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Design and Development of Reusable Common API for UDI, CDR and Digital Locker Integration Using Aadhaar

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Abstract: E-Governance helps us to share information and deliver services for the benefit of both government and the citizens. Good governance helps us to reduce the duplication of document, cost, fast service delivery and documents can be reused by increasing interoperability across departments, reusability and provides efficient service delivery to citizen. The main objective of this paper is to provide Unique Document Identifier for each document so that the document can be verified by respective department that improves the verification process to track the status, Aadhaar enabled access and the genuineness of the document. In addition, Key content area of the documents also used for online and offline verification. Encrypted 2-Dimensional Barcode is responsible to produce the genuine use of data and very economical, In additionfor security Aadhaar card authentication and water marking can be used.

Key words: Interoperability · Reusability · Verification · e-SDP platform · QR code · Optimization

INTRODUCTION

Storing and sharing of physical documents like Ration card, PAN card, Aadhaar card, Birth certificate, Death certificate, Land Records, etc. and keeping records of all documents is not safe [1]. Document verification services are done by the respective document issued by particular department and shared within other government departments for issuing new documents. Interoperability, Reusability between departments are enhanced by using the documents as a proof across the departments. It provides fastest verification mechanism by providing a Unique Document Identifier (UDI). Unique Document Identifier that helps us to identify the document with the sequence number, issuing department etc and can be verified by that particular department.

Unique Document Identifier (UDI): Documents uploaded in the database without any formatting leads to to fetch wrong document at the time of verification process and takes more time by increasing the verification service. UDI will be used as key identifier for each document and helps us to reduce the verification time [2]. The proposed UDI to the document eliminates the irrelevant document by its name eliminates the particular document in the database.

- UDI is identified across various states and domains in government.
- Unique Document Identifier improves the verification service,
- Provides the status of the service.
- Reduces the time of service delivery life cycle.

Benefits:

- The time taken for Document life cycle is reduced
- Scalability and reusability of the document is improved
- Interoperability between multiple domains is achieved
- Each and every document is verified.
- Each document is secured and well authenticated.
- Cost, time and Resources are reduced

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- Saves paper and eco-friendly.
- The status can be tracked of each document.

Document Life Cycle: Citizen centric services such as pan Card, Voter ID, driving License, birth Certificate, death Certificate, Community Certificate, income tax Certificate, patta/chitta Certificate, e-District Certificate, income Certificate, No Graduation Certificate, Nativity Certificate and Residence Certificate etc., citizens need to carry documents. Quick delivery of services through multiple modes are possible only if the documents that are necessary for making decisions are available immediately.

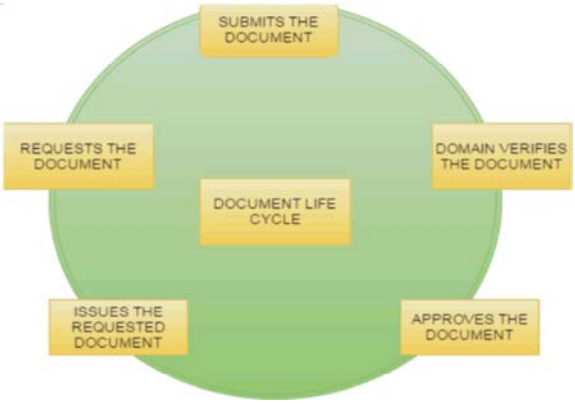

Fig. 1: Document Life Cycle Model

Requests the Document: At the time of a particular service citizen needs to fill application form and to submit the documents as proof of identity, date of birth or address as supporting documents.

Submits the Document: All these documents, once submitted by the applicant, can be used for future references.

Domain Verifies the Document: Once a document is digitized and stored in central repository, it can be made available anytime, anywhere to all key stake holders. So this results in faster delivery of services to citizens.

Approves the Document: After verification the authority approves the document and all the details are stored in central repository.

Issues the Requested Documents: After verification the authority issues the document to citizen.

e-SDP model architecture has the following core elements.

Present System: Present system of obtaining a document from the government requires an Identity proof, Address Proof, age proof, etc to be submitted along with the form in a particular format [3]. The document processing in present system includes submission of document, processing of document and verification of document. Manual system of the above process of each document is done manually by respective domain people. Then the document is submitted, processed and verified by the particular department is sealed as verified and approved and it is sent back to the requested domain inside the country [4]. This current system consumes lot of manual power, time and cost for processing the document and leads to long document life cycle and the document service is delayed to the citizen.

Problems in Present System:

- Status of the document cannot be obtained.
- Interoperability is not present.
- Every document is not secured.
- Every document is not genuine.
- Documents are not available anytime anywhere.
- Spends more cost, time and resource.

