



Ensuring Quality in Web Applications

NIC Webinar- Knowledge Sharing among peers

PAN INDIA

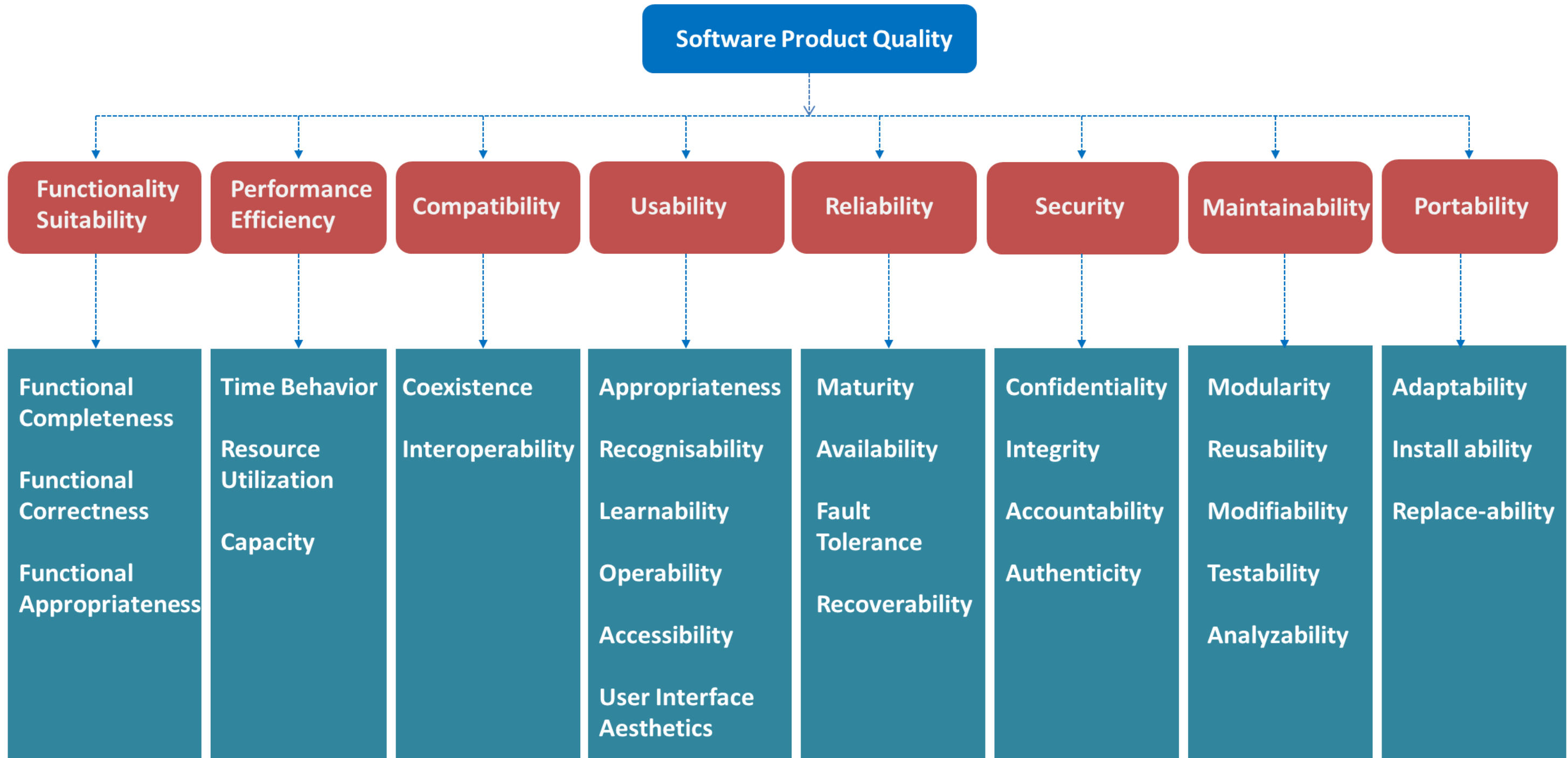
on

30th JAN 2019

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IEEE's definition of Software Quality

“A **planned and systematic** pattern of all actions necessary to provide adequate confidence that an **item or product conforms to established technical requirements** and a **set of activities** designed to evaluate the process by which the products are developed or manufactured.”



Web App Quality - *The Purpose*

- NIC is involved in design and development of large scale e-governance applications for various Ministries/Departments/State Governments.
- The quality of these applications in terms of **functionality, reliability, performance, supportability, modularity, security** etc. is of paramount importance and can have **impact on usability of these applications.**

Its not about ***blind automation*** of pushing more ***bad code*** through a shiny pipeline



Its about ***ensuring quality*** in every simple block we build...

