

## emAS – eMudhra Authentication Solution

Create your own trusted enterprise network of users, devices, applications!

With malware, ransomware and other cyber threats constantly thrown at Enterprises, a holistic security platform is required to securely enable digital identity and transaction management. eMudhra's flagship product eMudhra Authentication Server has been empowering millions of users securely manage their online identity and authentication needs by offering a single holistic security perspective!

Trusted by several large Banks, emAS offers a host of strong authentication options that help Enterprises secure physical, mobile, logical access to applications.

**emAS addresses the need of the hour – mitigating risk for enterprise and it's end users while keeping it simple**

### Threats are multi-channel

With customers, employees, suppliers accessing applications across web, desktop, mobile and cloud; Enterprises have to constantly worry about newer threat dimensions. emAS's behavioral analytics module runs machine learning algorithms to detect anomalies and put in place risk mitigation measures.

### Cloud applications add a new dimension

With the explosion of cloud offerings and hosting providers and sensitive data on cloud, security officers have to constantly think about how to protect authentication on the cloud. emAS's plug and play architecture allows quick addition of newer platforms and factors of authentication.

### Ensure integrity and legal-non-repudiation using PKI

Plain username/passwords & OTPs are today most vulnerable for cyber attack. emAS offers the ability to attach users to a risk profile to allow creation of trusted networks using Public Key Infrastructure offering strongest form of protection to Enterprises and its customers.



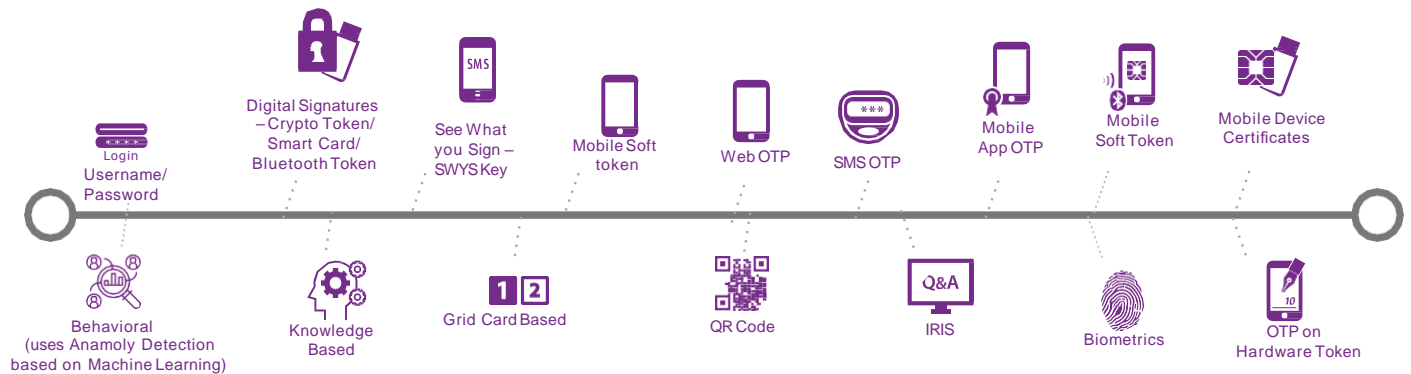
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products/identity-transaction  
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### Product Benefits

- o Cost effective deployment of strong authentication across Enterprise
- o emAS is running in over 40 banks globally and processes over 10 million authentications EVERY DAY
- o Mobility enabled for leveraging mobile authentication options
- o Acceptance of global CA certificates for Digital Signature Certificate & Public Key Infrastructure based authentication
- o Platform agnostic – deployed across Solaris/Windows Server/Red Hat Linux/ IBM AIX
- o Built for the future with FIDO Compliance measures

## Authentication Types:



emAS supports a wide array of authentication options which are configurable based on user groups and roles. emAS is built for scale and allows rapid multi-factor authentication deployment across the Enterprise and its customers resulting in enhanced security while reducing cost.

