



DG DIGIT

Unit.D2 (Interoperability Unit)

# Open Source Software Country Intelligence Report Turkey 2021

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# Turkey

## Executive Summary

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The Digital Transformation Office of the Presidency of the Republic of Turkey is the main entity in charge of Turkey's digital transformation, which includes the promotion and development of open source software (OSS) policies and initiatives in the country. In Turkey, the central government, local authorities, and local companies are increasingly using and developing OSS as part of their internal processes.

In the last decade, the development of OSS within public administrations has been a recurrent objective of the Turkish government's eGovernment digital strategies and action plans, as stated in Turkey's Eleventh Development Plan<sup>1</sup>, the 2020 Annual Programme of the Turkish Presidency<sup>2</sup>, and the 2021 Annual Programme of the Turkish Presidency<sup>3</sup>. Since 2020, the Turkish government has intensified its efforts to encourage the development of an open source ecosystem in Turkey with the creation of an Open Source Platform<sup>4</sup>, gathering around 100 public entities and private organisations to foster the use of OSS in the country.

## Actors

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This section presents the policy makers who are active in digitalisation efforts and influence the status of open source in the public sector, as well as the main strategic players that work together with the government at all levels to raise awareness on OSS.

### *Policy makers*

- The Digital Transformation Office of the Presidency of the Republic of Turkey<sup>5</sup> is responsible for the implementation of the digital transformation of public institutions and increasing the efficiency and quality of Turkish public services in line with the goals, policies, and strategies set by the Turkish government.
- The Ministry of Industry and Technology<sup>6</sup> is tasked with the development and implementation of all policies about the digitalisation of the Turkish private sector. The following units should be considered:

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<sup>1</sup> [https://sbb.gov.tr/wp-content/uploads/2020/03/On\\_BirinciPlan\\_ingilizce\\_SonBaski.pdf](https://sbb.gov.tr/wp-content/uploads/2020/03/On_BirinciPlan_ingilizce_SonBaski.pdf)

<sup>2</sup> [https://sbb.gov.tr/wp-content/uploads/2019/11/2020\\_Yili\\_Cumhurbaskanligi\\_Yillik\\_Programi.pdf](https://sbb.gov.tr/wp-content/uploads/2019/11/2020_Yili_Cumhurbaskanligi_Yillik_Programi.pdf)

<sup>3</sup> [https://www.sbb.gov.tr/wp-content/uploads/2020/11/2021\\_Yili\\_Cumhurbaskanligi\\_Yillik\\_Programi.pdf](https://www.sbb.gov.tr/wp-content/uploads/2020/11/2021_Yili_Cumhurbaskanligi_Yillik_Programi.pdf)

<sup>4</sup> <https://www.turkiyeacikkaynakplatformu.com/>

<sup>5</sup> <https://www.cbddo.gov.tr/en/>

<sup>6</sup> <https://www.sanayi.gov.tr/anasayfa>

- The National Technology Directorate General<sup>7</sup> is in charge of the implementation and support of programmes on OSS. The Directorate General is also in charge of contributing to the development of the digital transformation ecosystem.
- The Strategic Research and Productivity General Directorate<sup>8</sup> is tasked with cooperating with relevant institutions and organisations in studies to be carried out to develop science, industry, technology, research, development, and innovation policies.
- The Presidency of Strategy and Budget of the Presidency of the Republic of Turkey<sup>9</sup>, is in charge of coordinating the development of sectoral and thematic policies and strategies, especially the preparation of basic policy documents, preparation and implementation of the central government budget, resource allocation, budget, policy and strategy implementation.

### *Strategic players*

- The Scientific and Technological Research Council of Turkey<sup>10</sup> (TÜBİTAK) is the governmental agency in charge of the management, funding, and conduct of scientific and technological research in Turkey.
- Türksat<sup>11</sup> is a state-owned company that develops and operates a vast array of mission-critical software projects and IT infrastructure for the government.
- Turkey Open Source Platform<sup>12</sup> is the civil initiative that brings all actors together with a pre-competitive cooperation model for the development of an OSS ecosystem in Turkey.

## Policy and legal framework

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This section summarises the main OSS-related policies and legal acts of the last ten years, including the first known milestone in this domain. The list is presented in chronological order, starting from the most recent milestone.

- The Presidential Circular no. 2021/18 on the National Artificial Intelligence Strategy<sup>13</sup> 2021-2025 (NAIS), published in August 2021, was prepared in cooperation with the Digital Transformation Office of the Presidency of the Republic of Turkey and the Ministry of Industry and Technology, and with active participation of all relevant stakeholders. The NAIS is Turkey's first national strategy document on artificial intelligence (AI) and includes provisions to support the development of open source solutions in the AI ecosystem.

