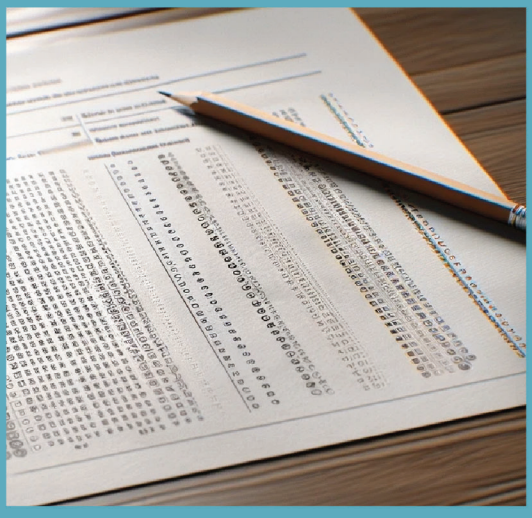
SARAL

REVOLUTION OF STANDARDISED ASSESSMENTS IN UTTAR PRADESH

FEBRUARY 2024



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MESSAGE

Shri Sandeep Singh

Minister of State (Independent Charge)
Basic Education
Government of Uttar Pradesh

I am happy to highlight the success of the NIPUN Assessment Test (NAT) via the Saral App for the 1.9 crore students of grade 1-8 under the Department of Basic Education, Uttar Pradesh. This initiative marks a monumental achievement that showcases the first-ever instance of at-scale assessments being conducted within a week and results declared in a month.

Uttar Pradesh has been the leader in leveraging technological advancements to revolutionize traditional educational methods, guaranteeing teacher support to ensure every student receives a quality education without being left behind. In this manual, we aim to convey our experiences, including challenges, journey, and successes, to inspire and enable you to replicate our achievements in your respective states.

I extend my gratitude to all contributors to the success of NAT and wish everyone the best in their journey of achieving success in the journey of imparting quality education to all our students.

(Sandeep Singh)

MESSAGE

Dr. M.K.S. Sundaram, IAS

Principal Secretary
Basic Education
Government of Uttar Pradesh

It is with a sense of profound responsibility and pride that I address through this manual the monumental task of conducting at-scale assessments in Uttar Pradesh, a state renowned for its vastness and diversity.

The identification of the myriad challenges associated with large-scale assessments was a critical first step in our journey towards educational innovation. The introduction of the Saral App was a game-changer in this regard. By leveraging cutting-edge technology and the concept of phygitisation, the Saral App facilitated a streamlined and effective assessment process.

The success of the NIPUN Assessment Test, conducted through the Saral App, is a testament to the power of technological innovation in transforming educational outcomes.

I extend my sincerest gratitude to all the educators, technical experts, and administrative staff who played a role in this significant achievement. I hope through this manual, all of us can take inspiration and continue to embrace technology and innovation in every step of our quest to ensure the universality of the reach of quality education.

(M.K.S. Sundaram)

TRANSFORMATION STORY

How Saral cracked the way we conduct standardised assessments

Seema Rastogi, a dedicated teacher at a primary school in, Cholapur Block, Varanasi, a district of Uttar Pradesh, found herself summoned to a staff meeting that promised to be anything but ordinary. Typically led by the school headmistress on a weekly basis, these gatherings often delved into mundane topics like student attendance and school infrastructure. However, today held a spark of anticipation for Seema as she learned that the results of the recent state-wide **NIPUN Assessment Test (NAT)** were to be unveiled.

Seema was quite excited & looked forward to gaining insights into her students' performance, especially since she had been diligently working to provide them with the best support on their journey to becoming NIPUN. The headmistress, recognizing the importance of these results, intended to delve into these results during the meeting, promising a shift from the usual routine.

The latest round of NIPUN Assessment Test offered teachers a completely new mode of assessments through the Saral App. Teachers were introduced to the world of **simple artificial**

intelligence (AI) capabilities through the app, where all the manual data in their possession would be **instantly digitized**. This streamlined process saved them countless hours of manual effort, allowing them to invest this time more effectively with their students. This assessment now serves as a prime illustration of how standardized, large-scale assessments are not the laborious operational task they are often perceived to be.

