

संकेत
CDAC



प्रगत संगणन विकास केंद्र
CENTRE FOR DEVELOPMENT OF ADVANCED COMPUTING

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1. Background & Summary

Government of India vide its Gazette Notification (REGD. NO. D. L.-33004/99 dated 28th January 2015) gave legal credence made way for a method that facilitates CA to offer eSign service to citizens who have Aadhaar ID. Objective of eSign service is to offer on-line service to citizens for instant signing of their documents securely and in a legally acceptable form.

Citizens with Aadhaar ID can use eSign service to get them digitally signed. User is provided with the digitally signed document and Digital Signature Certificate to be presented to relying party.

In the traditional Digital Signature system, an individual is responsible for applying for a Digital Signature Certificate to a CA for key pair generation and for safe custody of the keys. The Certifying Authorities issue Digital Signature Certificate (DSC) to individuals after verification of credentials. Such Digital Signature Certificates are valid for a fixed duration, normally two to three years.

With the objective of scaling digital signature to mass usage, an online system of Digital Signing has been adopted since 2015 as per the Gazette notification “Electronic Signature or Electronic Authentication Technique and Procedure Rules, 2015”. Known as eSign, the digital signing service leverages Electronic Know Your Customer (eKYC) service of Aadhaar using Online Authentication for establishing the identity of the signer. Public Key Infrastructure (PKI) provides the necessary trust in the system.

C-DAC offers its eSign service, named eHastakshar as an eSign Service Provider (ESP). Both One Time Password (OTP) and Biometric (Fingerprint) based eKYC authentication modes are supported by eHastakshar service. The service can be integrated with applications based on four level integration processes. Below diagram depicts the eSign overview.

