Binnur KURT, Ph.D.
https://www.linkedin.com/in/binnur-kurt/

KEY QUALIFICATIONS

He received BS, MS, and Ph.D. degrees from Istanbul Technical University in 1995, 1997, and 2007, all in computer engineering. He was a lecturer at the Computer Engineering Department of Istanbul Technical University from 2004 to 2012 and offered courses mostly on software engineering, including web technologies and object-oriented software development. After academia, he worked as an information technology consultant and technology trainer in Java Enterprise Technologies, Object Oriented Analysis and Design, Service Oriented Architecture, MySQL, Oracle Middleware Technologies, Unix Programming and Administration, High-performance computing, and Real-Time Computer Vision systems. He has been the Founder and CEO of DEEPCLOUDLABS since February 2018.

He has been involved in numerous projects as a project manager, software architect, and technology consultant. He has published many international conference and journal papers and book chapters on these topics. He has also designed many IT training and written training materials on advanced topics, including Spring Cloud, MicroService Architecture, Java, C++, and Python.

He has experience in writing proposals for Horizon Europe and contributed to 5 consortiums in 2020 and 2021.

He holds several certifications, including Sun Certified Java Programmer, Oracle Certified Professional MySQL 5.0 Developer, Oracle Certified Professional MySQL 5.0 Database Administrator, and Red Hat Certified Engineer.

GENERAL PROFESSIONAL EXPERIENCE

He has 25 years of experience in developing software. He has an excellent and deep understanding of computer science and hands-on experience in the following technologies:

- Java SE, Java/Jakarta EE,
- Object-Oriented Analysis and Design, Design Patterns, Clean Architecture
- Cloud-Native Applications and MicroServices Architecture
- Domain-Driven Design, Test-Driven Development, Behavior-Driven Development
- Spring Framework (Boot/Cloud/Data/ORM/MVC/Security)
- Programming Languages and Paradigms (e.g., C/C++/Java/JavaScript/Python)
- HTML5/CSS3/JS Frameworks (jQuery/Angular/React/Vue.js/Knockout)
- MySQL/MySQL Cluster/MongoDB/Cassandra
- Oracle Middleware Technologies (WLS, SOA, BPM, OSB, Coherence),
- Application Server Administration (JBoss and WebLogic Server)
- Unix Programming and Administration,
- High-Performance Computing (Java, OpenCL/CUDA)
- Real-Time Computer Vision Systems
- Big Data and Machine Learning Technologies
- Algo-Trading and High-Frequency Trading Systems
- Crypto-currency and Blockchain

He has excellent knowledge and skills in supporting technology development, first by training the team in these technology fields and then by developing the core parts of the software, and finally, by living with the team throughout the project.

SPECIFIC PROFESSIONAL EXPERIENCE

Over 20 years of experience in managing software projects and technology consultancy:

- **PROJECT MANAGER and SOFTWARE ARCHITECT**

  - On-Chain Analysis Platform (2022)
  - Cloud-native AI Platform for monitoring distance learning performance and exam security based on face biometry (2022)
  - Deep Learning-based Diagnosis System for Anomaly Detection in Chest X-Ray Images (2021)
  - Developing Exchange and Algorithmic Trading Platforms for CryptoCurrency Markets as Cloud Native Applications using Spring Cloud, Apache Kafka, MongoDB, and TensorFlow (2019)
  - High-Frequency Trading Software (written in C and using Celoxica) (2019)

- **CONSULTANCY**

  - TÜBİTAK B3LAB (Cloud Computing and Big Data Research Laboratory) worked as a consultant in Safir DEPO Project. Safir Depo (Safir Cloud Storage), developed by TUBITAK BİLGEM Cloud Computing and Big Data Research Laboratory (B3LAB), is a national and secure cloud object storage application. Objects stored in Safir Depo are accessible anytime and anywhere via smartphones, tablets, or computers through the Internet.
  - İŞ INVESTMENT: He worked as a consultant in trading software projects and helped the team with the following technologies: Multi-core and Parallel Programming in C++11, Linux Programming
  - TÜBİTAK BİLGEM: He worked as a consultant on TAAAS (Test Automation As A Service) project. He guided the team in the following technologies: Core Spring, Spring Boot, Spring Data, Spring REST, Spring Security, and Angular.
  - TÜBİTAK BİLGEM: He worked as a consultant in the VİSKON Crowd Sourcing Platform developed for AFAD (Disaster and Emergency Management Authority of Turkey).
  - ERICSSON: Reviewed the architecture of Ericsson's Telco CRM Application Consultancy and training in MySQL Cluster and JBoss EAP 6 Clustering