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<sup>7</sup> <https://www.sanayi.gov.tr/merkez-birimi/c03f1f3bae27/hakkimizda>

<sup>8</sup> <https://www.sanayi.gov.tr/merkez-birimi/92d9c73bddbb/hakkimizda>

<sup>9</sup> <https://www.sbb.gov.tr/>

<sup>10</sup> <https://www.tubitak.gov.tr/en>

<sup>11</sup> <https://www.turksat.com.tr/en>

<sup>12</sup> <https://www.turkiyeacikkaynakplatformu.com/>

<sup>13</sup> <https://www.cbddo.gov.tr/en/nais>

- The 2023 Industry and Technology Strategy<sup>14</sup> aims to develop Turkey’s OSS ecosystem by bringing together the public sector, private sector, NGOs, and universities in order to increase the quality of software produced in Turkey and to develop products and services on a global scale.. The Strategy promotes the development of open source domestic solutions to address cybersecurity risks that may arise in high priority projects and national initiatives in the digital field. In addition, the Strategy recommends the use of open source solutions to foster the interoperability of public applications and registries (e.g. land registry, diploma, customs applications, etc.) with Turkey’s blockchain infrastructure.
- Turkey’s Eleventh Development Plan<sup>15</sup> (2019-2023) defines the policy objectives to be pursued by the Turkish government until 2023. The Plan details that Turkey will develop its OSS industry and network especially in the field of cybersecurity. Additionally, the Development Plan promotes the use of OSS within the Turkish public administration.
- The 2021 Annual Programme of the Turkish Presidency<sup>16</sup> includes provisions on a preference for OSS in public ICT investments, to be monitored by the Digital Transformation Office, Presidency of Strategy and Budget, and TUBITAK. Additionally, the Annual Programme and Action 813.2 “Institutional plans for transition to open source software will be prepared. The Digital Transformation Office, Relevant Institutions, and Organizations are responsible in this regard.”
- The 2020 Annual Programme of the Turkish Presidency<sup>17</sup> includes the development of an OSS ecosystem in Turkey, as well as the launch of an open source platform<sup>18</sup>.
- The National eGovernment Strategy and Action Plan<sup>19</sup> (2016-2019) aims to increase the digitalisation of the Turkish administration and the development and implementation of eGovernment services. To this end, the Strategy calls for the preparation of a roadmap for the use of OSS within Turkey’s public administration and includes the generalisation of the use of OSS for priority information systems<sup>20</sup> in Turkish public agencies.

## Open source software initiatives

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This section presents an overview of the main open source software related initiatives in Turkey. The list is presented in a chronological order, starting with the most recent initiative.

- Pardus, 2005<sup>21</sup>: The Debian GNU/Linux-based operating system Pardus was developed by the Turkish government in 2005, with the support of TÜBİTAK. The Pardus project aims to foster

<sup>14</sup> <https://www.sanayi.gov.tr/assets/pdf/SanayiStratejiBelgesi2023.pdf>

<sup>15</sup> [https://www.sbb.gov.tr/wp-content/uploads/2020/03/On\\_BirinciPlan\\_ingilizce\\_SonBaski.pdf](https://www.sbb.gov.tr/wp-content/uploads/2020/03/On_BirinciPlan_ingilizce_SonBaski.pdf)

<sup>16</sup> [https://www.sbb.gov.tr/wp-content/uploads/2020/11/2021\\_Yili\\_Cumhurbaskanligi\\_Yillik\\_Programi.pdf](https://www.sbb.gov.tr/wp-content/uploads/2020/11/2021_Yili_Cumhurbaskanligi_Yillik_Programi.pdf)

<sup>17</sup> [https://sbb.gov.tr/wp-content/uploads/2019/11/2020\\_Yili\\_Cumhurbaskanligi\\_Yillik\\_Programi.pdf](https://sbb.gov.tr/wp-content/uploads/2019/11/2020_Yili_Cumhurbaskanligi_Yillik_Programi.pdf)

<sup>18</sup> More information on this initiative is available in the ‘Open source software initiatives’ section.

<sup>19</sup> <https://afyonluoglu.org/PublicWebFiles/strategies/2016ESEP/2016-2019%20National-e-Government-StrategyAnd%20Action-Plan-EN.pdf>

<sup>20</sup> Priority Information systems are a type of software that organizations use to manage day-to-day business activities such as accounting, procurement, project management, risk management and compliance, and supply chain operations.

<sup>21</sup> <https://www.pardus.org.tr/>

the dissemination of OSS within the Turkish public sector by making available a government-built and approved operating system. Thus, the adoption of Pardus has been encouraged by Turkish public authorities. Pardus is used by the Ministry of Justice, Ministry of Defence Military Recruitment Division, Ministry of Industry and Technology, Ministry of Interior, Ministry of Health, Presidency of Religious Affairs. Since 2016, the Pardus project has been gaining importance with the development of several Pardus-compatible OSS aiming at complementing the operating system: the Octopus cyber security software<sup>22</sup>, the Engerek identity management system<sup>23</sup>, the Liderahenk management system<sup>24</sup>, and the Interactive Board Interface Project<sup>25</sup>.