## emAS offers a holistic deployment of a trusted network for your Enterprise

### Single/Simple Platform

Instead of deploying multiple authentication systems, emAS comes with all features required to deploy strong authentication at an Enterprise level. This simplifies user and access management based on risk profiling.

### Ultra-fast processing of authentication requests

emAS processes millions of authentication requests within a timeframe of 6 milliseconds ensuring no delay for end users.

### Risk Mitigation through Analytics

Through proprietary Machine Learning algorithms, emAS powers the ability to run anomaly detection based on behavioral profiling,

### Multiple credentials under one single platform

A variety of strong authentication options allows users or administrators to ensure easy and seamless multifactor authentication based on risk profiling of users.

### Plug-n-Play

emAS is platform agnostic and can be deployed across a host of environments without complex integration or customization.

### Integrations with emCA

Certificate Lifecycle Management – emCA, CertificationManager product offers the deployment of trusted users, devices and things as part of a network which can be validated by emAS.

### Authentication backbone of emSigner

Secure digital transaction management – emSigner, the digital transaction management platform of eMudhra, authenticates end user digital signatures with emAS.

### Integrations with leading Banking Suites

emAS has out of the box integrations with Infosys Finacle, Oracle Flexcube, TCSBancs therefore making it easy for Core internet & mobile Banking applications to quickly rollout multifactor authentication for its customers.

# emCA – eMudhra Certifying Authority Suite

Issuing and managing digital signatures has never been easier!

As your Enterprise crosses the Digital chasm and adopts Cloud, Mobility, how do you ensure that your digital assets are protected and your customers data is protected. Adopt the power of eMudhra PKI suite of solutions that use digital certificates to create a secure digital identity and transaction management platform!

emCA powers eMudhra's Certifying Authority operations which issue over 12 million end user Certificates yearly (3x global volume of SSL's issued).

eMudhra's solutions are trusted by several large Banks, Government, Financial Institutions globally who use Digital Signatures to put advanced security for their physical, mobile, logical access to applications.

## emCA addresses the need of the hour – mitigating risk for enterprise and it's end users while keeping it simple

### Deploying PKI is Simple

With customers, employees, suppliers accessing applications across web, desktop, mobile and cloud; Enterprises have to constantly worry about newer threat dimensions. emCA allows for a quick deployment of both On-Premise and Managed PKI to ensure your threats are mitigated.

### Bring all your signing and encryption needs under one roof

Flexibility of PKI allows for both signing and encryption of data in a media-neutral manner to ensure non-tampering and confidentiality. Complexity is managed by design while ensuring ease of use for end users.

### Username/Passwords are inadequate

Ensure integrity and legal-non-repudiation using PKI – The basis of legal non-repudiation for online transactions is dependent on integrity, confidentiality and traceability of transactions to a strong identity. The architecture of PKI ensures the above thereby providing legal validity and non-repudiation to onlinetransactions.



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<http://www.emudhra.com/products/pki/emca.html>

### Product Benefits

- On premise / Cloud Deployment as Managed PKI
- Cost effective deployment
- Comprehensive Certificate Lifecycle Management
- Elliptic Key Cryptography Support
- Mobility enabled for leveraging mobile certificate options
- Platform agnostic – deployed across Solaris/Window server/Red Hat Enterprise/Linux/AI
- API's for easy provisioning of Certificates

## Key Features

- Highly Scalable
- Provides keys and certificates for software such as browsers, and Web servers, for tokens, devices, things etc
- Support for Key Archiving and Recovery
- Certificates generated by emCA comply with global
- Digital Signature Certificate Standards - X.509 v3 standards
- Integrating with Leading HSM manufacturers – Thales/Safenet
- M out of N access control mechanism
- Digital signature based authentication for Login Authentication
- OCSF/CRL Module
- Timestamping Module
- RA/CA Module

Whether your Enterprise is deploying a new Certifying Authority or migrating from an existing solution, emCA can seamlessly handle your Certifying Authority operations with a host of features that will help you scale your trusted network as it grows.