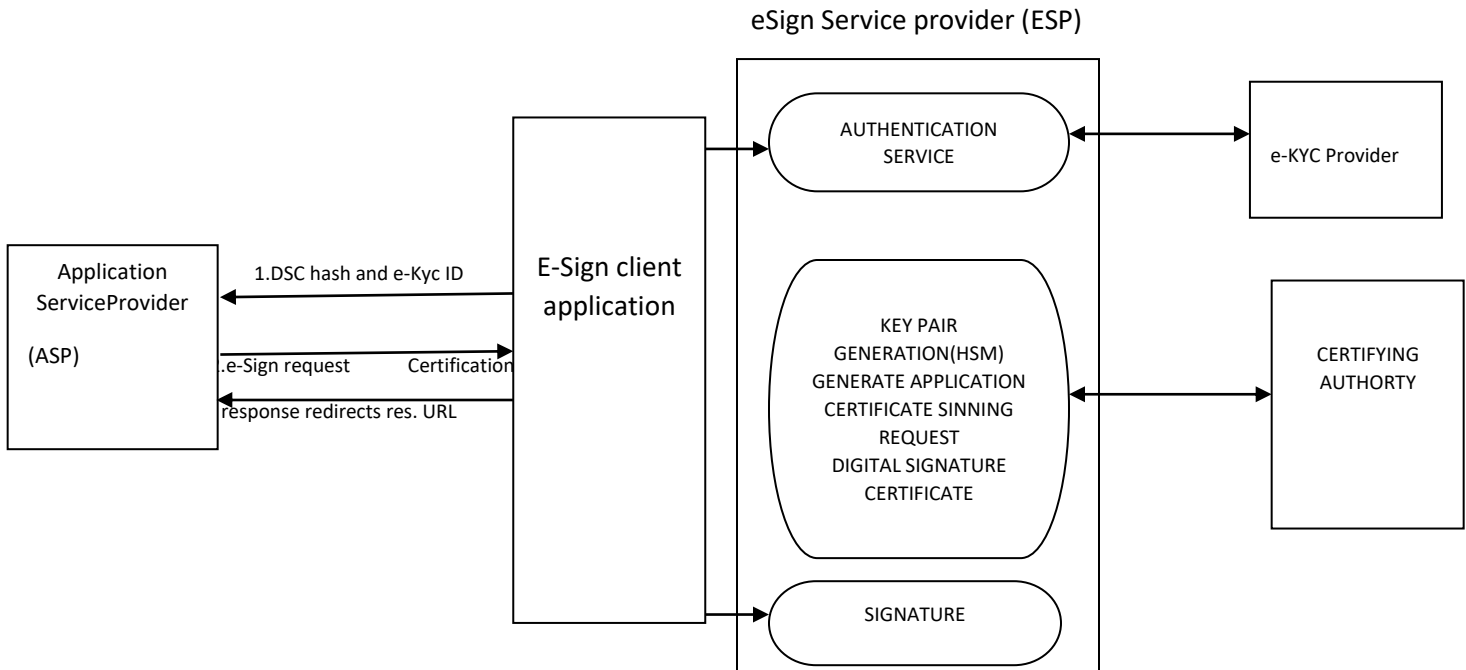


Fig-1: eSign overview

Recently, eSign framework has been extended to usage of Offline Authentication based on Aadhaar Offline eKYC XML. So, there are two methods of doing the eSign one using the online eKYC and other using the offline eKYC.

This requires a one-time registration of a signer with ESP for registering eKYC with the ESP. Once registered, the eKYC can be used for a period of two years. Each certificate issuance requires two factor authentications.

eSign framework is guided by Controller of Certifying Authority (CCA). Since the launch in 2015, versions of eSign APIs have evolved from version 1.0 to version 3.0 with intermediate versions as v1.6, v2.0 and v2.1. Version 1.0 of specifications facilitated single document signing using Online Aadhaar Authentication. Version 1.6 of specifications enabled multiple document signing in a single request and support of pre-verified KYC. Both version 1.0 and version 1.6 of eSignArchitecture required capturing of Authentication ID and Authentication Data at application (ASP) end.

Version 2.0 and Version 2.1 of specifications support re-direction-based architecture wherein the signer provides Authentication ID and/or Authentication Data on ESP side in place of ASP side. Usage of Virtual ID has also been supported since version 2.1 of software.

eSign services comes under purview of adhering to various Procedure, Processes and stringent Guidelines of IT ACT, AADHAAR and Controller of Certifying Authority (CCA) and also aligns with ISO27001 standard. It is mandatory to establish Datacenter and Disaster Recovery sites with multilayer physical and network security.

Overall eSign Services delivery is being carried out by members across various C-DAC Centers based on which the infrastructure could be setup and service was commissioned within 6 months' timeframe.

The team includes

- Design
- Development
- Customer Support
- Operations
- Compliance and Audit
- Marketing & Finance

C-DAC's eSign Services leverages on In-house developed eSign Software. C-DAC evolved the processes, procedures and various manuals to adhere to the guidelines to operate as "Certifying Authority". eHastakshar operations are covered under Internal and External Audits on a half-yearly and yearly basis.

As eSign services are tightly coupled with external agencies like Network providers for Internet lease lines (ISP) and Unique Identification Authority of India (UIDAI), C-DAC has taken appropriate measures to ensure high availability of various services and other components.

Major emphasis is on securing the operations without compromising on provision of services so as to offer ease of use to the end user.

Since 2015, C-DAC is offering eHastakshar Services through various "Application Service Providers (ASP's). These services are provisioned to cater to the needs of various domain areas and sectors like Finance, HR, e-Governance, Banks etc.

The eSign and CA information systems are essential to C-DAC ESP (eSign Service Provider) and CA operations; therefore, it is critical that services provided by C-DAC CA are able to operate effectively without excessive interruption. So, the C-DAC is offering eSign service from MS site and DR site. eSignInterface is component of C-DAC ESP and it is located at Main Site and DR site. Main site is designated as primary site for operations for digital signatures and issuance of DSC. DR site is designated as Disaster Recovery. Both MS and DR are in active-active mode.

HA architecture has been incorporated in eSign for OTP/auth/eKYC by leveraging both AUA/KUA sites at Delhi and Pune. An autonomous system has been deployed which carries out log analysis based on the AUA/KUA application specific error codes (not merely relies on server (HTTP) status for availability) and on this basis, decides to direct requests for OTP/auth/eKYC to either of the sites (primary or secondary). The system with auto failover capabilities, using aforementioned correlation has cut down eHastakshara service un-availability due to AUA/KUA, UIDAI related issues to a larger extent. Below is block representation of components, connectivity and their interactions for scheme briefed above.

