



Government of India

Open Source Software Stack

(Open source software stack for use in e-Governance applications)

November 2022

OTG-TDOC-OSS-2022-1 | Version 8.8

**NATIONAL INFORMATICS CENTRE
Ministry of Electronics & Information Technology
New Delhi-110 003**

*Disclaimer: Open Source Software and the logos included is / are copy right of
respective Owners / Open Source Community*

Amendment log

Version No	Release Date	Description	Section(s) Modified By	Prepared by	Reviewed by	Approved By
8.8	29 th November 2022	OSS Stack 2022 for NIC	Reviewed. New Tools added after feedback from NIC Officers.	OTG Team, NIC	Srinivasa Raghavan K, DDG and SIO - TNSC	DG,NIC
8.7.5	09 th November 2022	OSS Stack 2022 for NIC	Updated Tools with the latest version.	OTG Team, NIC	OTG Team, NIC	
8.7.4	07 th October 2022	OSS Stack 2022 for NIC	Reviewed. Added New Tools after feedback from NIC Officers on updated report based on DigitalNIC circular.	OTG Team, NIC	OTG Team, NIC	
8.7.3	13 th September 2022	OSS Stack 2022 for NIC	Reviewed. New Tools added after feedback from NIC Officers.	OTG Team, NIC	Srinivasa Raghavan K, DDG and SIO - TNSC	
8.7.2	02 nd September 2022	OSS Stack 2022 for NIC	New Tools added after feedback from NIC Officers.	OTG Team, NIC	OTG Team, NIC	
8.7.1	01 st July 2022	OSS Stack 2022 for NIC	ALL	OTG Team, NIC	OTG Team, NIC	
8.7	17 th September 2020	OSS Stack 2020 for NIC	Suggestions from DG, NIC	OTG Team, NIC	Dr.V.S.Raghunathan, DDG	DG,NIC
8.6	21 st July 2020	OSS Stack 2020 for NIC	ALL	OTG Team, NIC	Dr.V.S.Raghunathan, DDG	
8.5	09 th March 2020	OSS Stack 2020 for NIC	ALL	OTG Team, NIC	Dr.V.S.Raghunathan, DDG Technical Advisory Committee (TAG)	
8.4	7 th May 2019	OSS Stack 2019 for NIC	Suggestions from TAG are incorporated.	OTG Team, NIC	Dr.V.S.Raghunathan, DDG Technical Advisory Committee (TAG)	DG,NIC
8.3	16 th April 2019	OSS Stack 2019 for NIC	New Tools added after second level feedback from SIOs/HoGs/HoDs.	OTG Team, NIC	Dr.V.S.Raghunathan, DDG Technical Advisory Committee (TAG)	
8.2	29 th March 2019	OSS Stack 2019 for NIC	New Tools added after First level feedback through SIOs/HoGs/HoDs	OTG Team, NIC	Dr.V.S.Raghunathan, DDG	
8.1	12 th March 2019	OSS Stack 2019 for NIC	ALL	OTG Team, NIC	Dr.V.S.Raghunathan, DDG	
1	1 st May 2014	Policy on Open source software stack 2014 for use in e-Governance applications	ALL	OTG team, NIC	Dr P Balasubramanian DDG	DG, NIC

OPEN SOURCE POLICY

Organizations worldwide have adopted innovative alternative solutions in order to optimise costs by exploring avenues of “Open Source Software”. Govt has also been promoting the use of open source technologies in the e-Governance domain within the country in order to leverage economic and strategic benefits. The first Framework for Adoption of Open Source Software in e-Governance Systems was brought out by Government of India during April 2015 with NIC as the key contributor. Refer www.meity.gov.in for more details.

RECOMMENDED OPEN SOURCE STACK FOR NIC

As an effort towards compliance of the above policy, the open source software stack for use in NIC for developing e-Governance application was revised and circulated to HoG/SIO/HoD and to all officers over IntraNIC for review and feedback. The feedback received from various states and project teams were compiled, reviewed, evaluated and incorporated. All the software/tools mentioned are that of Community Edition only.