## emAS offers a holistic deployment of a trusted PKI network for your Enterprise

**Plug-n-Play** - Quick deployment of both On-Premise / Managed PKI.

**Multiple credentials under one single platform** – A variety of strong authentication options allows users or administrators to ensure easy and seamless multifactor authentication based on risk profiling of users.

**IoT Ready** - emCA is capable of issuing device certificates and supports relevant protocols.

**Simplified RA Module** - Simplified and intuitive RA dashboard where you can finish any activity in 3 simple steps.

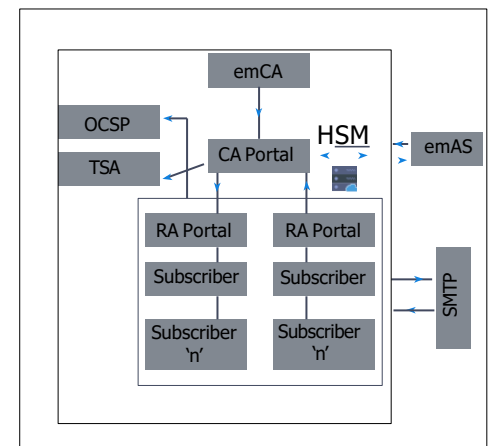
**Integrations with emAS** – Strong Authentication Platform – emAS, eMudhra Authentication Server can be integrated with emCA to ensure validation of digitally signed documents in accordance with key policies.

## emCA powers Identity Management Needs for Secure Digital Transformation

**Device Certificates for even more security** – Deploy device certificates on mobile devices for authentication of devices and signing of data for communication in a network and ensure no intrusion takes place.

**Certificate deployment on embedded devices** – eMudhra's R&D efforts have resulted in the ability to issue/manage digital signature certificates to embedded devices ("Things") and ensure your IoT network is safe and secure.

Legal Non-Repudiation is driven by need for government licensed/accredited CA's - emCA powers eMudhra's service which helps people digitally sign documents on the fly using their National ID.



# emSafe – Secure Communication Engine

Encrypt and Decrypt all the sensitive information and documents using Hybrid Cryptography.

As the world is progressing towards Digitization, securing data is imperative for organizations to protect sensitive and classified information. With breaches of all types on the rise and penalizing regulations becoming a global standard, strong encryption is a key factor in ensuring that your organization is well positioned to cater to a landscape, that is subject to constant evolution.

emSafe is a solution developed to address this risk that is very real in today's world. Whether it's server to server communication or person to person communication, emSafe can be deployed on premise to protect sensitive data within the organization.

## emSafe – Encryption/Decryption

emSafe ensures confidentiality of data by encryption and decryption of files or data. The solution uses key stored in the USB crypto token/HSM to ensure the end-to-end data security by encrypting and decrypting of data.

emSafe is a highly scalable application which can be hosted across bank data centers.

## Symmetric Encryption

In Symmetric encryption a single key shall be used to encrypt as well as to decrypt a message. Encryption algorithms such as Data Encryption Standard (DES), 3DES and AES 256 shall be used for encryption.

## Asymmetric Encryption

emSafe uses **Asymmetric keys based encryption/decryption** where in a key can be used to encrypt as well as to decrypt a message.

In Asymmetric Encryption Technique a message that is encrypted with a Private key can only be decrypted with a corresponding Public key. Similarly, a message that is encrypted with a Public key can only be decrypted with the corresponding Private key.

