of DXP also offer readily available vertical solutions such as finance, employee, and more as part of the platform stack
User experience	• Mainly portlets- and widgets-based architecture • Personalization is mainly static through rules configuration • Customization needed for touchpoint optimization • Often results in a siloed experience	• Designed with rich, responsive, and forward-looking user interface (UI) technologies • Lean platform approach with Web-oriented architecture (WOA) • Dynamic context-based personalization based on runtime user behavior patterns, navigation patterns, and purchase behavior • User touchpoint optimization throughout the user journey using responsive, interactive, and lightweight components • Unified experience due to information and data consolidation	DXPs offer engaging, compelling, and personalized experience to improve customer relationship
Key architecture themes	• Layered architecture • Service-oriented design	• Lean architecture • Modular services • Information consolidation	
Enterprise integration	Mainly uses services / application program interface (APIs) along with an enterprise bus service (ESB) middleware for enterprise integration	• Provides readymade integration with presentation, and content and commerce systems • Offers flexible and modular integration options • Lean integration model involving micro services and REST / JSON-based services	DXP provides in-built lightweight services for various modules
Digital transformation	• Normally involves content and data migration • Most legacy modernization involves custom migration effort	• Most DXPs offer open standards-based components, which ease the digital transformation effort • A platform-based approach offers flexible and extensible digital experiences • Enables reusability through extensions and plug-ins	DXP eases the digital transformation effort
Testing	Generally needs custom test cases development	Few DXP platforms offer in-built testing capabilities such as A/B testing for optimizing experience	

The DXP experience for various stakeholders

Let us look at the optimizations done by DXP across the value chain for various stakeholders.

- Low cost operations
- Easier and quicker changes
- Agile processes
- Predictive self-service
- End-to-end value chain optimization

- Enhanced customer engagement and loyalty
- Business friendly controls and page / campaign management
- Process automation and readiness to respond to market dynamics

Operations

Business DXP **Digital user experience**

Technology

- Cross-channel seamless experience
- Personalized and contextualized content / services
- Responsive, interactive, and forward-looking experience
- Touchpoint and user journey optimization

- Modular, extensible platform-based architecture
- Analytics-driven customer insights at all touchpoints
- Open standards-based integration
- Future-ready platform

DXP for customers and end users

- Customers and end users experience seamless digital experiences in all their interactions
- Highly personalized experience based on the context (location, device, timing, etc.), preferences, interaction history, and other factors
- Customers rewarded with loyalty programs based on all their interactions and purchase patterns across all access points
- Enables enterprises to adopt a customer-centric approach
- Enhanced customer service through self-service and increased collaboration

DXP for business

- Ability to adopt newer business models using the latest technologies and modular components in DXP
- Enables self-service for business users. The platform components provide a higher degree of independence and greater control for managing online channels. With DXP, business users can easily configure pages, manage campaigns, and track metrics across all user touchpoints
- Provides a 360-degreee view of all customer activities and customer

data in a dashboard-like view. Customer interaction across various applications, devices, and social channels can be easily captured and aggregated. This helps in faster and effective decision-making. A unified view of the customer data can help predict future customer needs and provide effective recommendations
- Ability to enhance customer loyalty, helping reduce customer cost. Customer behavior data is collected throughout the customer journey and at all touchpoints. These insights are used to offer personalized content and services
- Ability to optimize employee productivity and task completion time through efficient self-service, decision tools, and relevant information discovery
- One of the key business scenarios where DXP is most useful is digital transformation. This makes it possible to efficiently automate business processes using self-service, collaboration, and user experience features
- Ability to develop a robust digital marketing platform for easy-to-use campaign management
- Helps align various business stakeholders, such as employees, partners, sales, dealers, resellers, and marketing teams with the enterprise vision. DXPs enable a unified view of the enterprise and customer data, and thus help to make

informed decisions
- A nimble DXP-based platform can quickly adapt to changing customer needs and observed trends. Such a platform would be able to respond quickly to changing market and business dynamics.
- End-to-end customer insights made possible through analytics, helping businesses further focus on the problem areas and increase conversions

DXP for technology

- Helps adopt a platform-based approach to build solutions. It enhances flexibility, reusability, and extensibility of the solution
- Offers analytics-driven personalization and recommendations

DXP for operations

- Offers easier technology consolidation and a smoother digital transformation journey
- Lower maintenance cost with a pre-integrated technology stack. The operating cost can also be reduced through self-service capabilities
- Easier and efficient integration with modular services, plug-and-play architecture, and extensible architecture
- Increased customer satisfaction due to enhanced experience

A case scenario

Let us look at a case scenario to understand the role played by DXP in user journey optimization. We have considered a wealth management scenario. Let us begin by tracing the customer journey.

The customer registers in an online wealth management system and searches for relevant products. We will trace the customer journey from the pre-registration stage to the subsequent visit stage. The customer analyzes various competitive products and collaborates with bankers to choose the most relevant product for purchase. In this case, we will consider that a banker collaborates with the customer, advising and helping them choose the most relevant product.

The figure below illustrates the various phases of the user journey and the optimizations that happen in each phase. It also mentions the DXP capabilities utilized for each optimization.