- **TECHNOLOGY TRAINER**

  - Garanti BBVA, SIEMENS, SOFTTECH, TÜBİTAK BİLGEM, EPİAŞ, SAHABT, ERICSSON, GE

CAPACITY BUILDING AND BOOTCAMPS

In today's world, rapid technological advances make it necessary to continually adapt businesses and employees to the widespread effects of technologies on their industry. By establishing relevant skills in cutting-edge technology, companies can efficiently accomplish tasks, resulting in streamlined production, increased sales, and lower costs. Despite these obvious benefits, it is difficult to systematically train an entire workforce. Boot camps are an efficient and cost-effective tool to promote company-wide technological adaptation. DEEPCLOUDLABS offers specialized boot camps in Artificial Intelligence, Machine Learning, Data Science, and Full-stack Application Development:

Machine Learning and Data Science Bootcamp

- Introduction to Python Programming
- Advanced Python Programming
- Data Analytics using Python
- Practical Machine Learning using Python
- Deep Learning with PyTorch
- Deep Learning with TensorFlow
- Foundation of Deep Learning with Backbone Architecture Papers

Full-stack Development Bootcamp

- Java SE 17 Programming
- Developing Enterprise Applications Using Spring Framework 5
- Developing React Applications
- Implementing MicroServices Architecture using Spring Cloud

RESEARCH AND DEVELOPMENT

Research and development activities play a crucial role in everyday operations in **DEEPCLOUDLABS**. We seek knowledge to design and develop software solutions by creating new products and adding features to old ones. We take research and development grants from national institutes such as TÜBİTAK (Scientific and Technological Research Council of Turkey), TEYDEB (Innovation Funding Programs Directorate) Support Programs, and KOSGEB (Small and Medium Enterprises Development Organization of Turkey). Recent Research and Development projects supported by TÜBİTAK's several funding grants are given in the following list:

- TÜBİTAK 1512 (Entrepreneurship Support Program) (Project No: 2170404), "Blockchain and AI-Based Algorithmic Trading Platform for Crypto Currency Exchange Markets," 2018-2019
- TÜBİTAK 1511 (Research Technology Development and Innovation Projects in Priority Areas, Technology Focused Industrial Movement Program) (Project No: 1190024), "Deep Learning Based Diagnosis System for Anomaly Detection on Chest X-Ray Images," 2020-2021
- TÜBİTAK 1707 (SME Support Call for Order-Based R&D Projects) (Project No: 3215051), "Cloud-Native AI-Based Cognitive Services for securing Exams and Monitoring Student Performances in Distance Learning using Biometry," 2021-on going.

DEEPCLOUDLABS has participated in several consortiums as a partner and developed Horizon Europe Proposals. Our contributions as a partner are our expertise in Artificial Intelligence, Machine Learning, Data Science, and Cloud-Native Application Development. **DEEPCLOUDLABS** submitted several Horizon Europe Proposals in recent years:

CALL	PROPOSAL ID	PROPOSAL TITLE
H2020-LC-GD-2020-3	101036796	Advanced Technologies for Safe and Efficient Emergency Responses Against the Extreme Wildfires to Complex Scenarios in Real-Life Towards A Secure Ecosystem
HORIZON-CL5-2022-D6-01	101076571	Trustworthy Ai for Empathic, Trustworthy, and Inclusive Vehicles
HORIZON-CL5-2021-D1-01	101056713	Comprehensive Assessment of the Climate Mitigation of European Forests HEALTH Through Development of Robust, Resilient and Transparent Methodologies for High-Resolution Monitoring
H2020-LC-GD-2020-1	101037845	Green Airports as Multimodal Hub with a Positive Environmental and Societal Footprint for Changing Europe-airports in the Future Era
HORIZON-CL6-2022-FARM2FORK-01	101083489	Quantification and Digital Management of Food Waste and Loss while Innovating for Circular Industry

CONSULTANCY IN WRITING INNOVATIVE RESEARCH PROPOSALS

DEEPCLOUDLABS provides consultancy services to prepare project proposals in collaborating with project teams and building innovative solutions using state-of-the-art and beyond the-state-of-the-art technologies. We help companies to write research and development project proposals for funding from national and international bodies:

- TÜBİTAK (Scientific and Technological Research Council of Turkey) TEYDEB (Innovation Funding Programs Directorate) Support Programs
- KOSGEB (Small and Medium Enterprises Development Organization of Turkey)
- HORIZON EUROPE

Cloud-Native AI Platform for monitoring distance learning performance and exam security based on face biometry

Aug 2021 - Present



DEEPCLOUDLABS has launched a new R&D project titled "Cloud-Native AI Platform for monitoring distance learning performance and exam security based on face biometry" in partnership with Bahçeşehir College (https://www.bahcesehir.k12.tr/tr). TÜBİTAK's (The Scientific and Technological Research Council of Turkey) TEYDEB (Technology and Innovation Grant Programs) supports the project.