Areas to ensure application *Quality*



User Interface (UI)/User Experience (UX)

Forms and Reports

Data Quality, Management and Security

Technology, Frameworks and Deployment Architecture

Log Management

User Interface (UI)/User Experience (UX)

The **purpose, scope** and **intended audience** of Application is clearly specified on the **landing Page** of the application.

Government of India, Ministry/Department and NIC **Logo(s)** are incorporated at appropriate place(s) at landing page. The header and footer of forms and reports also carry appropriate logos.

The Users are able to clearly identify on the introductory/landing Page where to proceed for **Sign-Up/Sign In**. The **prerequisites** and **procedure** for **sign-up** has been clearly specified.

For Employee Centric and Ministry/Department Centric Application(s), **LDAP**(Lightweight Directory Access Protocol) **Authentication** is implemented. For LDAP Authentication, the complete email address like(abc.xyz@nic.in, abc.xyz@gov.in) is used as Login ID.

User Interface (UI)/User Experience (UX)

‘Forgot Password’ and ‘Change Password’ processes are implemented. The *Password quality* is implemented as per NIC Password Policy. (Refer <http://security.nic.in> for NIC Password Policy)

Proper Authentication mechanism(single factor authentication, two-factor authentication or multi-factor authentication) has been implemented as per sensitivity of the application.

The **Sensitive Personal Data or Information** (SPDI) like Passwords, Adhaar No., Driving Licence No, Financial Information(e.g. bank account, credit card details etc.),Biometric Information is **not displayed/published** publically. If required, it is **masked** on display.

User Interface (UI)/User Experience (UX)

The application is well **responsive to any device**(desktop, laptop, tablet, mobile) i.e. the application user interface flawlessly align depending on the resolution and dimensions of the device. (Responsive Design Mode feature available in Mozilla Firefox/ Google Chrome can be used to validate if the Application is responsive to any device.)

Enter a valid email ID

muthu.com

No feature of the application is **Browser dependent**. It functions properly across latest versions of the popular browsers(Internet Explorer, Mozilla Firefox, Chrome, Safari, Edge).

All **exceptions/errors** are displayed as **user interpretable** (User Friendly messages) and not as system default errors. The application implements required validations to **protect users against making mistakes**.

User Interface (UI)/User Experience (UX)

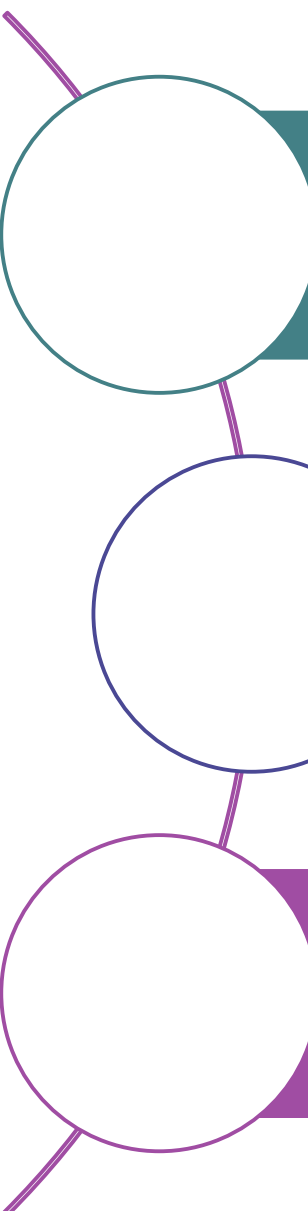


The application provides necessary tools like User manual, Help, FAQs, Contact Us etc. to enable the **user to learn to use the product** with **effectiveness** and **efficiency**.

The labels, menu options, drop down lists, radio buttons, Inline Text, directories etc. and other related **content** in the application has been checked for any **spelling / grammatical errors**.

The **drop down lists** containing more entries is **provisioned with option to type and search** for the required input.