- Octopus, 2018<sup>26</sup>: The Pardus-compatible cyber security software was developed by the Turkish Academic Network and Information Centre<sup>27</sup> (ULAKBIM). Octopus is composed of several cybersecurity open source components such as a cyber event management system, a network access control system, and a cyber-attack early warning system.
- Engerek Identity Management System, 2017<sup>28</sup>: Engerek is an open source Identity Management System developed by TÜBİTAK and the Pardus community under an Apache-2.0 licence. Pardus-compatible, the software can synchronise multiple sources of identity data, manage data from these sources, convert them to another data and synchronise with each other.
- Liderahenk, 2016<sup>29</sup>: Liderahenk is a Pardus-compatible software system that enables central management, monitoring, and control of systems and users on the corporate network. The software includes an encrypted channel to secure internal communication.
- Interactive Board Interface Project (ETAP), 2013<sup>30</sup>: ETAP was developed by TÜBİTAK and the Pardus community, the Pardus interactive board and its open source management system have been specifically designed for education services. Over 60,000 Pardus interactive boards are in use in Turkish schools as of 2021.
- GIBUX project, 2013<sup>31</sup>: The GNU/Linux-based open source operating system has been designed and developed by Turkish engineers to be used by the Revenue Administration (GİB) in all the tax offices of the country. Initiated in 2013, the GIBUX project was completed in January 2018 with the country-wide deployment of the software. GIBUX

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<sup>22</sup> <http://www.ahtapot.org.tr/ahtapot.html>

<sup>23</sup> <http://www.pardus.org.tr/projeler/engerek/>

<sup>24</sup> <http://www.liderahenk.org/>

<sup>25</sup> <http://www.etap.org.tr/>

<sup>26</sup> <http://www.ahtapot.org.tr/ahtapot.html>

<sup>27</sup> <https://ulakbim.tubitak.gov.tr/en>

<sup>28</sup> <http://www.pardus.org.tr/projeler/engerek/>

<sup>29</sup> <http://www.liderahenk.org/>

<sup>30</sup> <http://www.etap.org.tr/>

<sup>31</sup> <https://gibux.gib.gov.tr/icerik/gibux-nedir>

is actively used in 1,184 locations and on 37,300 desktops and 515 servers as of 2021. GIBUX is a customised version of the Pardus operating system.

- Public Open Source Conference, 2021<sup>32</sup>: The Turkish government held the Public Open Source Conference to promote the use of open source database management systems aiming to increase the use of PostgreSQL in the public and private sectors. A series of trainings were offered to public agents such as PostgreSQL Database Administrator Training, PostgreSQL Database Developer Training, Free Software Camps, and PostgreSQL Database Administrator Training. The documents that emerged during the utilisation and training activities were expanded and shared under open licence as PostgreSQL Administrator Documentation and PostgreSQL Database Developer Documentation.
- YÖKSANLAB, 2021<sup>33</sup>: was developed in responding distance learning needs due to the COVID-19 crisis. The Council of Higher Education (YÖK), in cooperation with TUBITAK and the private sector, ensured that physics and chemistry laboratory courses in all universities were carried out remotely. The system was opened to the use of 38 universities in its first year and used by a total of 6 000 students. Java Spring Framework, JavaScript React Framework software development libraries were used in the system, PostgreSQL and Redis were used as databases. Its infrastructure works on Linux/GNU operating systems on container technology by using Docker and Docker Swarm.
- Turkey Open Source Platform, 2020<sup>34</sup>: Launched in the framework of the 2020 Annual Programme of the Turkish Presidency, the Open Source Platform aims at developing an open source ecosystem in Turkey. About 100 public or private organisations participate to the platform, in order to develop the use of OSS in Turkey, as well as the development of the country's OSS industry.
- Liman Project, 2020<sup>35</sup>: Developed for the Central Management System by Havelsan<sup>36</sup>, the Liman project allows the central management of servers, infrastructure extension, user and role management, and web-based and remote process management.
- Turkey Open Source Platform, 2020<sup>37</sup>: The platform was launched in the frame of the 2020 Annual Programme of the Turkish Presidency and aims to develop the open source ecosystem in Turkey. About 100 public and private organisations participate in the platform to promote the use of OSS in Turkey, as well as to develop Turkey's OSS industry. The platform's activities cover a series of topics such as artificial intelligence, mobility, digital badge, smart cities, and open banking and works to increase the number and competency of software developers.