This document recommends the Open Source Software Stack for developing and deploying in e-Governance Applications managed by NIC. The document is divided into two parts namely **priority tools** and **supplementary tools**. These tools are classified under various functional areas and grouped in three major stack categories namely Open Web Technology (OWT), Java and PHP. The prioritized tools are limited to the tools that are deployed in the NIC data centres. The priority tools included are highly recommended that the new project should prefer to use. It is recommended that project teams should strive to update or upgrade to the latest supported version. The personalized advisories will be made available for those who have updated their environmental deployment details under DIGITAL NIC. The tools and their versions indicated in this document may change from time-to-time as per the release cycle of the respective tools and the requirements from the project teams.

OSS REPOSITORY SERVICES

NIC has been providing consultancy, advisory and support services towards the adoption of OSS as per “Policy on Adoption of Open Source Software for Government of India”. These services are limited to the prioritized tools that are deployed in the NIC data centres only. The services that are offered through OSS REPOSITORY includes the following **pre-configured hardened artifacts for CentOS, AlmaLinux, Rocky Linux & Ubuntu Operating Systems**.

- Customized ISO images
- Update Utilities tools option for Updating to the latest versions of OSS tools as per the stack
- Native packages in RPM and DEB formats

Personalized advisories are provided for the prioritized OSS stack tools in OSS Repository Portal through DigitalNIC and SANDES (GIMS). Four types of repositories are made available namely

1. The information & advisory dissemination through ossrepository.gov.in
2. Operating Systems Update/ Upgrade for respective OS
3. Community Repositories for PostgreSQL (PGDG), PHP (Raven), Apache HTTP (Remi), Node NPM, Nginx, MariaDB, Gitlab, Docker and Python PIP are also provided.
4. Custom RPM and DEB repository for CentOS and Ubuntu.

OSS SUPPORT

NIC Service Desk <https://servicedesk.nic.in> will have list of priority tools for which consultancy and advisories can be availed. New OSS tool(s) that are found suitable may also be submitted through NIC Service Desk for evaluation and inclusion in supplementary list.

Priority Tools

Functional Areas for Tools	OWT Technology Stack	Java Technology Stack	PHP Technology Stack
----------------------------	----------------------	-----------------------	----------------------

Solutions for Infrastructure

Server Operating System	CentOS (7.x), CentOS Stream (8/9)* Ubuntu (22.04/20.04/18.04) AlmaLinux(9.x/8.x) Rocky Linux(9.x/8.x)
Desktop Operating System	Ubuntu (22.04/20.04/18.04)

Solutions for Application Development & Deployment

Web / HTTP Server	Apache HTTP Server (2.4.x), Nginx (1.23.x)		
Application Server	Apache Tomcat (8.5.x/9.0.x/10.0.x/10.1.x)		
Programming Language Server-side and Library	OpenJDK(17.x/11.x), PHP (8.1.x/8.0.x)	OpenJDK (17.x/11.x)	PHP (8.1.x/8.0.x)
	Python (3.x)		
Relational Database	PostgreSQL Community Edition (15.x/14.x/13.x/12.x/11.x) MariaDB Community Edition (10.9.x/10.8.x/10.6.x/10.5.x/10.4.x/10.3.x) MySQL Community Edition (8.0.x)		

Supplementary Tools

Functional Areas for Tools	OWT Technology Stack	Java Technology Stack	PHP Technology Stack
----------------------------	----------------------	-----------------------	----------------------