Proposed System: Proposed system uniquely identifies thedocument in the respective database using Unique Document Identifier (UDI).Reduces the document service life cycle and reduces the time, resource and cost by using the verification service in e-SDP to track the status, Aadhaar enabled access,validity and genuineness of the document.

Unique Document Identifier: A document issued by the government does not any standard format, so each document issued by the government has its own format also varies depending on the issuer [1]. This paper mainly deals with unique identification to the documents issued to the citizen. The unique document id can be used to identify the document issued by the government when the document is submitted as a proof of identity or address.

The key identifier of the document indicates the document is identified across the Ministry or State, department and the status of the document can be tracked.

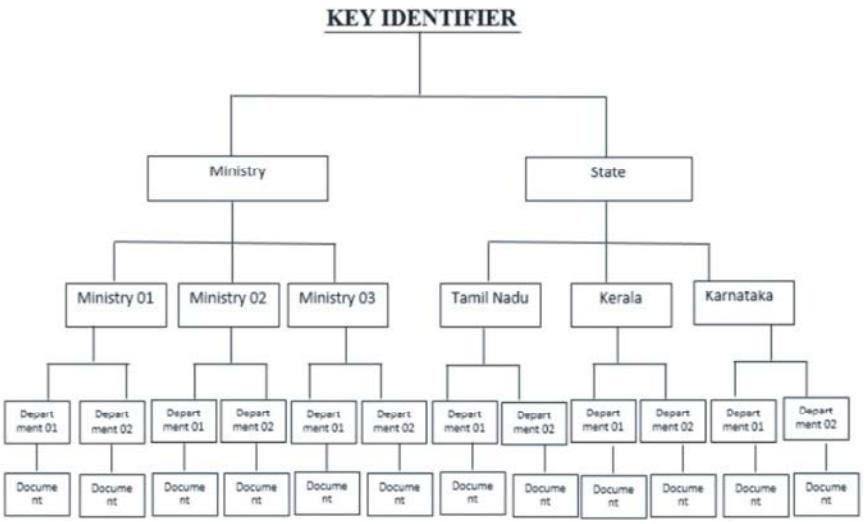

Fig. 2: Unique Document Identification (UDI) process

Table 1: Functions Of Unique Document Identifier (UDI)

Catergory	Sub-Catgory	Description
Authority	State/Central	Identifies the document whether it is issued by Central or State Government
	Ministry/State	Identifies the document wether the document belongs to ministry i central government or state government
	Department	Identifies the department wether the document is issued by state department or central department
	Issuing Office	Issuing office within the department
	Document Type	Document type within the department
Sequence Number	Year Of Issue	Year of issue of the document
	Serial Number	Sequence Number initiates year for the department

The government issued document used by the citizens can be uploaded in the central repository of the Digi Locker system for organize the document in single place by Government or by an individual. Birth certificate, SSLC/HSC, Community certificates, mark sheet certificates userscan save the documents in the DigiLocker. Unique Document Identifier (UDI) is used to identifies the document in the central repository and helps us to track the status, validity and the genuineness [5]. Helps us to improve verification process by using Unique Document Identifier (UDI) for identification.

UDI Document Creation:

- Register document classification [6] in e-SDP
- Integrate UDI generation API in the application
- Generate UDI encrypted 2Dbarcode for the registered document
- Register every document in CDR of e-SDP with verification URIs

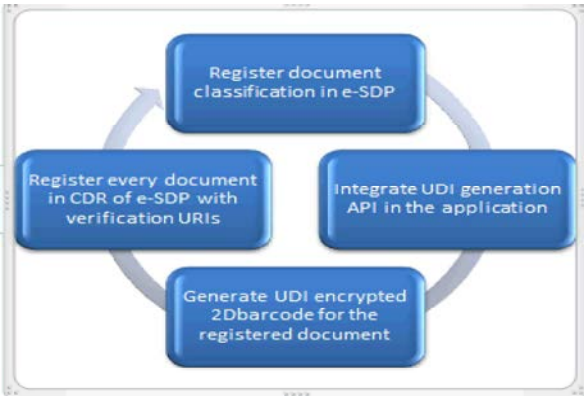

Fig. 3: UDI Document Creation and Verification

Steps Involed for Registering the Document:

- Register Every Document In Central Document Repository.
- Register the document classification.
- Integrate UDI Generation API.
- Generate UDI Encrypted 2D barcode for the registered document

2D Barcode: Two-dimensional (2D) barcodes provide a means of embedding Web addresses, text or other data in a camera-readable format. This enables users of modern mobile phones to scan [7] a 2D barcode with their form and be automatically directed to a Web page or other data contained within the code and information details in the barcode [2].

