CCR PORTAL REVAMP AND DATA MIGRATION

RAHUL R
TKM19MCA020
Project Guide: Prof. Nadeera Beevi M

CONTENTS

ABSTRACT

- Central Control Room (CCR) for Air Quality Management Portal is the chief repository of All India’s air Quality data which is then used across administrative, scientific and policy domains.

- It is an Air Quality Management System To monitoring pollution from different sectors like industries , vehicles.

- In this system IOT analyzers collect pollutant data from different stations , and stored it in kairos db.

INTRODUCTION

- Air Quality Index is a tool for effective communication of air quality status to people in terms, which are easy to understand.
- It transforms complex air quality data of various pollutants into a single number (index value), nomenclature and colour.
- The CCR portal, because of its widespread utility, needs to be fast, scalable and robust.
- The revamp operation was undertaken to upgrade the portal in accordance with its future needs.
- Data was migrated from OpenTSDB to Kairosdb in order to facilitate less query time

INTRODUCTION (CONT.)

- There are six AQI categories, namely Good, Satisfactory, Moderately polluted, Poor,Very Poor, and Severe.
- Each of these categories is decided based on ambient concentration values of air pollutants and their likely health impacts (known as health breakpoints).
- AQ sub-index and health breakpoints are evolved for eight pollutants (PM10, PM2.5, NO2, SO2, CO, O3, NH3, and Pb) for which short-term (upto 24-hours) National Ambient Air Quality Standards are prescribed.
- AQI categories and health breakpoints for the eight pollutants are specified in the below table.

AQI categories and health breakpoints

AQI Category	AQI	Concentration range*							
		PM_{10}	$PM_{2.5}$	NO_2	O_3	CO	SO_2	NH_3	Pb
Good	0 - 50	0 - 50	0 - 30	0 - 40	0 - 50	0 - 1.0	0 - 40	0 - 200	0 - 0.5
Satisfactory	51 - 100	51 - 100	31 - 60	41 - 80	51 - 100	1.1 - 2.0	41 - 80	201 - 400	0.5 - 1.0
Moderately polluted	101 - 200	101 - 250	61 - 90	81 - 180	101 - 168	2.1 - 10	81 - 380	401 - 800	1.1 - 2.0
Poor	201 - 300	251 - 350	91 - 120	181 - 280	169 - 208	10 - 17	381 - 800	801 - 1200	2.1 - 3.0
Very poor	301 – 400	351 - 430	121 - 250	281 - 400	209 - 748*	17 - 34	801 - 1600	1200 -1800	3.1 - 3.5
Severe	401 - 500	430 +	250+	400+	748+*	34+	1600+	1800+	3.5+