## Hybrid Encryption

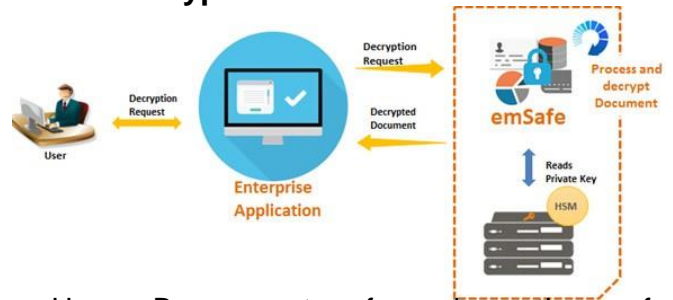
emSafe is also capable of Hybrid Key Encryption whereby both, Symmetric & Asymmetric keys are used for higher security in encryption. The Asymmetric key encrypts the Symmetric key, which then, encrypts the actual data. This approach helps the customer leverage the processing efficiency of Symmetric Encryption with the higher security offered by Asymmetric cryptography.

## Storage Encryption



- User A request for encrypting of data/documents, and selects the User B Public key for encrypting document using emSafe application.
- emSafe application on the other hand employs Public key to encrypt data using secured Algorithms.
- Encrypted documents will be secured and cannot be decrypted using any other key other than User B's Private key.

## Decryption



- User B requests for decryption of documents, which is encrypted by User A using User B's Public key.
- emSafe application reads the Private key from the HSM and performs the decryption of the document.
- Decrypted documents will now be accessible to user B to view.

## emSafe Node to Node Encryption

Node to Node encryption follows the complete encryption of the document from originator node to receiver node without any threat of man in the middle attack. Complete encryption process shall work in the same order using Public key for encryption and Private Key for decryption of the data.

Public Key algorithm	RSA
Symmetric Key algorithm	AES
RSA Public Key Technology	RSA Encryption Standard (1024, 2048 bit)  PKCS#12 Portable format for a user's private keys

## emSigner – Enterprise Paperless Office Solution

Why print, sign, scan paper when you can digitally sign?

Get the easiest, fastest and most secure way to get documents signed anywhere anytime! eMudhra, a market leader in digital identity and transaction management solutions introduces emSigner.com, a secure automated signing and workflow solution which can be accessed from anywhere at anytime.

It allows you to define predefined workflows and have all parties digitally sign without pen and paper using legally valid electronic signatures. This reduces the hassle of managing physical paper and its associated costs and time. emSigner.com is secure, fast and reduces costs up to 80%!

emSigner.com allows easy configuration of workflows for Human Resource, Finance, Legal and allows quick creation of complex workflows across Banking, Insurance, Telecom, Healthcare, Education, Government, Legal, Real Estate and Corporates in general.

emSigner paperless office solution is a strong workflow solution which is capable of transforming your internal workflows to significantly reduce turn around times, improve productivity, increase accountability, and reduce direct and indirect costs. It is a proven solution which has proven valuable in adding to overall productivity in SME's, enterprises, and governments.

Unlike most conventional workflow systems which are digital and not paperless, emSigner eliminates the need to print, sign, scan, and upload back into the system. This essentially eliminates unwanted gaps and also bridges any geographic gap for multinational enterprises. No matter how big or small your company may be, emSigner is the new way to run your workflow systems and enhance productivity in your company.



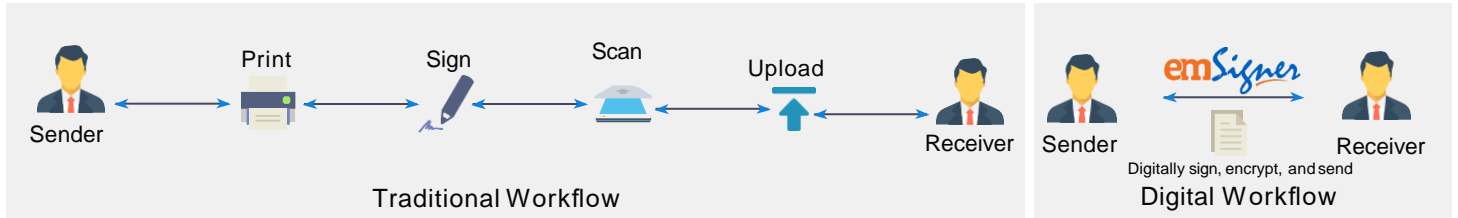
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<http://www.emudhra.com/products/paperless-office/emsigner.html>