Forms and Reports

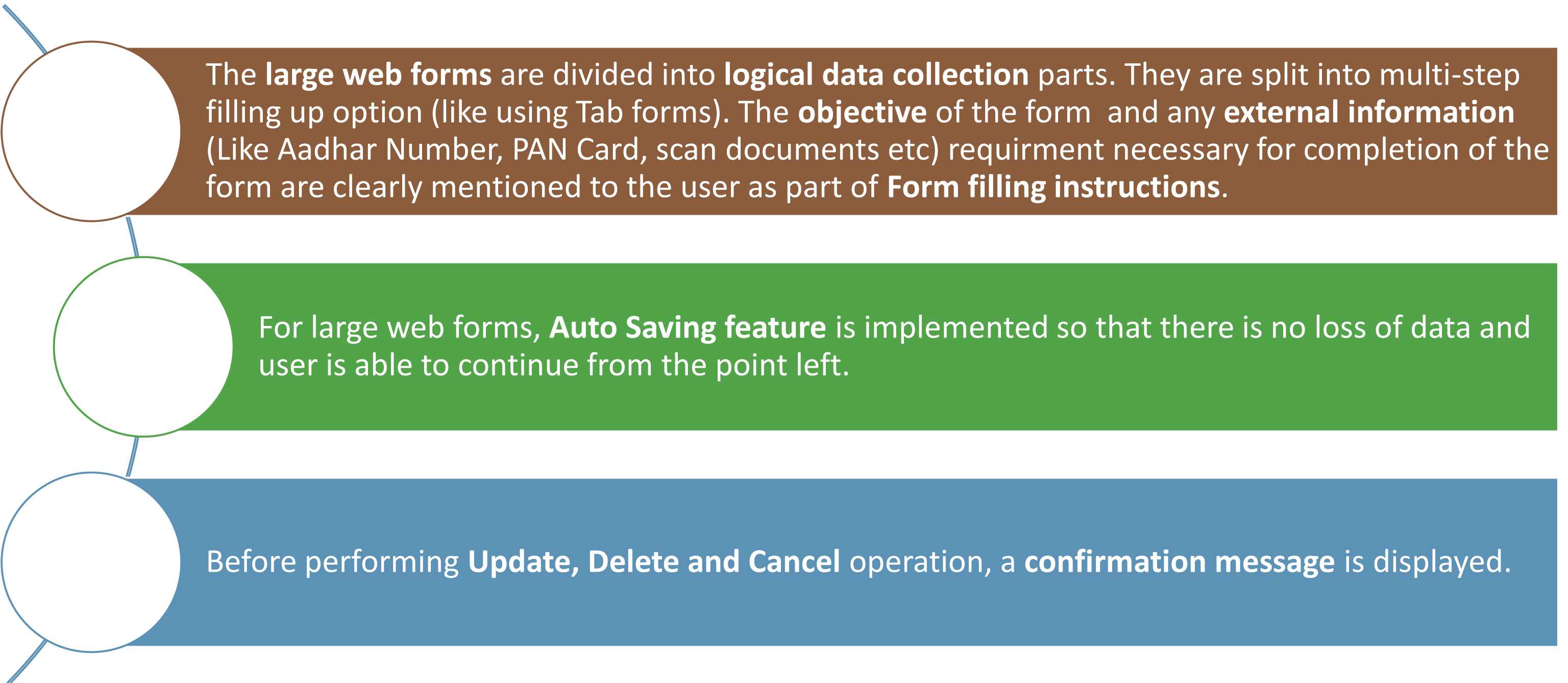


Required(Mandatory) and **optional** fields are clearly marked. **Required fields** are indicated by an asterisk (*).

Primary Action Buttons (Save, Submit or Continue) are kept **prominent** in form. If **Secondary Action Buttons** (Cancel, Reset or Back) are incorporated **less visual weight** is given to them.

Field level validations and **Form level validations** are carried out at appropriate events. Appropriate messages are displayed for validation and exceptions handling. **The client side** and **server side** validations are incorporated in the application.

Forms and Reports



The **large web forms** are divided into **logical data collection** parts. They are split into multi-step filling up option (like using Tab forms). The **objective** of the form and any **external information** (Like Aadhar Number, PAN Card, scan documents etc) requirement necessary for completion of the form are clearly mentioned to the user as part of **Form filling instructions**.

For large web forms, **Auto Saving feature** is implemented so that there is no loss of data and user is able to continue from the point left.

Before performing **Update, Delete and Cancel** operation, a **confirmation message** is displayed.

Forms and Reports

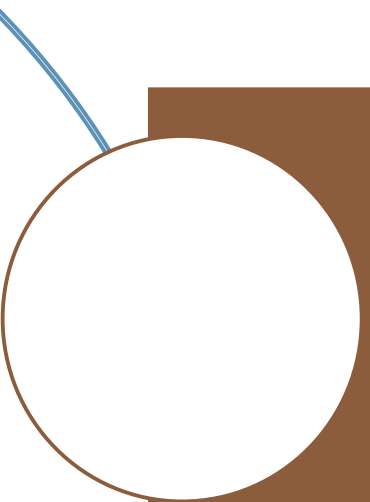


The **restrictions**(File Type, size etc.) related to **document/image upload** is clearly indicated and incorporated.