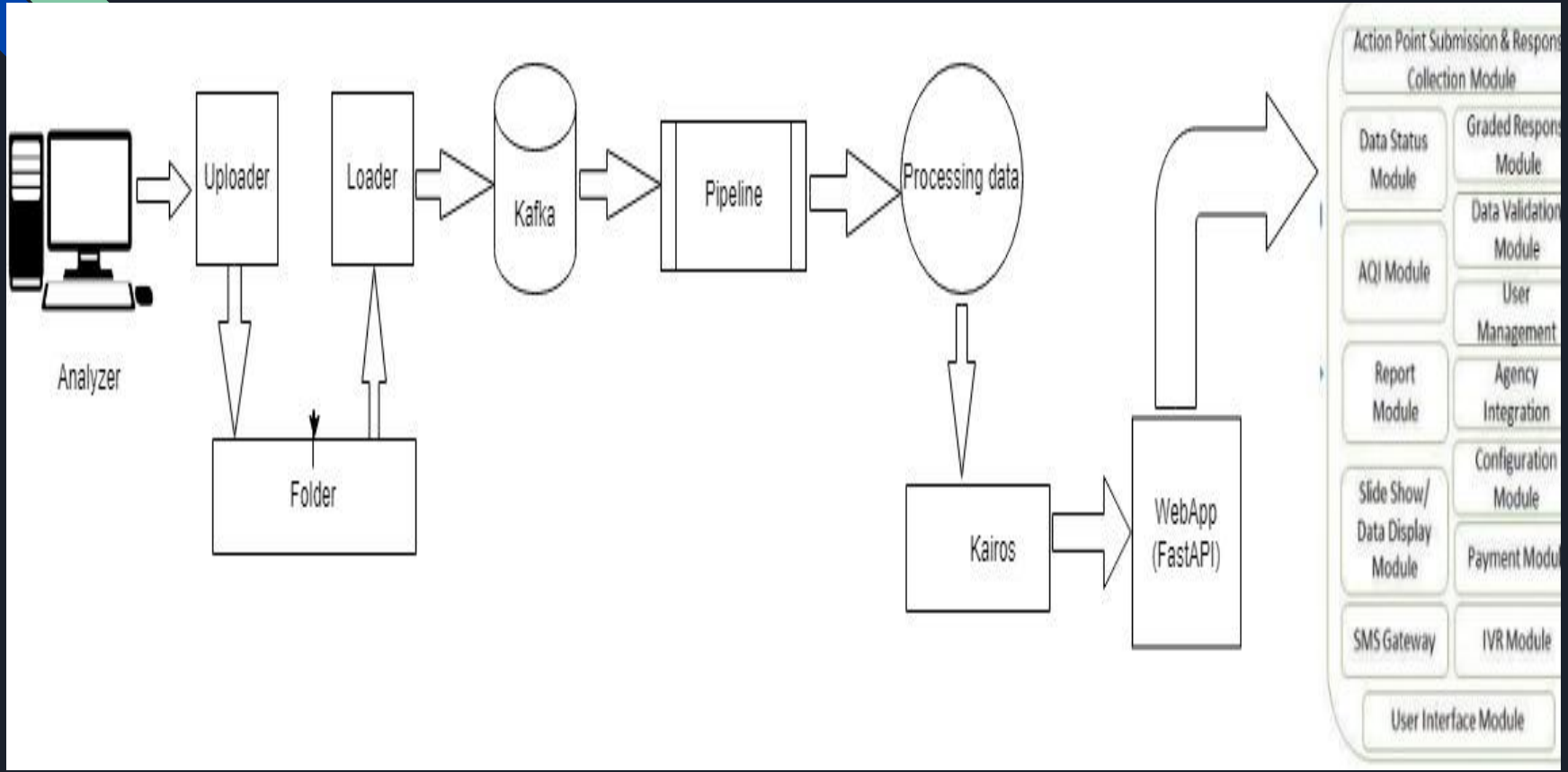
* CO in mg/m^3 and other pollutants in $\mu g/m^3$; 2h-hourly average values for PM_{10}, $PM_{2.5}$, NO_2, SO_2, NH_3, and Pb, and 8-hourly values for CO and O_3.

PROBLEM STATEMENT

The CCR Portal uses OpenTSDB to store data and is built in tornado framework. The revamping was undertaken to convert the tornado framework to FASTAPI and migrate data from OpenTSDB to KairosDB. The major deliverables were-

- Increasing the scalability and robustness of the portal
- Decreasing query fetch time
- Giving proper structure to the code
- Proper documentation

SOLUTION ARCHITECTURE



METHODOLOGY

- Hardware specification :

  A computer with internet connectivity and MVC supported browser.

- Software specification:

  Programming Language : Python ,

  Framework: FastAPI

  Designing tools : Angular

  Cloud service used : Amazon (AWS)

  Web server : Apache

  Web Browser : Any web browser

  Backend : Elasticsearch, MongoDB, KairosDB

MODULE DESCRIPTION

- CCR

  Central Control Room (CCR) for Air Quality Management Portal is the chief repository of All India's air Quality data which is then used across administrative, scientific and policy domains.

- SAMEER APP

  1. Sameer Provides the hourly update of the National Air Quality Index (AQI) published by Central Pollution Control Board.

  2. This App is also for public to register Complaints related to air pollution

- NAMP

  This Portal is for submission of ambient air quality data generated from manual stations operated under NAMP by SPCBs/PCC.

RESULT

- By Developing the new utilities to handle database query changes in migration helps to retrieve the data in a quick manner. As part of the CCR Revamp project, developed a datapush script. The script can handle seamless data migration from OpenTSDB to KairosDB with minimal query changes.

- In the existing system the fetching time of queries are around 2-3 minutes as the user select any particular states to fetch the AQI value, As the proposed system comes in to production , the fetch query time is very less because of the data is coming from Kairos DB instead of Opentsdb.

- Revamping of the CCR portal and Data migration from opentsdb to kairos DB minimized the query fetching time and increased the efficiency.

CONCLUSION

- The project aimed to minimize user efforts to monitor and control pollution as per industrial rules and regulations.