NIPUN Bharat Monitoring Center

Basic Education Department, Government of Uttar Pradesh

9818620855

Color Base

A+>=90	A<90 and a>=75	B<75 and b>=60	C<60 and c>=50	D<50 and d>=40	E<40

Sr.No.	School Name	Student Name	Enrollment No.	Class	Status
1	PS RAJWARI	ABUL ATIF AZAD	039468895	1	A+
2	PS RAJWARI	ANAMIKA	038474504	1	A
3	PS RAJWARI	ANKUSH NISHAD	039740075	1	A+
4	PS RAJWARI	ANSH	038040091	1	A
5	PS RAJWARI	ANSHIKA	038314809	1	A
6	PS RAJWARI	ANSHIKA YADAV	038532560	1	E
7	PS RAJWARI	ARHAN	037927758	1	A+
8	PS RAJWARI	ASTHA YADAV	037955588	1	A
9	PS RAJWARI	AYUSH KUMAR	038040312	1	B
10	PS RAJWARI	DEEPIKA CHAUDHARI	037926653	1	A+
11	PS RAJWARI	DIBYANSHI KUMARI	039105148	1	A
12	PS RAJWARI	DIVYANSHI LUIS	038316021	1	A
13	PS RAJWARI	NAINA CHAUDHERY	038038982	1	B
14	PS RAJWARI	OM SHARMA	038039688	1	A+
15	PS RAJWARI	PANRITI NISHAD	037956218	1	B

13 M Students Assessed

74 Learning Outcomes Assessed

82% State-wide Attendance

01 week to conduct at-scale assessments

04 weeks to create visibility on results across state

Post the meeting, Seema eagerly sat down with the results, marking a unique opportunity for her. Unlike previous state-wide assessments, the results in front of her were available at the **click of a dashboard**, offering a detailed breakdown for each of her students. With a keen eye, she studied the performance trends within her class, identifying areas where her students excelled and those where they needed additional assistance. Reflecting on the past, Seema couldn't help but smile. The contrast between the meticulous process of creating question papers, manually grading answer sheets, and inputting data for state analysis with no guarantee of visibility on these results, versus the comprehensive and timely results before her, was striking.

47% Students scored **>75%**

13 M Students scored **>90%**

In the past, she often felt disheartened by delayed communications and missed opportunities to address her students' needs promptly. Now, armed with a thorough analysis, Seema felt empowered to guide and support her students effectively, marking a refreshing and promising chapter in her teaching journey. While Seema was happy to see a good proportion of her students on-track, she was appreciative of the fact that she has granular visibility on the performance of students who need more of her attention.

Since 2019, the state of Uttar Pradesh has been at the forefront nationally in prioritizing Foundational Literacy and Numeracy (FLN) skills within classrooms. Recognizing the deficiency in these skills as a significant factor contributing to future student dropouts from the formal education system, the state boldly transitioned from a conventional textbook-based learning approach to a curriculum focused on achieving learning outcomes.

To address this gap, the state launched **Mission Prerna and NIPUN Bharat Missions** in 2019 and 2021, respectively. These missions were designed to concentrate efforts on **enhancing FLN skills**, providing a comprehensive academic strategy coupled with sufficient resources and teacher training. To gauge progress and **monitor the achievement of learning outcomes**, the state implemented quarterly assessments called **NIPUN Assessment Test (NAT)**.

In spite of the well-intentioned nature of the assessments, they presented a formidable challenge for the 4.5 lakh teachers, resulting in minimal to no tangible benefits. This was primarily attributed to the lack of standardization in the assessments and the delayed access to results.

Acknowledging the significant technological strides made in the education sector in recent years, the incorporation of technology into the assessment process emerged as an evident solution. The State took proactive steps by introducing the Saral App, presenting a comprehensive approach to evaluate at-scale student performance. Saral App aims to **bridge the gap between information in the physical realm and structured digital information through the seamless use of AI capabilities.**

Functioning as an **OCR** (Optical Character Recognition)-plus application, Saral not only performs OCR but also comprehends the structure of physical input—a process termed '**phygitization**.' This innovative solution replaces traditional answer sheets with OMR-based answer sheets, allowing teachers to scan them through the Saral App. This process instantly transforms the data into a digital format, enabling the state to receive digitized information on the very day of scanning.

75 Districts

880 Blocks

130 k Schools

450 k Teachers

17 M Students

The Saral App revolutionizes the data collection process, making it swifter and more accessible. It facilitates multiple iterations of assessments throughout the year seamlessly, providing a dynamic and efficient solution to the challenges previously faced by teachers like Seema. This technological intervention not only enhances the accuracy and speed of the assessment process but also signifies a progressive step towards a more streamlined and effective education system.

Located approximately 300 kilometres away in the Basic Education Department of Uttar Pradesh in Lucknow, Mr. Shailesh Singh found himself concluding another day at work. It was a rare occasion for him, departing from his office while daylight still lingered, a stark contrast to the usual late hours associated while state-wide assessments were conducted. Conducting assessments in a state like Uttar Pradesh was no easy feat, and Mr. Singh was responsible for the end-to-end conceptualisation and execution of the same.