Solutions for Source Code management, Dev Ops & Documentation	IDE	Eclipse (2022-xx) with extensions, Netbeans (15.x), JetBrains- IntelliJ IDEA(2022.2.x), Visual Studio Community Edition(17.x)		
	Source Code Control	Git (2.38.x) / Subversion (1.x), GitHub(3.1.x)		
	Source Code Editor	Visual Studio Code (1.73.x)		
	Documentation	LibreOffice (7.3.x), Openoffice (4.1.x)		
	Build Tool	Apache Maven (3.8.x), Gradle (7.5.x), Webpack(5.74.x)	Apache Maven (3.8.x) , Gradle (7.5.x)	Phing (2.17.x), puppet(7.19.x), Composer(2.4.x)
	Application Life Cycle Management / Project Management	Tuleap (13.x), Redmine (5.0.x),		
	CI/CD	Jenkins (2.x), GITLab(15.x), SonarQube(9.7.x)		
	Code review	Gerrit (3.x)		
Solutions for Application Development & Deployment	Programming Language Client-side	HTML (5.x), CSS (3.x/4.x), JavaScript (ECMA Script 2022), jQuery (3.6.x)		
	Web Service Framework	Apache CXF (3.5.x/3.4.x) Symfony (6.1.x/5.4.x)	Apache CXF (3.5.x/ 3.4.x), PostGREST (10.0.x)	Symfony (6.1.x/5.4.x), CakePHP (4.4.x) / Laravel (10.x/9.x), CodeIgniter (4.2.x)
	Web / HTTP Server	nginx-quick (1.23.x) with boringssl		
	Programming Language Server-side and Library	XAMPP(8.1.x/8.0.x/7.4.x) GoLang(1.19.x/1.18.x), ASP.NET Core MVC(7.0)		
	Server Side Framework	Spring Boot (2.7.x)	Apache Wicket Framework (9.12.x/8.14.x) , Ruby on Rails(7.0.x/ 6.1.x/ 6.0.x/ 5.2.x), Struts (6.0.x / Spring (5.3.x) /Spring Boot (2.7.x)	CakePHP (4.4.x) / Laravel (10.x/9.x), Symfony (6.1.x/5.4.x), CodeIgniter (4.2.x)
		.NET Core (7.0.x/6.0.x), Python-Django (4.1.x), Whack(0.7.x), WSO2 CE(4.7.x), Kong CE(3.x.y/2.x.y)		
	Server-side API	TYK (4.2.x/4.0.x)		
	Server-side API(GoLang)	Go Chi(5.0.x), JWT-GO(3.2.x), Gorm(1.24.x), Logrus(1.8.1), Resty(2.7.x), GRPC-Go(1.50.x), envconfig(1.4.x), Gorilla /Web Socket(1.5.x) Go(1.19.x/1.18.x), FluxIO Go XMPP(0.5.x), Go Redis(8.11.x), bleve(2.3.x), HikariCP(5.0.x), Themis(13.x), Gorilla MUX(1.8.x)		
	Application Server	Node.js (19.x/18.x) with Express.js(4.18.x)		
	Client-side Framework	React.js (18.2.x/17.0.x), Vue.js(3.2.x), Polymer.js (3.4.x/2.8.x), Angular (14.0.x/13.0.x), Ember (4.8.x) , Bootstrap (5.x/4.x), underscore.js(1.13.x), Redux (4.2.x)		
	Client-side API	Openlayers(7.1.x), google-webrtc(1.0.x)		