Proposed System Functionality: A set of proof are submitted for the verification when the document request is initiated. The submitted document proof belongs to different domain. So the citizen needs to register the details of the document [8]. The document name, name of the department, issuing authority and the validity of the document should be registered, the details are registered in the central repository and it generates a light weighted barcode [9]. This barcode has the details of statel/central, ministry/state, department and issuing office. The QR code also presents the feature of damage resistant [10] and has the property of restore the information and it is damaged by external factors, such as bad capture condition [11].

Unique document identifier can be accessed through mobile application of respective domain. Mobile Application is created and used to scan the barcode of the document and Aadhaar Authentication provision is provided. QR code [12] gives the status, validity, genuineness and DigiLocker [13] link by scanning the QR code. Each data is fetched from the respective database through web services.

Measure Of Proposed System: The measure of proposed system provides reusability of the documents and provides interoperability between different government

Document Id						
Authority					Sequence Number	
State/Central	Ministry/ state	Department	Issuing Office	Document Type	Year of issue	Serial number

Fig. 4: Unique Document Identifier (UDI)

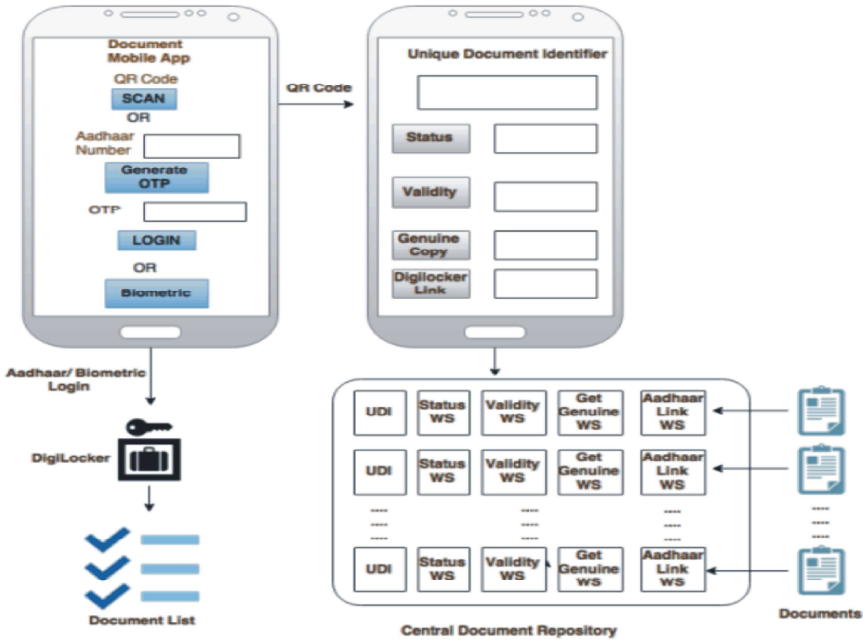

Fig. 5: Proposed System Functionality

domains [3]. The identification of each document is very easy and the verification service [14] also done fast. Citizen receives effective service delivery.

Unique Document Identifier of each government document that is issued to citizen involves verification to ensure that the citizen is eligible to obtain the requested

document [15]. Based on the data analysis the optimization is achieved by reduction in time, resource and the cost incurred to process the document from the submission of proof in manual and in digitalized manner to till the issuance of the requested document is done in secured way [1].

Optimization (Process ~Resource, Cost, Time) (2)

Optimization is obtained by considering the full manual verification process of the document
In Manual Verification System,

$$\text{PRESENTCOST} = \sum_{i=1}^{m} (R_i * C_S) + (R_i * C_P) + (R_i * C_V) \quad (3)$$

Where,
R -Resource
m - Number of Process
C_S - Submission cost
C_P - Processing cost
C_V - Verification cost

In Proposed Verification System,

$$\text{PROPOSEDCOST} = \sum_{i=1}^{n} (R_i * C_T) \quad (4)$$

Where,
R-Resource
n- Number of Process
C_T -Time (Submission cost (C_S) +
Processing cost (C_P) + Verification cost (C_V))
Where, $C_T < C_S, C_P, C_V$
$C_t < C_S + C_P + C_V$

CONCLUSION

This paper proposes the unique identification and verification of documents issued by the government to be secured and verified. Then gives the details about status of the document, Aadhaar enabled access and genuineness of the document. The verification process integrates the Unique Document ID (UDI) and helps us to track the Status, Validity and Genuineness of the document [16]. By using single verification process reusability process is attained. It helps us to reduce document service life cycle. Unique Document Identifier (UDI) and encrypted QR barcode for the UDI in verification system enables the way for fast and free verification. Reduction in cost, time and resource can be achieved [17]. The system identifies the document uniquely across the domains and the verification is processed through the central portal by attaining interoperability. In addition to the proposed method watermarking and Aadhaar authentication can be used to provide additional security to the documents when required by using e-Governance Service Delivery Platform (e-SDP).

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