His duties extended to guaranteeing the timely transmission of all assessment data to the state and subsequently processing it to create a clear visibility of the results. This information was essential for providing actionable insights to all stakeholders in the field. In the past, this entire undertaking had been a prolonged and demanding process, monopolizing all of Mr. Singh's time.

However, this time, there was a noticeable shift. The entire assessment cycle concluded within a month, a remarkable departure from the prolonged timelines of the past. He was able to quickly draw out actionable insights for different districts, different learning outcomes and different subjects extremely easily, owing to how detailed and granular the result analysis was.

Even though there were multiple, comprehensive trainings that were conducted with field stakeholders to orient them with this new method of conducting assessments, Mr. Singh kept a close eye on the performance of the app, ensuring no breaks and devised a seamless issue resolution mechanism in place to ensure a smooth experience for teachers on ground and complete accuracy of the result received at the state level.

85% **Teachers rated their experience >3/4**

99.6% **OMRs received of Assessed Students**

100% **Data received and result processing accuracy**

15 k **Concurrent users at peak times**

2.5 L **Daily users**

Mr. Singh found immense satisfaction in his ability to contribute to enhancing the quality of education that students received—an endeavour he had been passionate about since his college days. With a sense of accomplishment, he reflected on a job well done and was excited to be able to see a noticeable difference in the quality of education that the public school system had to offer.

The primary goal behind the entire assessment process was to enhance user-centricity for all stakeholders involved. Operationally, manual procedures were entirely eliminated for both teachers and administrators, resulting in **significant time savings**. This freed up more time for teachers to engage with their classrooms and allowed administrators to focus on deriving meaningful insights.

From a technical standpoint, the decision to opt for a 'phygital' assessment approach, blending physical and digital elements, was a crucial one. This decision was rooted in the behaviour of system actors and their comfort levels. While traditional OMR sheets involve manual entry, transitioning to a fully digital assessment posed a significant challenge in the state. The absence of adequate technological infrastructure and training, coupled with teachers' discomfort, made a simple app on their phones with intuitive UI/UX paired with OMR sheets a more feasible and behaviourally motivating solution.

This approach ensured that teachers could embrace the technology comfortably, providing results with the same accuracy and speed as a fully digital assessment.

Standardised state-wide assessments through the Saral App have significantly influenced the education system in Uttar Pradesh by addressing critical issues in conventional assessment methods. It provides a streamlined, cost-effective, and time-efficient approach to digitizing data reliably. Moreover, the comprehensive insights offered by Saral Assessments have empowered decision-makers, enabling them to make informed, data-driven decisions and promptly implement strategies to

improve educational outcomes across the state.

The successful implementation of the assessment process in the state of Uttar Pradesh marks just the initial phase for the Saral App. This experience has illuminated a crucial insight – the app's AI capabilities can effectively transform any manually inputted data by field stakeholders into a digital format.

Consider the decentralized nature of the admission process for new students in schools, where teachers are burdened with the substantial task of manually entering details for each student. Saral App can streamline this process, swiftly digitizing the data and saving teachers countless hours. Similarly, for maintaining daily visibility on student attendance in schools, Saral App can digitize data from attendance registers.

The 'phygitization' feature offered by Saral App opens avenues for action across various use-cases that currently consume significant time of all stakeholders. This ensures that their focus remains on the primary objective – guaranteeing each child receives a comprehensive and high-quality education experience in schools. This underscores the app's potential to pave the way for more efficient and impactful practices across diverse educational scenarios.

IMPLEMENTATION MANUAL

A guide to replicate implementation of Saral for other states

1. Introduction to Saral

1.1 What is Saral

Sunbird Saral attempts to create a connection between the information that exists in the physical world and ties it to digital structured information.

Saral, literally meaning simplicity, has been conceptualized to enable users to create structured digital information using mobile devices. The process is also called Saralify or Phygitization. Saral should be viewed as an OCR-plus (optical character recognition plus) application that is capable of doing OCR and can also understand the structure of the physical input.

Saral reference app works as an edge location solution to phygitize data on physical layout printed sheets and upload the data to the backend. This backend data will be then pushed to an Analytics system for insights and take actions accordingly.

1.2 Saral value proposition

The ability to generate structured digital data from a physical document even in an offline environment is an unparalleled feature of SARAL. The app is extensible to include more forms as needed for digitization

1.3 Current Use Case

At present, Saral is utilized for carrying out large-scale assessments at a census level, combining both physical and digital elements with the use of OMR sheets and Saral App.