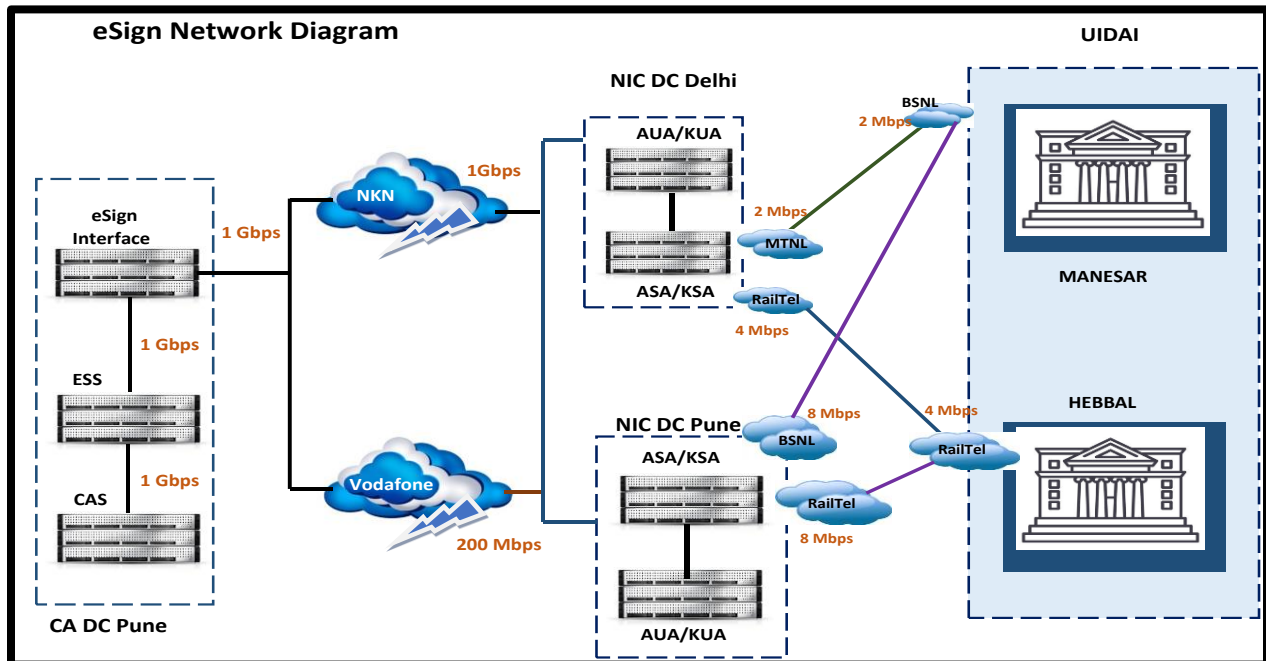


Fig-2: connectivity overview

To increasedaily signing capacity the new secure data centerhas proposed in eHastakshar project,infrastructure work has completed for the same in year-2021 at CIP, Pune. The data center is designed to cater the increasing eSign requirement. The new data center with have the new equipped hardware which will suffice the future requirement of eHastakshar service.

Error rates are reduced by implementing the Verhoeffalgorithm in software and optimizing the service. Live dashboard has been implemented to provide complete overview of the signature statics, error rate and overall system performance.

Implemented eHastakshar dashboard provides the overview of the current service performance.

Also,over the year, we have conducted the eSign awareness program with different organization to increase the digital signature usage.