The application provides option to the user to **export report** output to **PDF/Excel or any other format** as per requirement.

The application implements **proper secure permissions** such that access to report data is Role Based and provide option to the Admins for **permission management**.

Data Quality, Management and Security



Domain specific **Master code directories** are identified and codified. The **location directory** (State, District, Village, Panchayat, etc. are adopted from LG Directory(<http://lgdirectory.gov.in>) and Controlled Vocabulary Services (<http://vocab.nic.in>)). Proper mechanism is incorporated to ensure that **master code directories** are in **sync** with the **source** (using Web Service or maintaining a local copy)



Database schema is designed with **domain specific attributes** and **normalized** to a required level. All **key attributes** and **constraints** are defined.

Data Quality, Management and Security



The application has built-in mechanisms and **tools** to reduce or eliminate the need for **direct access/updation at Database level**.

Role based access control (RBAC) functionality enables application administrators to limit and **control the permissions** of users. At the most basic level, the roles : Super Admins, Admins, Users, Reporting Users and Read only users are considered for the application. The application implements the **principle of least privilege**.

Technology, Frameworks and Deployment Architecture



The application is built on **latest stable versions of technologies/frameworks**.

The **deployment architecture** is worked out by estimating critical parameters like number of hits, total number of users, concurrency, number of transactions, peak load, high availability requirements etc.. The Architecture is **horizontally scalable** and ensures that there is **no single point of failure** for critical applications. ***

The minimum **Response Time** for any page loading or action performed in the application is within 5sec, exceeding which, appropriate message is displayed.

*** (Refer "Building Scalable Web Applications" document at Digital NIC : Knowledge Café ->Software Quality Tab.)

Log Management



Audit logging feature is built to log relevant activity into a system that is **time synced** and **accessible to the application administrators** through UI.

All important events in application (like successful/failed login attempts) are recorded. When an **event is logged**, it should have details that provide enough information about the event to provide the necessary context of **who, what, when and where**. The critical fields like Username/User ID, IP Address of Terminal, Server time, object which is changed, Action which changed the object, Action Type (C R U D) and brief description of the Action are recorded.



Dashboard Individual

[Feedback/Suggestions](#)

- Profile
- Service Book
- My Entitlements
- Tour Report
- My Files

My Profile

- Payslip-PFMS
- Form 16
- Payment Details
- GPF | GPF Advance | GPF Withdrawal **NEW**
- Consolidate Pay Statement
- Tax Calculation with Saving **NEW**

My Payments

- Physical Assets
- GEM PO
- Issued Books
- Digital Assets
- e-Man **NEW**
- Website Quality Report for CMF Website(s)

My Assets

- Webinar
- Webinar participated:216 / 429
- VidyaKosh
- Training
- Software Quality
- Upload Software Quality Document
- Knowledge Management **NEW**

Knowledge Cafe

- NIC Logo
- APAR/ AWR
- eTour
- Administrative Modules **NEW**

Online Services

Employee	Division	Reporting Structure	
Shri G. Mayil Muthu Kumaran(3629) Scientist-F	Software Quality Group	Shri Pawan Kumar Joshi(1104) Scientist-G	Dr. Neeta Verma(176) Director General

Software Quality Documents

[Upload Software Quality Document](#)

Software Quality Documents

SI	Title	Description	Uploaded At	Action
1	Quality Assurance Checklist (e-Governance Applications)	The checklist lists out important basic quality attributes which needs to be incorporated in applications. These can be used as guiding principles while designing and development of e-Governance applications to meet basic quality requirements. This can also be used by project teams for self assessment of applications against these attributes.	28/12/2018 05:48:08	View
2	Software Productization – Self Assessment Checklist	This checklist has been developed with an objective to assist NIC Groups/Divisions to evaluate their product against listed Productization features. The checklist can also be used as a guide while designing and development of system to make it ready for Productization.	28/12/2018 05:43:36	View
3	SQL Query Optimization Guidelines (Draft)	This document is developed with an objective to assist NIC officials to improve the way in which queries are built and executed. It provides query optimization guidelines and best practices to validate the current querying practice and to improve the same for future endeavors.	30/11/2018 06:37:26	View
4	Guidelines on Building	The document will help e-Governance application architects in: Understanding the challenges of building web scale applications Apply	16/11/2018	View

Thank you !

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