2. Get ready for Saral based Assessments

2.1 Product Readiness

2.1.1 Production Setup

Hardware Requirement:

The following minimum configuration works for a scale as detailed below:

3,000 Users (with peak concurrency of 500-1000 users) can Successfully Login and Submit the Marksheet for 4,50,000 Students at a 1500 students save per second. Test Duration 5 Minutes with average response time of 10-20 Seconds with 100% Success rate.

Network Ports requirement:

1. 80 (nginx is configured in jenkins)
2. 443 (nginx is configured in jenkins)
3. 3005 (required to launch node server)
4. 27017 (to launch mongodb)
5. 8080 (for jenkins)
6. 22 (for ssh login to EC2)
7. 5601 (kibana dashboard for logging access)
8. 30005 (monitoring infra using Prometheus)
9. 30001 (Grafana dashboards)
10. 9001 (node exporter)

2.1.2 Local/development setup

Hardware Requirement:

We recommend following hardware requirements as minimum requirements to set up the Saral backend.
One server is required with the following configurations:

1. Any OS
2. 16 GB of System RAM (minimum requirement)
3. 4 core CPU (minimum requirement)
4. 250GB HDD

Network Ports requirement:

1. 3000 (required to launch node server)
2. 27017 (to launch mongodb)

Server	Instance Type	CPU	Memory	Disk	No. Of Servers
Jenkins CI/CD	m5a.large	2	8	50	1
Monitoring and logging	m5a.xlarge	4	16	50	1
EKS nodes	c5a.xlarge	4	8	50	2
MongoDB standalone	m5a.xlarge	4	16	100	1
This is optional if you want scale or else standalone is enough	m5a.xlarge	4	16	100	8
MongoDB as sharded cluster(3 sharded cluster) mongoconfig	m5a.large	2	8	50	2

2.1.3 Human capital

Type	Language/Skills	Experience	Full-time people
Backend Developer	NodeJs, JavaScript, Express.js,Postman, MongoDB Compas, SonarQube, Github, Jest Unit testing, Swagger documentation	3+ years	1
DevOps	Docker, AWS, KUBERNETES, jenkins,SCM tools, Grafana, Prometheus,EFK stack, Terraform	3+ years	1
QA	UAT	3+ years	1
Tech Lead	All of the above, & management skills	5+ years	1
Frontend Developer	React Native	3+ years	1
AI	Based on need	3+ years	1

2.2 Program Readiness

2.2.1 System integrator Onboarding / In House MIS Unit

This step involves the process of onboarding a system integrator or establishing an in-house Management Information System (MIS) unit for the program. The SI or MIS unit is responsible for setting, managing, and maintaining the Saral frontend and backend operations, Database management and result evaluation after assessment. This includes identifying and selecting the right IT professionals or vendors with the necessary expertise to handle the technical aspects of the program.

2.2.2 Identification and setting up of Database for Assessments

In this step, the focus is on identifying and setting up the necessary databases to store information about **schools, students and teachers** participating in the assessment. These databases will serve as the foundation for various assessment activities, including enabling logins, students mapping with various schools, student wise submission of answer sheets etc. . It's important to define the data fields, data structures, and access controls for these databases to ensure data accuracy, security, and integrity.

Saral Database Schema:

1. Schema details of different collections:

1.1 Brand

Key Name	Type	Required
logoImage	String	True
themeColor1	String	
themeColor2	String	
themeColor3	String	
themeColor4	String	
themeColor5	String	
appName	String	
state	String	True
supportIcon	String	
Logout	String	
About	String	
Support	String	
Help	String	
screenLabels	String	
ClearCache	String	

1.2 Classes

Key Name	Type	Required
className	String	True
classId	String	True
sections	Array	
schoolId	String	True

Saral Database Schema:

1. Schema details of different collections:

1.3 Counters

Key Name	Type	Required
counter_value	Number	
_id	String	True

1.4 Exams

Key Name	Type	Required
examId	Number	True
classId	String	True
type	String	True
schoolId	String	
examLO	String	True
examDate	String	
subject	String	True
set	Array	
totalMarks	Number	True
questions	Object	
state	String	

1.5 Locks

Key Name	Type	Required
lockType	String	True
lockId	String	True

Saral Database Schema:

1. Schema details of different collections:

1.6 Marks

Key Name	Type	Required
examId	Number	
classId	String	True
schoolId	String	True
examDate	String	
subject	String	True
set	String	
totalMarks	Number	True
section	String	True
studentId	String	True
studentIdTrainingData	Array	
predictedStudentId	String	
predictionConfidence	Array	
studentAvailability	Boolean	True
marksInfo	Array object	
totalMarks	Number	True
maxMarksTrainingData	Array	
maxMarksPredicted	String	
maxMarksConfidence	Array	
maxMarksTrainingData	Array	
securedMarks	Number	True
obtainedMarksTrainingData	Array	
obtainedMarksPredicted	String	
obtainedMarksConfidence	Array	
createdOn	String	
roiId	String	
shardedKey	String	True
userId	String	True

Saral Database Schema:

1. Schema details of different collections:

1.7 Roi

Key Name	Type	Required
subject	String	True
classID	String	True
roiID	String	True
roi	String	True
set	String	
state	String	True
type	String	

Saral Database Schema:

1. Schema details of different collections:

1.8 Schools

Key Name	Type	Required
name	String	True
schoolId	String	True
autoSync	Boolean	
autoSyncFrequency	Number	
autoSyncBatchSize	Number	
tags	Boolean	
isMinimalMode	Boolean	
supportEmail	String	
isAppForceUpdateEnabled	Boolean	
offlineMode	Boolean	
isManualEditEnabled	Boolean	
scanTimeOutMs	Number	
district	String	True
isFBAnalyticsEnabled	Boolean	
block	String	
useCase2	Boolean	
useCase3	Boolean	
useCase4	Boolean	
useCase5	Boolean	
state	String	True

Saral Database Schema:

1. Schema details of different collections:

1.9 Students

Key Name	Type	Required
name	String	True
studentId	String	True
fatherName	String	
classId	String	True
className	String	True
schoolId	String	True
section	String	

1.10 Users

Key Name	Type	Required
name	String	True
userId	String	True
schoolId	String	True
Password	String	True

For more details on collection schemas refer:

https://github.com/Sunbird-Saral/Project-Saral/tree/main/v1.0/backend/src/models

2. Additionally find sample data for these schemas in below link:

https://github.com/Sunbird-Saral/Project-Saral/tree/main/v1.0/backend/data

2.2.3 Identify central body for setting up centralized question papers

This step involves determining the central authority or organization responsible for creating and managing the question papers for assessments. The central body plays a crucial role in ensuring the quality, consistency, and security of question papers.

Creating centralized question papers is a pivotal and critical stage in census-level, saral assessments. It is essential to ensure uniformity across the entire state and facilitate result generation by encoding answer keys in the backend system. Without standardized question papers, it becomes exceedingly challenging to correlate students with their respective question paper sets and subsequently encode each set in the backend system for result processing.

2.2.4 Finalize operations for Question paper printing and distribution

This step involves finalizing the end-to-end operations and workflows for the printing, and distribution of question papers. It includes defining the roles and responsibilities of individuals involved in these processes, implementing quality control measures, and ensuring compliance with security protocols to prevent any unauthorized access to assessment materials.

Different choices can be considered depending on the existing infrastructure and available resources for this particular step:-

Option 1: Centralized Question Paper Printing and Distribution
If printing facilities are not available at school level, we suggest centralized printing, packaging and distribution of question Papers to schools. In this case, the state will need to do an RFP for printing, packaging and distributing question papers centrally at a school level for all the students.

Option 2: Decentralized Question Paper Printing and Distribution
In cases where schools have access to printing or projector facilities, question papers can be shared on the day of assessment to be printed or projected for all students in the school.

2.2.5 Finalize operations for OMR sheet printing and distribution

Similar to the previous step, this step focuses on the operations and processes related to the printing and distribution of OMR sheets to be used by students during assessment. It entails specifying the printing specifications, number of OMR sheets to be printed, handling logistics, and establishing security measures to safeguard the integrity of OMR sheets from production to distribution.

2.2.6 Set up query resolution center

The establishment of a query resolution center is essential for addressing inquiries, concerns, and issues raised by teachers, or other stakeholders participating in the assessments. This center serves as a centralized point of contact where individuals can seek assistance, clarification, or information related to the Saral App and Operations. It requires defining the communication channels, staffing, and processes for handling queries effectively.

These steps collectively contribute to the preparedness for Saral based Assessments.