Phases in the user journey	Customer onboarding	Information discovery	Finance product evaluation	Product purchase	Customer support	Repeated visits
User journey optimizations	• Single step user registration • Targeted content • Flexible login options • Easy and consistent navigation • Anytime, anywhere access	• Personalized dashboard for the customer and banker • Social content • Contextual product search • Personalized offers	• Decision-making tools • Virtual collaboration with banker • Automatic recommendation based on the risk score analysis • Social collaboration	• Single step user registration • Targeted content • Flexible login options • Easy and consistent navigation • Anytime, anywhere access	• Collaboration-based support • Knowledge base • Self-service tools • Frequently asked questions (FAQ) content	• Personalized recommendations • Metrics-based monitoring • Loyalty offers • Personalized campaigns • Reports • Social collaboration
DXP capabilities	• Process automation • Security services • Social marketing • Seamless omnichannel content • Responsive design • Customer-centric design • Campaign management	• Unified products data • Enterprise search • Analytics-driven personalization • Social integration • Web content management • Cross-channel personalized experience	• Collaboration • Optimized enterprise integrations • Seamless integration with social channels • Web content management • Asset management	• Process optimization • Campaign management • Social marketing • Seamless omnichannel content • Responsive design • Commerce services	• Collaboration • Trend analysis • Reporting • Voice of customer	• Continuous analytics monitoring • Predictive recommendations • Campaign management • Metrics-based monitoring and fine-tuning of recommendations

End-to-end journey optimization

Let us look at various optimizations enabled by DXP in the user journey.

Customer onboarding phase

The business has to create awareness about its financial product offerings and the digital channels. To achieve this, it could leverage social marketing and campaign management features of DXP. The platform would offer seamless cross-channel user experience during the registration process. The user would be able to register with a single step and the process would be flexible, allowing the user to make use of various login options such as for Facebook, Google, LinkedIn, and logins of a few other social media websites.

Information discovery phase

Post registration, the customer would visit the personalized dashboard. Based on the user role, various dashboard features will be personalized. The customer dashboard consists of portfolio details, finance transaction details, allocation graphs, and product views. Based on the previous customer interactions, the platform could recommend personalized offers to the customer. The banker can also target specific campaign content based on customer interests and transaction history. A banker dashboard consists of customer groups, pipeline reports, product-wise contract, and more. The dashboard is an effective way of presenting information aggregated from multiple applications and interactions. It would help the customer and the banker gain a holistic and the big picture view. Search plays a vital role in information discovery.

Finance product evaluation

The next logical step in the journey is product evaluation. The customer would look at all available products and recommendations and starts evaluating the most appropriate product. The system would use the analytics information and risk profile to create a recommendation. To aid decision making, the platform would provide many decision-making tools such as retirement calculator, risk profiling, need analysis, family budget planning, education calculator, and advisory tools to analyze the fitment of various products for a given budget. The customer can also avail the services of a banker through the digital office platform, which offers a highly sophisticated collaboration platform. The banker can use simulation tools (such as scenarios analysis tools and performance comparison tools), share documents, and co-browse along with the customer to help him / her decide the most appropriate product.