### Product Benefits

- On premise / Cloud Deployment
- Save Huge Costs
- Ensure straightthrough processing
- Improve customer experience
- Comprehensive Paperless Office Workflow Management
- Verticalized for Human Resources, Finance, Legal etc
- Legally valid Digital Signatures and electronic signature

## Conventional Workflow Systems VS emSigner Workflow



### emSigner is operable in 3 business models based on customer requirements

- **On Cloud** – emSigner is offered on cloud on a subscription model for SME's and enterprises inclusive of workflow management tools as an end-to-end paperless DMS solution.
- **API Integration** – SME's and enterprises can plug-in to the emSigner signature utility via API's to complement existing workflow systems and make them paperless.
- **Bespoke Implementation** – For very customized implementations which require on premise hosting and complex workflow management, our specialists also offer bespoke services.

### Key Features

#### WORKFLOW

- Any levels of hierarchy
- Document status dashboard
- Template self-creation tool
- Alerts & reminders
- Admin & user-only access
- Document audit trail
- Time Stamping
- Add attachments, notes to flow
- Share out-of-domain

#### SIGNATURE

- Supports PKI & e-Signature
- Multi-party signing
- Online & Offline signing
- Mobile friendly platform
- Customizable signature design
- External parties can sign documents using your system
- On-screen or signature pad based e-signatures
- Legally valid signatures in GCC

#### OTHER FEATURES

- Encrypt and store documents locally
- Uses PKI to maintain data and user identity, authenticity & reliability
- Encrypted document storage & retrieval
- Access to all major public clouds
- eMail + mobile authentication



## emStream – Voice of Customer Analytics

emStream is a social listening and response tool, that has inbuilt advanced sentiment detection capabilities. As a result, no longer do you have to be content with a statement being positive or negative. You can now automatically identify what attribute of your product is being talked about the most and automatically assign sentiment to it, even in complex sentences that may talk about more than one attribute. To top it off, emStream Analytics also accepts your internal data (say customer emails or survey results) and can combine this analysis with data you have collected from millions of social feeds. After all, there is absolutely no reason why data collected from internal and external channels should be kept in separate silos!

## Real Time Voice of Customer Analytics Using Semantics from Internal & Social Data

### Customer Intelligence

emStream powers the ability for brands to combine structured data about customers (ex: loyalty, life time value etc) with sentiments from emails & map this with the customers sentiments & social profiles on digital channels thereby creating a 360 degree view of the customer.