3. Set up Saral Frontend and Backend for conducting assessments

3.1 Setting up Saral Frontend

Source Code references:

1. Open Terminal and clone source code git clone https://github.com/Sunbird-Saral/Project-Saral.git.
2. Change Directory to Project-Saral/ folder and switch to release tag as per release notes. git checkout tags/<tag_name>
3. $FRONTEND_FOLDER = Project-Saral/v1.0/frontend

Installation and Setup:

1. Setting up the React Native development environment Note: Choose React Native CLI Quick Start tab for setup instructions.
2. Download NDK 20.0.5594570 and extract the archive to the $ANDROID_HOME\ndk folder.
3. In Android Studio, navigate to File\Project Structure\SDK Location and set Android NDK location to $ANDROID_HOME\ndk\android-ndk-r20 (extracted in the last step).
4. Make sure sdk.dir paths are set properly in frontend\SaralApp\android\local.properties.
5. Register on Google Firebase, add the Saral project on the firebase dashboard and download the corresponding google-services.json.
6. Place downloaded google-services.json under the frontend/SaralApp/android/app folder.
7. Once Vysor and AVD are configured as per the instructions, follow the below steps to bring up the application.
8. Open a terminal in frontend/SaralApp and run npm in the command.
9. cd android && ./gradlew clean && cd ..
10. Make sure backend BASE_URL is configured in frontend/SaralApp/src/configs/config.js file.
11. npx react-native run-android
12. Successful frontend deployment should show Saral OCR login screen on AVD or USB connected Android device.

Generate keystore file:

1. For generating keystore file run this command
2. keytool -genkey -v -keystore my-release-key.keystore -alias my-key-alias -keyalg RSA keysize 2048 -validity 10000

Generating APK from source code:

1. open Terminal in frontend/SaralApp/android folder
2. Run command. /gradlew clean
3. APK Signing can be enabled using the below Gradle files. Make sure the Keystore file is to be used for signing placed in the frontend/SaralApp/android/app folder.
4. Change alias and password in frontend/SaralApp/android/gradle.properties

- MYAPP_RELEASE_STORE_FILE=my-upload-key.keystore
- MYAPP_RELEASE_STOREPASSWORD=changeit
- MYAPP_RELEASE_KEY_ALIAS=hwrecog-key-alias MYAPP_RELEASE_KEY_PASSWORD=changeit

5. Open Terminal in the frontend / SaralApp / android folder and run the command. / gradlewassembleRelease
6. You can find the release apk file in Project-Saral/v1.0/frontend/SaralApp/android/app/build/outputs/apk/release folder

Generate AAB (App bundle) from source code:

1. open Terminal in frontend/SaralApp/android folder
2. Run command. /gradlew clean
3. APK Signing can be enabled using the below Gradle files. Make sure the Keystore file is to be used for signing placed in the frontend/SaralApp/android/app folder.
4. Change alias and password in frontend/SaralApp/android/gradle.properties

- MYAPP_RELEASE_STORE_FILE=my-upload-key.keystore
- MYAPP_RELEASE_STORE_PASSWORD=changeit
- MYAPP_RELEASE_KEY_ALIAS=hwrecog-key-alias
- MYAPP_RELEASE_KEY_PASSWORD=changeit

5. Open Terminal in frontend/SaralApp/android folder and run command ./gradlewassembleRelease

Generate AAB (App bundle) from source code:

1. open Terminal in frontend/SaralApp/android folder
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3. APK Signing can be enabled using the below Gradle files. Make sure the Keystore file is to be used for signing placed in the frontend/SaralApp/android/app folder.
4. Change alias and password in frontend/SaralApp/android/gradle.properties

- MYAPP_RELEASE_STORE_FILE=my-upload-key.keystore
- MYAPP_RELEASE_STORE_PASSWORD=changeit
- MYAPP_RELEASE_KEY_ALIAS=hwrecog-key-alias
- MYAPP_RELEASE_KEY_PASSWORD=changeit

5. Open Terminal in frontend/SaralApp/android folder and run command ./gradlewassembleRelease
6. You can find the release apk file in Project-Saral/v1.0/frontend/SaralApp/android/app/build/outputs/apk/releases/app-release.aab folder

Debugging/running saral from android studio:

1. Open **frontend/SaralApp/android** folder from Android Studio.
2. Run npx react-native start command from Terminal in **frontend/SaralApp** the directory.
3. Run adb reverse tcp:8081 tcp:8081 from another terminal.
4. Now click on the Run or Debug button from Android studio.
5. When you are debugging, have debug breakpoints in android code as needed for troubleshooting.

Google Play Store App Publish:

Refer to Developer Program Policy for more details. These policies can be changed by google from time to time, so please refer to the latest policies before publishing the App in the playstore.