2. Statistics

2.1 Monthly eSignature Count – For Year 2021

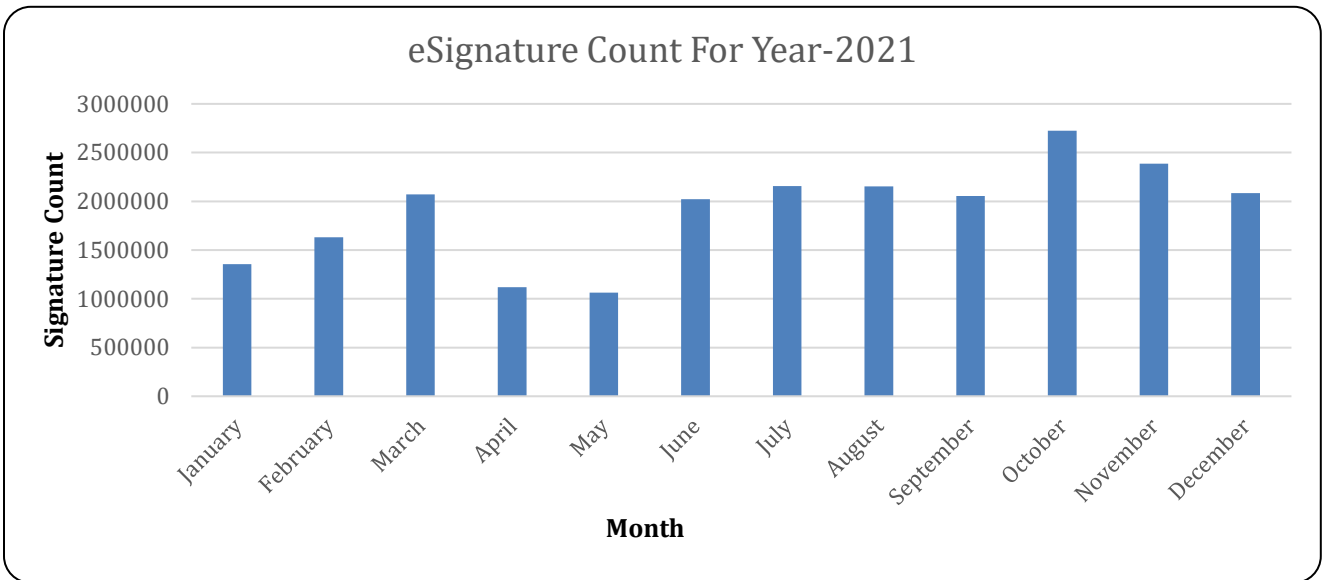


Fig-3: eSignature issued for 2021

Month	Count of eSignature Issues
January	13,54,387
February	16,31,947
March	20,70,576
April	11,17,716
May	10,63,621
June	20,22,950
July	21,55,184
August	21,52,749
September	20,56,414
October	27,25,927
November	23,85,818
December	20,84,676

Above graph depict the successful signature served on monthly basis, currently serving average 20 lakh signature per month.