Product purchase

Once the customer finalizes the product, he / she can purchase the product using an optimized purchase flow. DXP would enable modular integrations with back-end systems such as the product catalog system, commerce engine, marketing system, order management system, and other databases needed.
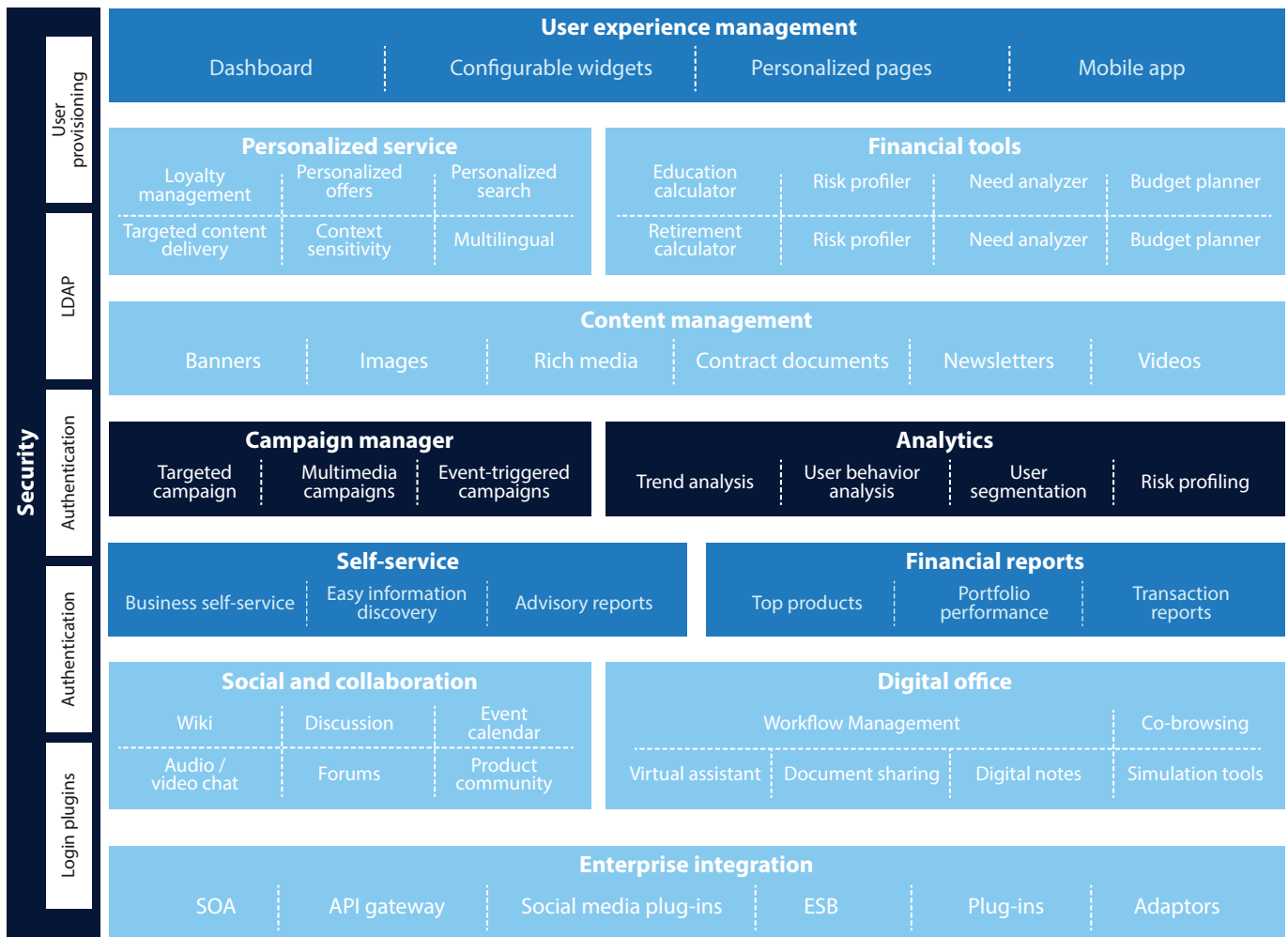
Customer support

The customer could use the existing collaboration platform and knowledge base to discover more about other offerings and products. The social and collaboration platform usually consists of event notification, calendar, audio / video chat, forums, and discussions related to various products. This encourages the harnessing of collective intelligence of the community and enhances productivity.

Repeated visits

During subsequent visits, the DXP platform would use analytics software to track and monitor various metrics. The key metrics include customer lifetime value, top search keywords, site traffic, most downloaded documents, most popular campaigns, most viewed topic, most active forum, etc. The insights gathered from these metrics would be further used for hyper-personalized product recommendations, fine-tuning campaign strategy, reports, user segmentation, cross-selling, upselling, and more. The customer would also be rewarded through loyalty points and offers using these insights which further strengthen the relationship between the business and the customer, thereby increasing the customer lifetime value.

Web content such as newsletters, documents, images, and rich media are managed in a content management system. The logical architecture of the wealth management DXP is shown below.

Security		User experience management			
	User provisioning	Dashboard	Configurable widgets	Personalized pages	Mobile app

Personalized service

Loyalty management	Personalized offers	Personalized search
Targeted content delivery	Context sensitivity	Multilingual

Financial tools

Education calculator	Risk profiler	Need analyzer	Budget planner
Retirement calculator	Risk profiler	Need analyzer	Budget planner

Content management

Banners	Images	Rich media	Contract documents	Newsletters	Videos

Campaign manager

Targeted campaign	Multimedia campaigns	Event-triggered campaigns

Analytics

Trend analysis	User behavior analysis	User segmentation	Risk profiling

Self-service

Business self-service	Easy information discovery	Advisory reports

Financial reports

Top products	Portfolio performance	Transaction reports

Social and collaboration

Wiki	Discussion	Event calendar
Audio / video chat	Forums	Product community

Digital office

Workflow Management			Co-browsing
Virtual assistant	Document sharing	Digital notes	Simulation tools

Enterprise integration

SOA	API gateway	Social media plug-ins	ESB	Plug-ins	Adaptors

Security side labels: User provisioning, LDAP, Authentication, Authentication, Login plugins

Key trends

DXP on cloud

Digital experience platform components along with the development ecosystem offered on cloud would drastically reduce IT maintenance cost and accelerate digital solution development.

Vertical solutions

Product vendors are offering enterprise-ready vertical solutions built on DXPs. Some of the offerings in this space include employee DXP, finance DXP, e-commerce DXP, and more.

About the Author

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Shailesh has 15 years of rich experience in enterprise Java technologies, portal technologies, web technologies, and performance engineering. He has published three technical books related to enterprise web architecture, enterprise portals, content management, and search. He has also filed four patent applications. He has published several papers and given talks at Institute of Electrical and Electronics Engineers (IEEE) conferences on web technologies and performance engineering. He has successfully led several large-scale enterprise engagements for Fortune 500 clients.

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