Privacy Policy for Apps to be listed in playstore to be generated and publish this policy of the app as a URL. The same Privacy Policy URL needs to be added in the play store "Store Listing" section of your application before publishing the Application.

Misleading Claims Google team reviews the app content including logos , images , content to see if any misleading claims. For example "government affiliation or authorization to facilitate government services through your app". An Advance Notice Form to be submitted for any such affiliations or claims for google team to review it.

3.1 Setting up Saral Backend

Prepare necessary hardware requirement for development environment :

Sample Hardware configuration snapshot

a. Any OS
b. 16 GB of System RAM (minimum requirement)
c. 4 core CPU (minimum requirement)
d. 250GB HDD

Clone the project repo:

1. Open Terminal and clone source code "git clone https://github.com/Sunbird-Saral/Project-Saral.git."

Install necessary dependencies:

1. The above cloned repo uses nodejs and mongodb technologies. If you wish to continue with the same please follow installation steps provided in previous steps.
2. If you wish to use a different tech stack like Java instead of NodeJs and mysql instead of mongodb. Please use above repo code as reference and build REST APIs by referring to postman collection (https://github.com/Sunbird-Saral/Project-Saral/blob/v1-develop/v1.0/backend/test) for endpoint details.

Database Setup/Data Ingestion :

a. The reference saral backend uses mongodb as Database, but you can use any database with necessary schemas. To know different schemas/Tables Refer path Project-Saral\v1.0\backend\src\models
b. Find sample/Initial data to be loaded under path Project-Saral\v1.0\backend\data

Data Processing:

You can use any API testing tool like POSTMAN to test API endpoints. To know about sample payload and responses refer https://github.com/Sunbird-Saral/Project-Saral/blob/v1-develop/v1.0/backend/test

4. Steps for conducting Saral based assessments

Once the Saral backend and front end is set up, we can start with operations required for Saral assessment.

1. Upload Latest Saral App on Playstore

This step involves the process of uploading the most recent version of the Saral App to the Google Play Store. This ensures that users have access to the latest features, improvements, and bug fixes.

2. Finalize schedule of assessment (For example: 1 day, 2 day, based on grades and scale

In this step, a schedule for conducting assessments is determined. The schedule may vary based on factors such as grade levels and the number of days required for the assessments. It is important to establish clear dates and timelines for the assessment activities.

3. Question paper setting by identified authority for all grades to be assessed

The identified authority is responsible for creating question papers for all grades participating in the assessments. Question papers may need to be prepared in multiple sets to accommodate the assessment schedule and requirements.

4. Print and distribute OMR sheets and Question papers

This step involves the physical production and distribution of OMR sheets and question papers to the assessment centers or schools. It is crucial to ensure that the necessary materials are delivered accurately and securely.

5. Prepare training collaterals for the teacher & ground staff

Training materials and resources are developed in this step to facilitate the training of teachers and on-ground staff involved in the assessment process. These materials should be

Date	Exam	Mandal 1	Mandal 2	Mandal 3	Mandal 4	Mandal 5	Mandal 6
11-Sep	Class 1-3	Lucknow	Ayodhya	Prayagraj	Saharanpur	Kanpur	Bareilly
12-Sep	Class 4-8	Lucknow	Ayodhya	Prayagraj	Saharanpur	Kanpur	Bareilly
13-Sep	Class 1-3	Gorakhpur	Varanasi	Chitrakoot	Meerut	Aligarh	Jhansi
14-Sep	Class 4-8	Gorakhpur	Varanasi	Chitrakoot	Meerut	Aligarh	Jhansi
15-Sep	Class 1-3	Devipatan	Moradabad	Azamgarh	Agra	Basti	Mirzapur
16-Sep	Class 4-8	Devipatan	Moradabad	Azamgarh	Agra	Basti	Mirzapur
15-Sep	**RESULTS PUBLISHED**						

comprehensive and user-friendly.

Sample Training Deck from Saral Based Assessments in Uttar Pradesh: Training Deck, FAQ Training Deck.

6. Training of teachers and staff

Teachers and on-ground staff are provided with the necessary training to prepare them for their roles in conducting assessments. This training ensures that they understand the process and procedures involved.

Whenever feasible, ensure that two rounds of training are conducted before the assessments take place.

7. Define SOPs for issue resolution operators

Standard Operating Procedures (SOPs) are established for operators working in the issue resolution center. These procedures provide guidelines for addressing and resolving queries, issues, and concerns from ground.

Sample SOP for Issue resolution operators in Uttar Pradesh: SOP for issue resolution operators.