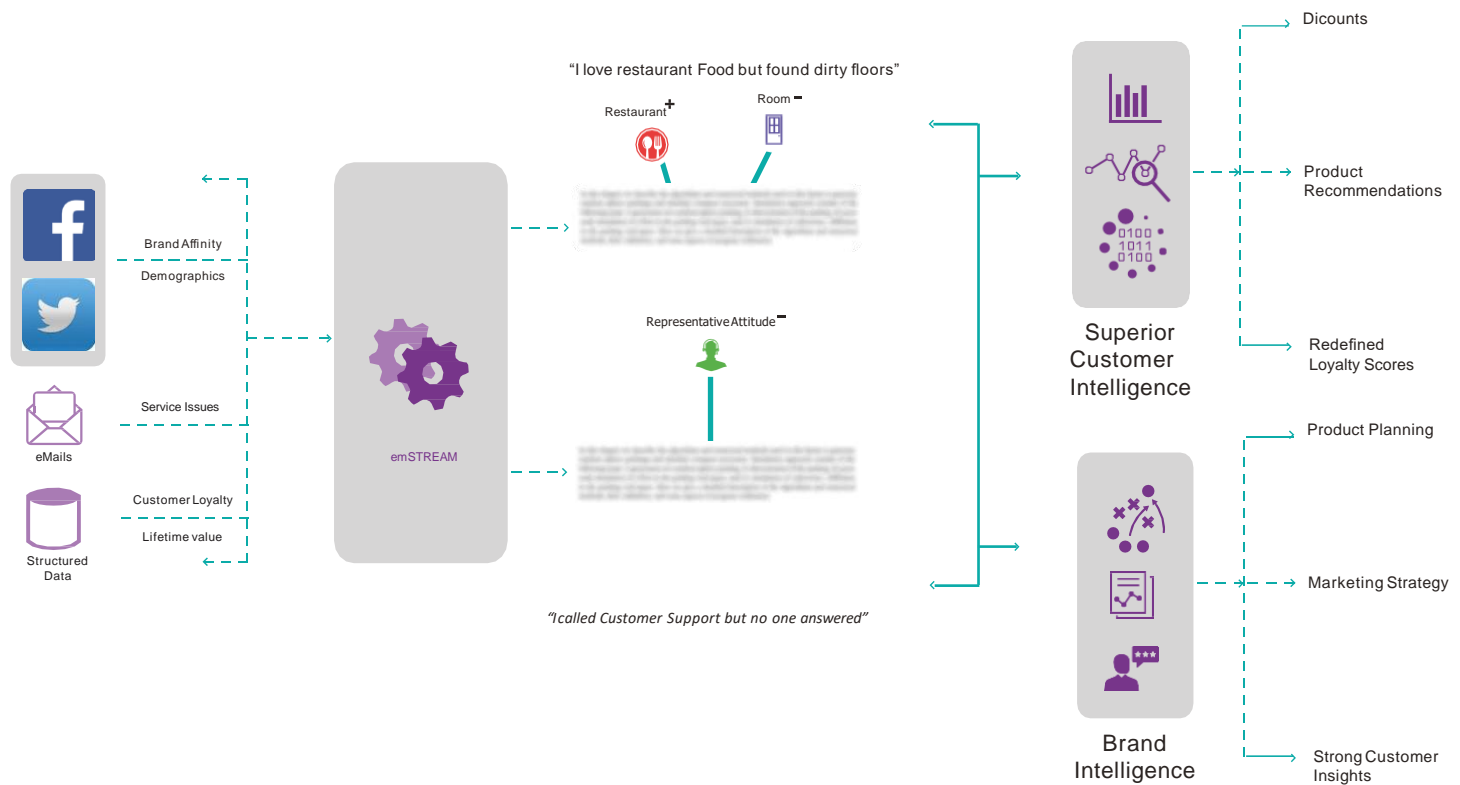
This superior intelligence is fed right back to the point of customer interaction or point of sale for a far deeper engagement with the customer.

emStream enables aggregated results about your customers' perception of your brand at a product attribute level through superior language processing capabilities, helping you take critical decisions on product planning, marketing and customer retention strategies.

Use emStream to create tailored Customer interaction journeys with your brand and make every customer a happy customer!

### Platform

- Document Tagging
- Sentiment Analysis
- Predictive Analytics
- Natural Language Processing
- Social Media Rooms
- Information Extraction using NLP
- Contextual NLP
- Social Network Analysis



## Real Time Analytics

emStream is powered by highly scalable HADOOP clusters which process data at the blink of an eye to power advanced customer and data analytics and make them available to you on a real time basis.

Customer segmentation, sentiment, problems and intent mining are a few clicks on emStream thereby allowing engagement with your targeted customers on a real time basis.

## Natural Language Processing (NLP)

emStream's NLP framework is fully proprietary. The key features of our NLP framework include:

- Name Entity Recognition (NER) Engine to identify Names, Dates, Numbers, Places, Organizations etc
- Extraction of Events
- Anaphora Resolution & Co-reference Chains
- Sentiment, Problem & Intent Analysis
- Topic Identification
- Theme Extraction
- Auto Summarization of Text
- Verb Argument Extraction