2.2 Year wise eSignature Count

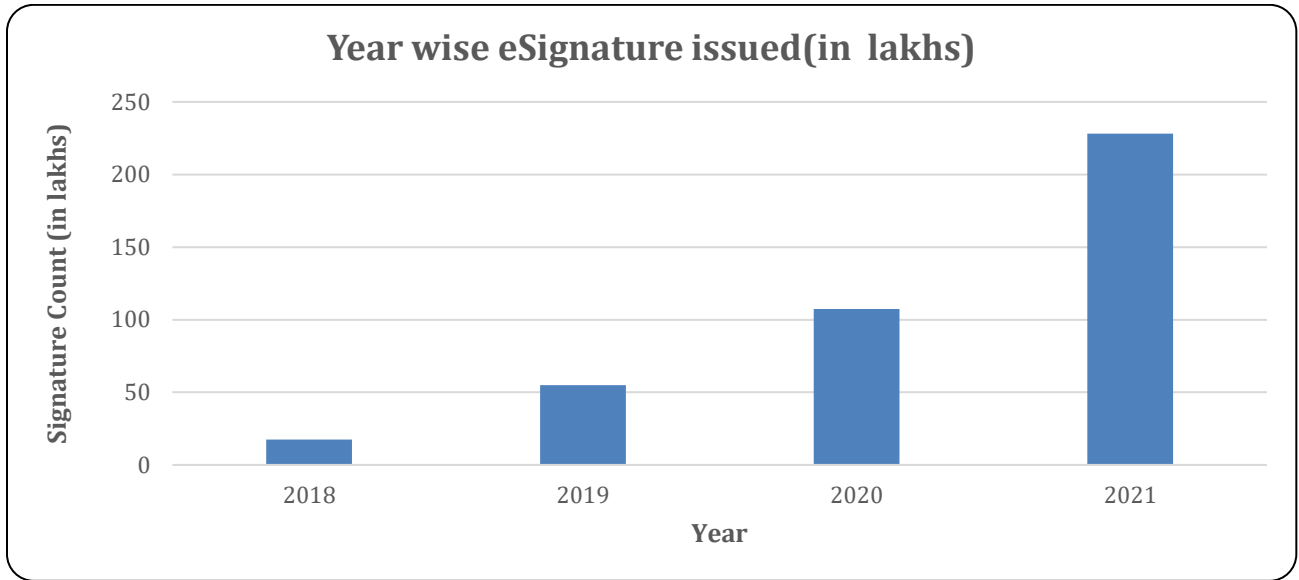


Fig-4: Year wise eSignature issued

Year	Count of eSignature Issues (in lakhs)
2015	0.05
2016	0.85
2017	23.36
2018	17.51
2019	54.95
2020	107.29
2021	228.21

eHastakshar service is growing around 100% year on year.

2.3 State wise eSignature issued



Fig-5: State wise eSignature issued (Year 2021)

States	eSignature count (in lakhs)	States	eSignature count (in lakhs)
Andaman Nicobar	0.03056	Lakshadweep	0.00345
Andhra Pradesh	10.01317	Madhya Pradesh	4.85032
Arunachal Pradesh	0.3451	Maharashtra	15.51218
Assam	1.07422	Manipur	0.16247
Bihar	4.39437	Meghalaya	0.16435
Chandigarh	0.64719	Mizoram	0.03219
Chhatisgarh	1.05879	Nagaland	0.06478
Dadra Nagar Haveli	0.07187	Odisha	2.3172
Daman Diu	0.03019	Puducherry	0.32479
Delhi	14.91064	Punjab	2.75625
Goa	0.58523	Rajasthan	4.1571
Gujarat	4.86293	Sikkim	0.05608
Haryana	4.5219	Tamil Nadu	31.42821
Himachal Pradesh	0.97822	Telangana	4.13212
Jammu Kashmir	4.12681	Tripura	0.3342
Jharkhand	2.03825	Uttar Pradesh	13.4348
Karnataka	77.16849	Uttarakhand	1.58569
Kerala	3.19739	West Bengal	5.19066

2.4 eHastakshar Statistics Dashboard



Fig-6: eHastakshar dashboard

eSign dashboard is one of the tools which used by the team to provide the overall view of the current service status, which help to identify the overall health of the system and performance. Dashboard provide the current and historical statistics.

2.5 Total ASP (Application Service Provider)

Since the launch of eSign service, various applications have been leveraging Online Digital Signing service for seamless delivery of their service. The usage has been adopted both in Government and Private sectors with applications in areas including eGovernance, Citizen centric services, financial forms, Legal documents. Total 141 agencies leveraging eSign 2.1 Production service.

3. ASP eSign Awareness Program

The eSign customer interface team conduct awareness program for different organization. The team has conducted total 12 awareness program for the year 2021. Following are the list of organization for which awareness program has conducted.

Sr.No.	Organization	Date
1.	Goa IT Department	06th Jan 2021
2.	Maharashtra Information Technology Corporation Limited (MahalIT) Department	14th April 2021
3.	Border Security Force and various Government Department	11th May 2021
4.	North East States Government Department	27th May 2021
5.	Chhattisgarh and Haryana State	10th June 2021
6.	Pondicherry and Government Department	08th July 2021
7.	Jharkhand and Government Department	20th July 2021
8.	Participated in Virtual C-DAC Tech Show 2021	28-29 July, 2021
9.	National Crime Records Bureau, New Delhi	30th July, 2021
10.	Central Government Department	11th November 2021
11.	Central Government Department	11th November 2021
12.	Central Government Department	15th November 2021

4. Future activities

- Setup IT infrastructure at CIP C-DAC, Pune and auditing the facility to offer eSignservice to client.
- Release of long-term validity API for e-Sign system.