8. Training of operators for resolving bugs and queries

Operators in the issue resolution center are trained to effectively handle and resolve technical issues, bugs, and queries that may arise during the assessment period.

9. Set up mechanism for documenting all queries coming from ground in a standardized format

A structured mechanism is put in place to document all queries received from the field in a standardized format. This helps in organizing and tracking the issues for timely resolution. A complaint redressal system may also be established for this purpose.

10. Finalize live dashboards for monitoring

The process and wireframes for creating live monitoring dashboards is finalized. These dashboards are essential for tracking assessment progress and providing real-time insights into the data.

11. Develop result dashboards

These dashboards will display assessment results after the results are generated in the required format.

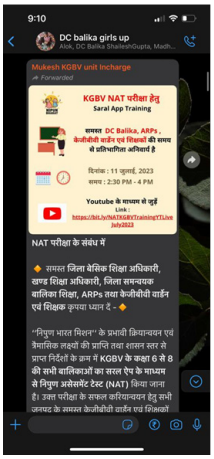
12. Enable logins of teachers for data checking on the App

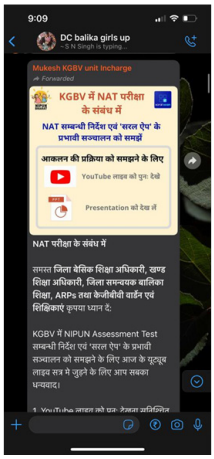
Teachers are provided with login credentials to access and review student data mapped to their login, class and school on the Saral App. This will also help them to familiarize themselves with the App.

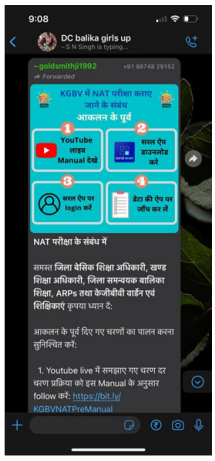
13. Continuous communications for better reach to all teachers

Communication strategies to be implemented to ensure that all teachers are informed about the assessment process and any updates or changes. Simple infographics, WhatsApp messages, Videos, posters can be used for the same.

Sample infographics and WhatsApp messages from Saral assessments in Uttar Pradesh:







14. Complete data check process

A thorough data check and data updating process is carried out one week before the assessments to ensure that all the student data is accurate and up to date, reducing the risk of errors during assessments.

15. Enable teacher logins

On the day of the assessment, enable teacher logins required to conduct the assessments smoothly.

16. Conduct assessments

Assessments are conducted as per the schedule, and all completed OMR sheets are scanned and submitted by teachers using Saral App.

17. Codify answer keys in the backend for result evaluation

The answer keys for the assessments are encoded into the backend system, which is crucial for accurate result evaluation.

18. Evaluate results and publish on the dashboards

Results of the assessments are carefully evaluated, and the outcomes are published on the designated dashboards for stakeholders to access..

19. Feedback from teachers

Feedback from teachers and participants is gathered to identify areas for improvement and further enhancements in the assessment process.

20. Define and take post assessment actions on the results

After the assessments are complete and results are published, specific actions and decisions are made based on the assessment outcomes, which may include academic interventions or future planning.

These steps collectively represent the detailed process involved in planning, conducting, and evaluating the assessments while ensuring effective communication, training, and technical support.

5. Sample Work plan with estimated duration for each step

#	Items	Timeline	Can start right after T	Followed by Previous action Item
01	Saral backend and frontend ready	T	-	
02	Database to be used for assessments identified and deployed on backend	T	-	
03	All steps completed for finalizing program readiness (Identifying central body for preparing question papers, set up issue resolution center etc.)	T	-	
04	Assessment schedule finalized	T+2		
05	Saral App tested and uploaded on play store	T+5		
06	Question papers prepared and verified	T+6		
07	Bid uploaded and work order released for printing QP and OMR sheets centrally	T+10		
08	Printing and Packaging of QP and OMR completed	T+30		
09	Distribution of QP and OMR sheets to schools completed	T+40		
10	Teacher training collaterals and SOPs for issue resolution operators ready	T+10		
11	Trainings completed for teachers, on ground staff and Issue resolution operators	T+35		
12	Teacher logins enabled for data checking	T+36		
13	Student Data checking by teachers completed on the Saral App	T+42		
14	Student data updated and locked on backend	T+44		
15	Teacher logins enabled for assessment/ Assessments conducted	T+50		
16	Development completed for live monitoring dashboards and result dashboards	T+25		
17	Answer keys for result evaluation codified in the backend	T+50		
18	Results evaluated and declared	T+56		

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