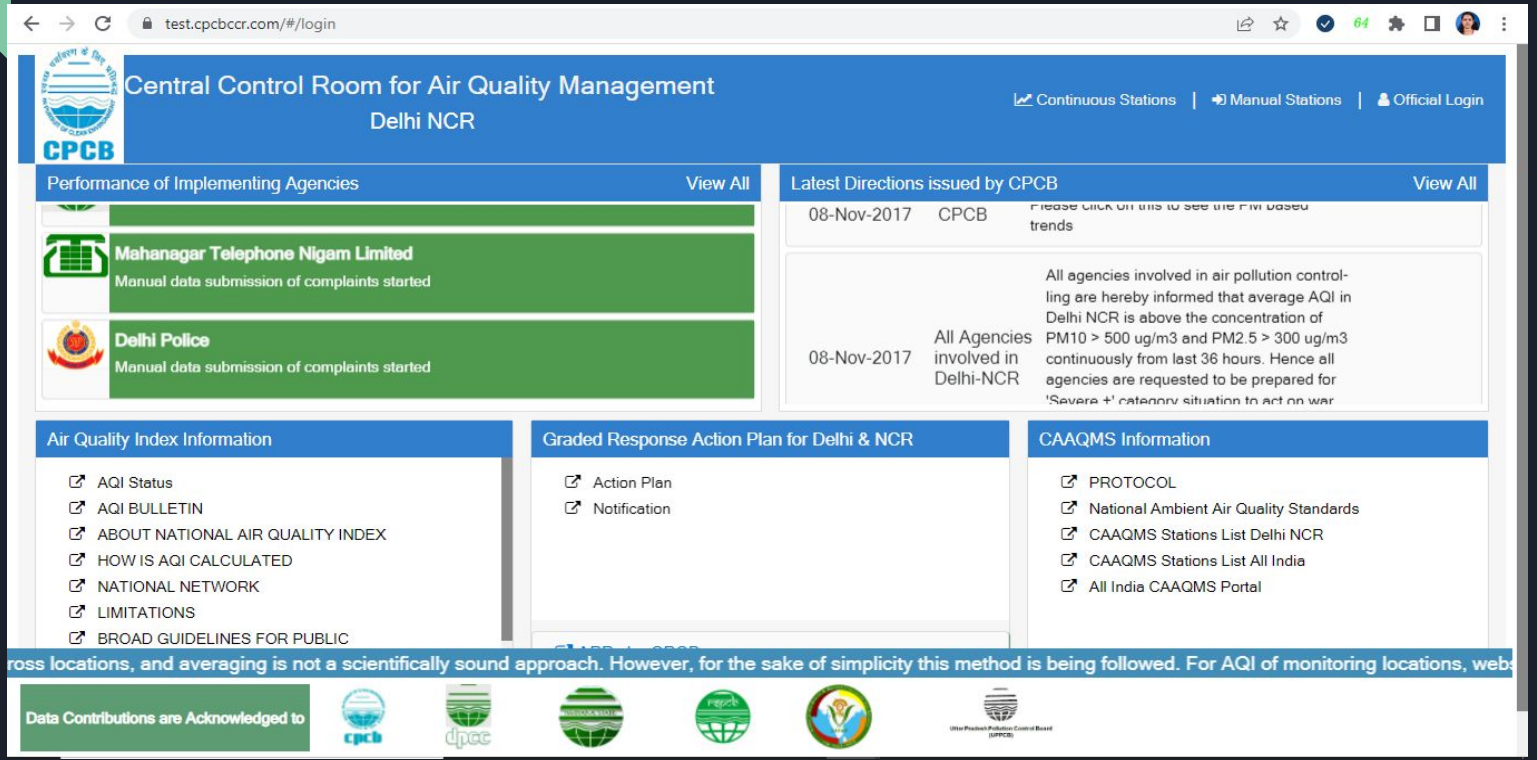
- This particular system has been designed in an attractive manner, so that even a user with minimum knowledge could operate the system easily. This is a very useful system for searching data from a large data set.

- AQI monitoring system for all over india authorised by govt of india

FUTURE ENHANCEMENT

- In the future, new stations can be easily added to the system without much refactoring.
- New types of reports can be added without much effort.