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<sup>32</sup> <https://yte.bilgem.tubitak.gov.tr/en/haber/tubitak-bilgem-yte-shared-postgresql-experience-public-ecosystem>

<sup>33</sup> <https://yoksanlab.yok.gov.tr/>

<sup>34</sup> <https://www.turkiyeacikkaynakplatformu.com/>

<sup>35</sup> <https://liman.havelsan.com.tr/>

<sup>36</sup> <https://www.havelsan.com.tr/en>

<sup>37</sup> <https://www.turkiyeacikkaynakplatformu.com/>

- Ministry of Finance, 2019<sup>38</sup>: The Ministry’s public accounting system uses an in-house developed PostgreSQL-based database. The accounting system includes several functionalities such as e-Invoice, e-Guarantee, e-Payment, e-Collection, and e-Documentation, in order to develop a process-oriented integrated information system.
- Safir Cloud Storage, 2016<sup>39</sup>: Developed by TÜBİTAK BİLGEM Cloud Computing and Big Data Research Laboratory (B3LAB), this cloud object storage application provides high speed data storage and access capability. GDPR-compliant, it can be integrated into systems serving large amounts of content like corporate content management systems and document management software. Safir Cloud Storage solution is now used by a number of public institutions and ministries.
- Koha, 2014<sup>40</sup>: The open source, scalable library management system is used at school and academic institutions. Several Turkish public libraries, universities<sup>41 42 43</sup>, and various ministries such as the Ministry of Culture and Tourism<sup>44</sup>, Ministry of Agriculture and Forestry<sup>45</sup> use Koha.
- Product Tracking System, 2010<sup>46</sup>: established in cooperation with the Turkish Pharmaceuticals and Medical Devices Agency, is an infrastructure for end-to-end tracking of medical devices and cosmetic products, executing health audit services, and facilitating clinical engineering processes. Java Spring Framework<sup>47</sup> and JavaScript Angular Framework<sup>48</sup> as well as middleware tools such as Infinispan<sup>49</sup>, WSO2 ESB<sup>50</sup>, S3 File Server, and Tomcat<sup>51</sup> were used during the development phase of the system. NoSQL Cassandra<sup>52</sup> was used as a database solution in the system.
- Government Accounting Management System<sup>53</sup> is an electronic document-based information system which enables the centralised management of all public accounting transactions. Developed by the Turkish Ministry of Treasury and Finance, the Government Accounting Information System uses a PostgreSQL database, as well as the Kafka Messaging tool<sup>54</sup> for communication of microservices, Docker<sup>55</sup>, Mesos/Marathon<sup>56</sup> tools for container management,

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<sup>39</sup> [https://www.b3lab.org/en/sayfalar/safir\\_bulut-13/](https://www.b3lab.org/en/sayfalar/safir_bulut-13/)

<sup>40</sup> <https://www.koha-community.org/>

<sup>41</sup> <http://ekatalog.nevsehir.edu.tr/>

<sup>42</sup> <https://opac.sdu.edu.tr/>

<sup>43</sup> <http://koha.etu.edu.tr/>

<sup>44</sup> <http://koha.ekutuphane.gov.tr/>

<sup>45</sup> <https://kutuphane.tarimorman.gov.tr/>

<sup>46</sup> <https://www.its.gov.tr/>

<sup>47</sup> <https://spring.io/>

<sup>48</sup> <https://angularjs.org/>

<sup>49</sup> <https://infinispan.org/>

<sup>50</sup> <https://wso2.com/products/enterprise-service-bus/>

<sup>51</sup> <http://tomcat.apache.org/>

<sup>52</sup> <https://cassandra.apache.org/ /index.html>

<sup>53</sup> <https://muhasebe.muhasebat.gov.tr/>

<sup>54</sup> <https://kafka.apache.org/>

<sup>55</sup> <https://www.docker.com/>

<sup>56</sup> <https://mesosphere.github.io/marathon/>

Apereo CAS tool<sup>57</sup> as central authentication service, Elastic Stack<sup>58</sup> for log records, Pinpoint<sup>59</sup> for distributed monitoring, and Zabbix<sup>60</sup> for infrastructure monitoring.

- Turkish Data Depository<sup>61</sup>: A web library for preparing the datasets needed for processing Turkish texts, creating the distribution infrastructure of these datasets, creating high-performance libraries, and presenting user-friendly and online tools based on these libraries. With this, data and tool libraries that will contribute to academic studies in Turkey and that can be easily accessed and used by end-users are presented as open source.

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<sup>57</sup> <https://www.apereo.org/projects/cas>

<sup>58</sup> <https://www.elastic.co/elastic-stack/>

<sup>59</sup> <https://pinpoint-apm.github.io/pinpoint/>

<sup>60</sup> <https://www.zabbix.com/>

<sup>61</sup> <https://tdd.ai/>