Data Analytics	Analytics and Search Engine		Apache-Spark(3.3.x), Apache-Flink (1.15.x/1.14.x), R-Programming (4.2.x), Apache-Zeppelin(0.10.x), Apache-Nutch(2.x.y/1.x.y) , ELK-Elasticsearch(8.5.x) , Apache Solr (9.0.x) , Apache Lucene (9.4.x) , OpenSearch (2.3.x/2.2.x/1.3.x)
	Dashboard		C3.js (0.7.x), D3.js (7.6.x), dc.js (4.2.x)
Application testing	Testing		QUnit (2.19.x), JUnit (5.x) QUnit (2.19.x), JUnit (5.x), Apache Jmeter (5.5), Apache Jmeter (5.5), W3C markup Validation service(1.4) W3C markup Validation service(1.4)
	Static Code Analyzer		Selenium (4.6.x), Gophish(0.12.x) PMD (6.51.x)
Mobile Applications	Mobile Native (Android)		Android Studio 2021.3.1 (Dolphin)), rootbeer(0.1.x), volley(1.2.x), Smack(4.4.x), okhttp(4.10.x), zxing(3.5.x),
	Mobile Native (iOS)		SwiftJSON(5.0.x), SwiftLinkPreview(3.4.x), CryptoSwift(1.6.x), Swift 5(5.6.x), SwiftEntryKit(2.0.x), ReverseExtension(0.6.x), ZIPFoundation(0.9.x), RNCryptor(5.1.x), Cocopods(1.11.x), Toolbar(0.7.x), coturn (4.5.2.x), SVProgressHUD(2.2.x), DataCompression(3.6.x), AlamofireImage(4.2.x), Alamofire(5.6.x), IQKeyboardManager(6.5.x) , XMPPFramework(4.1.x), FlexColorPicker(1.4.x), TextFieldEffects(1.7.x),
	Cross-platform		Apache-Cordova (11.0.x), Ionic(6.3.x), Flutter(3.3.x), Appium(2.0.x), Glide(4.14.x), GoogleWebRTC(1.01x), React Native (0.70.x)
Solutions for Infrastructure	Server Operating System		Debian (11.x)
	Desktop Operating System		BOSS (9.x/8.x) / Fedora (36) / Debian (11.x)
	Containers		Docker (20.10.x), Kubernetes(1.x) , podman (4.2.x) ,
	Command Line Interface		Fish (3.5.x), Byobu (5.x), Guake (3.9.x), Snowflake SSH(1.0.x),
	Monitoring Solution		OpenNMS(30.0.x), Zabbix(6.x/5.x), Netdata(1.35.x), Nagios (4.4.x), OpenDCIM(21.x), AWStats(7.x), IBM appmetrics(5.1.x)
	Directory Services		OpenLDAP (2.6.x)
	Virtualisation		proxmox(7.x)
	Cloud Platform		OpenStack (Zed), Minio(RELEASE.2022-10-05T14-58-27Z) , Jaeger(1.39)
	Video Conference		Apache OpenMeetings (6.3.x), Jitsi(2.x)
	Configuration Management		Apache Zookeeper (3.8.x), Ansible(2.9.x)
	VPN		wireguard(1.0.x)
	Issue Tracking		OTRS (Open-source Ticket Request System)(8.0.x)
	Mail		Zimbra(9.0.x)
	Malware		Malware Information Sharing Platform (MISP) (2.4.x)
	Storage		Ceph Storage (17.2.x)
Solutions for Data Management	Networkign Platform/API		Open vSwitch (OVS)(2.17.x), Open Network Operating System (ONOS) (2.7.x), OpenDaylight (ODL)(Chlorine-SR0)
	Instant Messaging		eJabberd(22.x)
	Non-Relational Database (Big Data)		Apache Cassandra (4.0.x) , Apache Hbase (2.5.x) with Hadoop (3.3.x) , Apache CouchDB (3.2.x) ,Apache Hive (3.1.x) , ArangoDB(3.10.x), mongoDB(6.1.x), Apache Drill (1.20.x) , RavenDB(5.4.x)
	Object Relational Mapping	Hibernate (6.1.x)	Hibernate (6.1.x) Doctrine (3.2.x)
	Database Administration	PgAdmin IV (4.x), PhpMyAdmin (5.2.x), phppgAdmin(7.13.x), Redash(10.1.x)	
	Database Reporting		Jasper Report (6.20.x) with iReport Designer (5.6.x), Birt (4.9.x) Jasper Report (6.20.x) with iReport Designer (5.6.x), wkhtmltopdf (0.12.x), Birt (4.9.x) wkhtmltopdf (0.12.x), MPDF(8.1.x), FPDF(1.x), TCPDF(6.4.x)