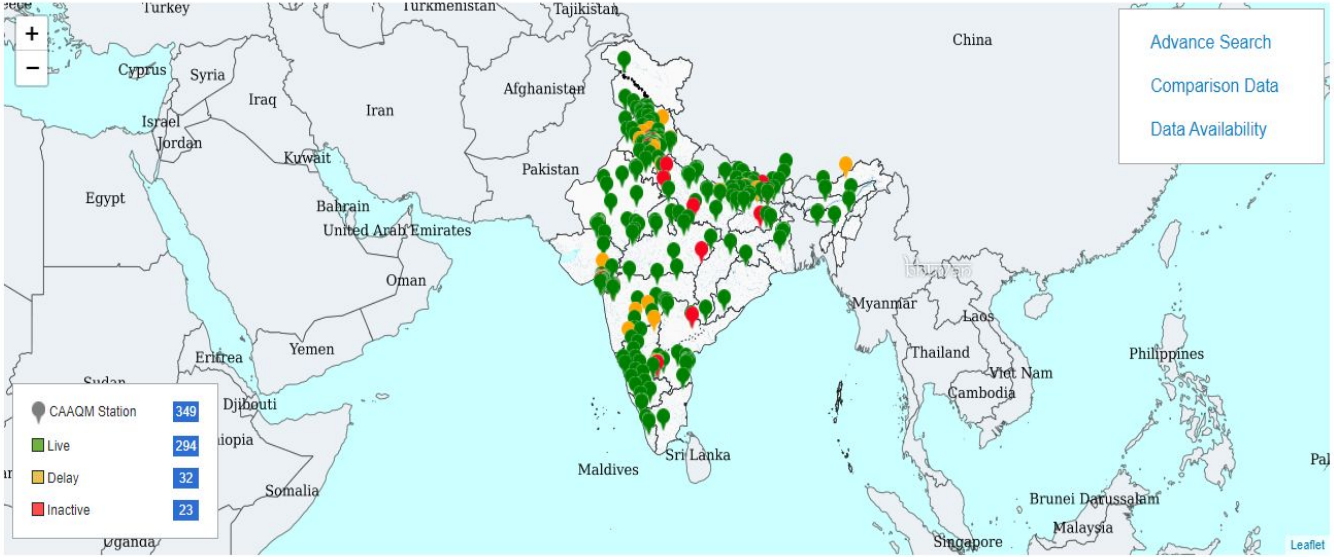
SCREENSHOT


test.cpcbccr.com/#/login
Central Control Room for Air Quality Management
Delhi NCR
CPCB
Continuous Stations | Manual Stations | Official Login
Performance of Implementing Agencies
View All
Mahanagar Telephone Nigam Limited
Manual data submission of complaints started
Delhi Police
Manual data submission of complaints started
Latest Directions issued by CPCB
View All
08-Nov-2017
CPCB
trends
08-Nov-2017
All Agencies involved in Delhi-NCR
All agencies involved in air pollution control-ling are hereby informed that average AQI in Delhi NCR is above the concentration of PM10 > 500 ug/m3 and PM2.5 > 300 ug/m3 continuously from last 36 hours. Hence all agencies are requested to be prepared for
Air Quality Index Information
AQI Status
AQI BULLETIN
ABOUT NATIONAL AIR QUALITY INDEX
HOW IS AQI CALCULATED
NATIONAL NETWORK
LIMITATIONS
BROAD GUIDELINES FOR PUBLIC
Graded Response Action Plan for Delhi & NCR
Action Plan
Notification
CAAQMS Information
PROTOCOL
National Ambient Air Quality Standards
CAAQMS Stations List Delhi NCR
CAAQMS Stations List All India
All India CAAQMS Portal
ross locations, and averaging is not a scientifically sound approach. However, for the sake of simplicity this method is being followed. For AQI of monitoring locations, webs
Data Contributions are Acknowledged to

Central Control Room for Air Quality Management - All India

Continuous Stations Status

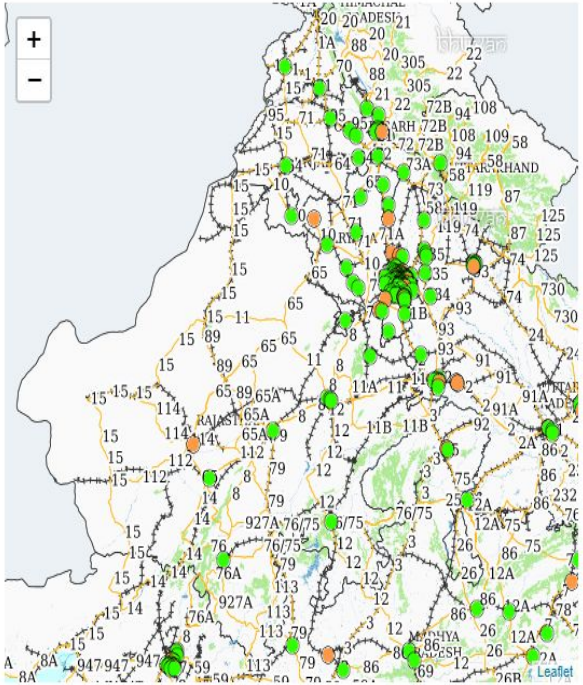
Excel



National Air Quality Index

Central Pollution Control Board,
Ministry of Environment, Forests and Climate Change