	Database Replication	SymmetricDS (3.14.x / 1.7.x)		
	Database Management	SQLyog (Community Edition)(13.1.x)		
	NewSQL	YugabyteDB (2.14.1.x), Vitess(15.x)		
	Data Management	ODK (Open Data Collect) (2022.3.x), Netlogo (6.3.x), Fluentd(1.15.x)		
	Caching (in memory DB)	redis (7.0.x), memcached(1.6.x)		
Solutions for GIS	GIS Server	Geo Server (2.21.x), Geotools(25.x)	Geo Server (2.21.x), Geotools(25.x)`	Map server (8.0.x/7.6.x), MBTILES Community module(1.x),GEOWEB CACHE(1.x), JDBConfig- Extension to GeoServer,GeoServer Printing Module extension
	GIS Desktop	Quantum GIS (3.28.x / 3.22.x), GRASS GIS (8.x/7.8.x), gvSIG (2.5.x)	Quantum GIS (3.28.x / 3.22.x), GRASS GIS (8.x/7.8.x), gvSIG (2.5.x)	Quantum GIS (3.28.x / 3.22.x), GRASS GIS (8.x/7.8.x), gvSIG(2.5.x) , TILEMILL map studio(1.0.x)
	GIS Database	PostGIS (3.1.x), neo4j CE (4.4.x)		
Portal,e-learning,KM,BI etc.	Portal/CMS	Drupal (9.4.x/9.3.x/7.x), wordpress(6.0), zope(5.x)	Liferay Community Edition (7.4.x), Strapi.io CE (4.4.x)	Drupal (9.4.x/9.3.x/7.x), wordpress(6.0), zope(5.x), Joomla (4.2.x/3.10.x)
	Digital Archival Repository	Dspace (7.x), LogicalDoc CE (Community Edition)(8.7.x)		
	Integrated Library Systems	Koha (22.05), Folio		
	E-learning	Moodle (3.11/4.0/4.1)		
	Messaging	Apache Kafka(3.3.x/3.2.x/3.1.x), ActiveMQ(5.17.x/5.16.x), RabbitMQ(3.11.x/3.10.x), NATS.io (2.9.x)		
	Knowledge Management	OpenKM-CE (Community Edition)(6.3.x)		
	Business Intelligence(BI)	Pentaho(Community Edition)(9.3/8.3) knowage-server(8.0.x)		

Legend

■ OSS Stack 2020 supplementary Tools

■ Meta data collected tools for advisories

■ New Tools added based on feedback 2022

* Please see disclaimer in last page.

Disclaimer: This content is prepared for NIC's internal use and cannot be disclosed or copied without the prior written consent of National Informatics Centre (NIC). Nothing in this content constitutes a guaranty, warranty, or license, express or implied. NIC disclaims all liability for all such guaranties, warranties, and licenses, including but not limited to: Fitness for a particular purpose; merchantability; not infringement of intellectual property or other rights of any third party or of NIC; indemnity; and all others. The reader is advised that third parties can have intellectual property rights that can be relevant to this content and the technologies discussed herein, and is advised to seek the advice of competent legal counsel, without obligation of NIC. NIC retains the right to make changes to this content at any time, without notice. NIC makes no warranty for the use of this content and assumes no responsibility for any errors that can appear in the content nor does it make a commitment to update the information contained herein.

* Redhat has issued an advisory and a checklist on the use of CentOS Stream release of OS. Redhat says that CentOS Stream is not designed for production use. It is intended as a development platform for Red Hat partners and others that want to participate and collaborate in the Red Hat Enterprise Linux ecosystem. Consequently, running CentOS Stream in production environments presents many challenges compared to enterprise-ready distributions like RHEL. For more details visit <https://www.redhat.com/en/resources/centos-stream-checklist>

** From the community perspective binary equivalents of RHEL 8 / 9 are AlmaLinux 8/ 9 and Rocky Linux 8/ 9.



Open Technology Group

National Informatics Centre

Ministry of Electronics & Information Technology

OTG, A-Wing, First Floor, Rajaji Bhawan,

Basant Nagar, Chennai – 600 090

E.mail: otghelpdesk@nic.in



राष्ट्रीय सूचना विज्ञान केंद्र
ए-ब्लॉक, सीजीओ कॉम्प्लेक्स, लोधी रोड,
नई दिल्ली - 110 003 भारत