State: Delhi | City: Delhi | Station: Bawana, Delhi - DPCC | 25/04/2022 | 21:00



Very Poor

329

AQI

0 500

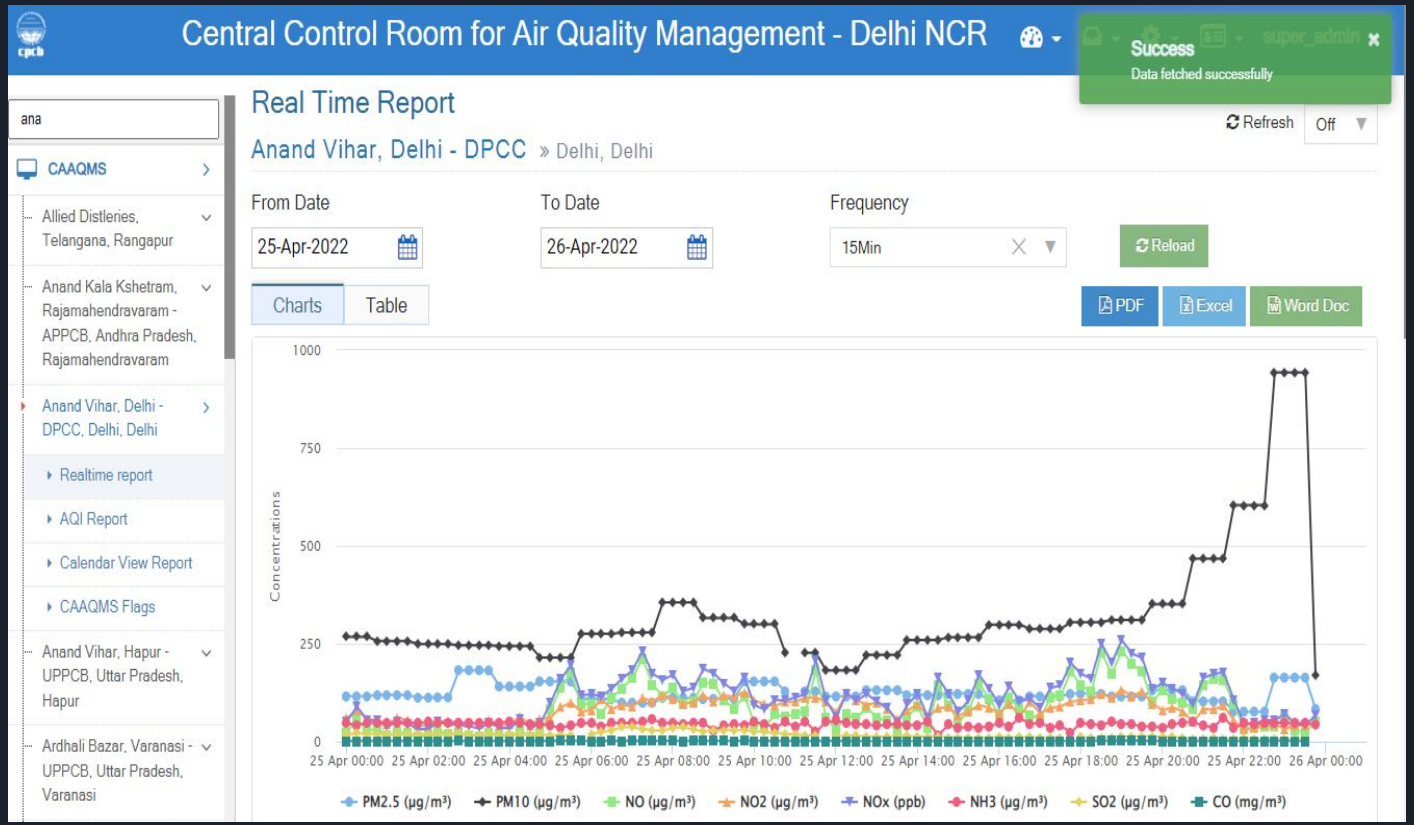
Bawana, Delhi - DPCC

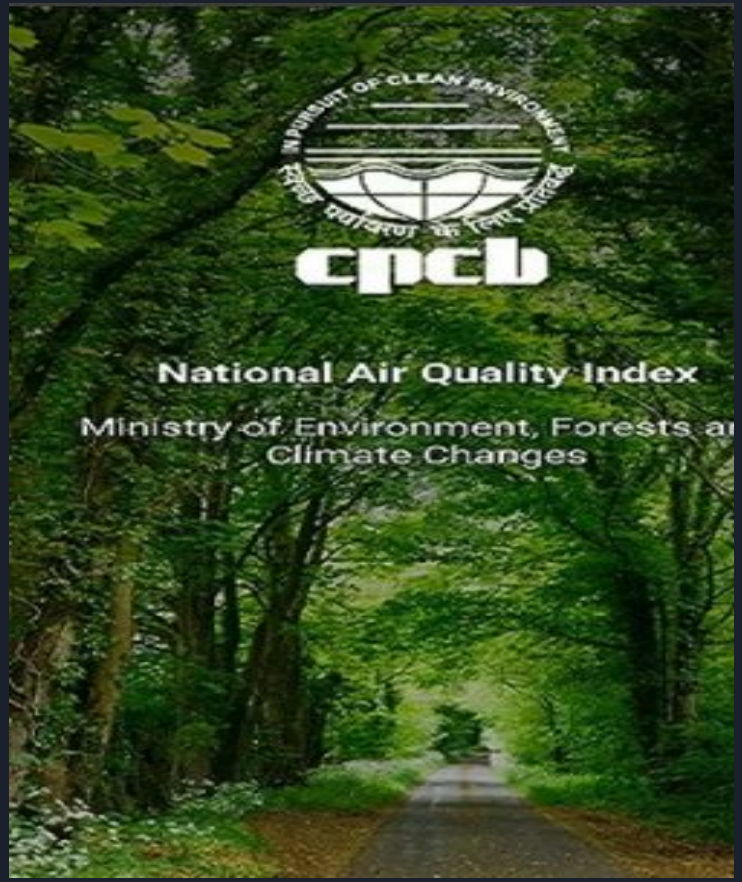
Prominent Pollutant is **PM10**

On **Monday, 25 Apr 2022 09:00 PM**

Pollutant	Timeline	Avg	Min	Max
PM2.5		268	70	424
PM10		329	135	470
NO2		16	4	41
NH3		9	6	9
SO2		16	5	28
CO		49	30	102
OZONE		48	16	69

10... 2AM, Mon 6AM, Mon 10AM, Mon 2PM, Mon 6PM, Mon


Central Control Room for Air Quality Management - Delhi NCR
Success
Data fetched successfully
ana
CAAQMS
Allied Distleries, Telangana, Rangapur
Anand Kala Kshetram, Rajamahendravaram - APPCB, Andhra Pradesh, Rajamahendravaram
Anand Vihar, Delhi - DPCC, Delhi, Delhi
Realtime report
AQI Report
Calendar View Report
CAAQMS Flags
Anand Vihar, Hapur - UPPCB, Uttar Pradesh, Hapur
Ardhali Bazar, Varanasi - UPPCB, Uttar Pradesh, Varanasi
Real Time Report
Anand Vihar, Delhi - DPCC » Delhi, Delhi
Refresh
Off
From Date
25-Apr-2022
To Date
26-Apr-2022
Frequency
15Min
Reload
Charts
Table
PDF
Excel
Word Doc
Concentrations
1000
750
500
250
0
25 Apr 00:00
25 Apr 02:00
25 Apr 04:00
25 Apr 06:00
25 Apr 08:00
25 Apr 10:00
25 Apr 12:00
25 Apr 14:00
25 Apr 16:00
25 Apr 18:00
25 Apr 20:00
25 Apr 22:00
26 Apr 00:00
PM2.5 (µg/m³)
PM10 (µg/m³)
NO (µg/m³)
NO2 (µg/m³)
NOx (ppb)
NH3 (µg/m³)
SO2 (µg/m³)
CO (mg/m³)


cpcb
National Air Quality Index
Ministry of Environment, Forests a
Climate Changes