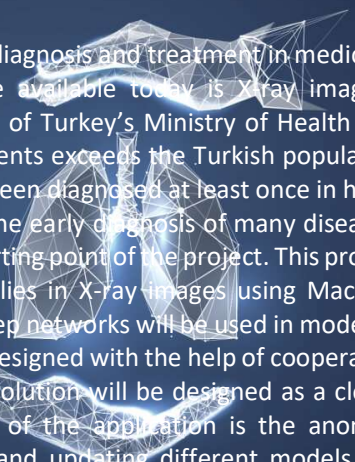
COVID-19 has dramatically changed our lives, and the most dramatic effect has happened in learning. Schools have been closed worldwide, and teaching is offered remotely and on digital platforms. The change means distinct w challenges. Performance monitoring and reporting tools are needed to help students, teachers, and parents overcome the challenges. Another big challenge to address is exam security which includes verifying the student's identity when logging into the system and during the exam.

We have been planning to develop the following SaaS services to solve the problems explained above:

- Multi-Factor Authentication Service
- AI Services to improve the performance of distance education through
  - Monitoring student attention level
  - Converting the teacher's speech to text and segmenting the online session into the segments labeled with subtopics defined in the course content
  - Measuring and reporting student participation and involvement statistics in an online education session
  - Preparing personal exam sessions based on the student's performance reports and the previous exam results
  - Mentoring students on how to improve their exam performance by offering topic repetitions and explaining exams solutions

Deep Learning-Based Diagnosis System for Anomaly Detection on Chest X-Ray Images

2020 -2021



A vast amount of medical imaging techniques is widely used for diagnosis and treatment in medicine. The most pervasive and readily accessible imaging technique available today is X-ray imaging, according to World Health Organization's reports. The Republic of Turkey's Ministry of Health also reports that the number of medical imaging applications to patients exceeds the Turkish population in the year 2019. These numbers suggest that every person has been diagnosed at least once in his or her lifetime. These medical images can be potentially used for the early diagnosis of many diseases. This is especially important for preventative medicine and the starting point of the project. This project proposes a computer-aided diagnosis system to detect anomalies in X-ray images using Machine Learning techniques. In the context of the project, multi-layer deep networks will be used in modeling ChestX-ray 14 data set. An operational software solution will be designed with the help of cooperating hospitals providing required medical imaging data. A software solution will be designed as a cloud-native application in Microservices architecture. At the heart of the application is the anomaly detection Microservice, which is responsible for constructing and updating different models and extracting features based on these deep models. The following abnormalities found in X-Ray Chest images are chosen and modeled in the project: Mass, Nodule, Pneumonia, Pneumothorax, Cardiomegaly, Atelectasis, Effusion, and Infiltration.

DEEPCLOUDLABS has launched the "Healthcare-As-A-Service Platform" to Manage Medical Information and Predictive/Personalized Medicine Applications. DCL developed the AI analysis pipeline for health, which includes deep learning-based analysis models for processing large-scale health data. With the developed AI pipeline, approximately 1400 X-Ray images can be processed (inference) per second and provide value-added inputs to CAD / CADx systems.

Blockchain and AI-Based Algorithmic Trading Platform for Crypto Currency Exchange Markets
2018-2019

DEEPCLOUDLABS has developed Blockchain-Based Algorithmic Trading and High-Frequency Trading Solutions for Crypto-currency exchange markets using Advanced Big Data Analytics. The platform enables traders, quants, and financial institutes to implement, test, monitor, and finally operate their profitable algorithms on real cryptocurrency exchange markets easily without facing the complexity of the underlying computer system. DEEPCLOUDLABS has practical experience in implementing algorithmic and high-frequency trading systems in stock exchange markets. In this project, DEEPCLOUDLABS concentrates on implementing algorithmic and high-frequency trading systems for emerging cryptocurrency markets.

B3LAB
TÜBİTAK BİLGEM
2016 – 2019
CONSULTANT, SOFTWARE ARCHITECT

I joined the team almost at the beginning of the development process to help shape the architecture and development practices. The team was already experienced in cloud infrastructure but less experienced in microservices architecture, microservices patterns, event-driven architecture, and Spring Boot best practices. I delivered training on these topics and transformed the architecture into Microservice architecture. I coded the core and performance-critical modules in the project. Safir Depo Desktop Synchronization tool has been implemented by **DEEPCLOUDLABS**.



IDC TURKEY CLOUD TECHNOLOGY AWARDS

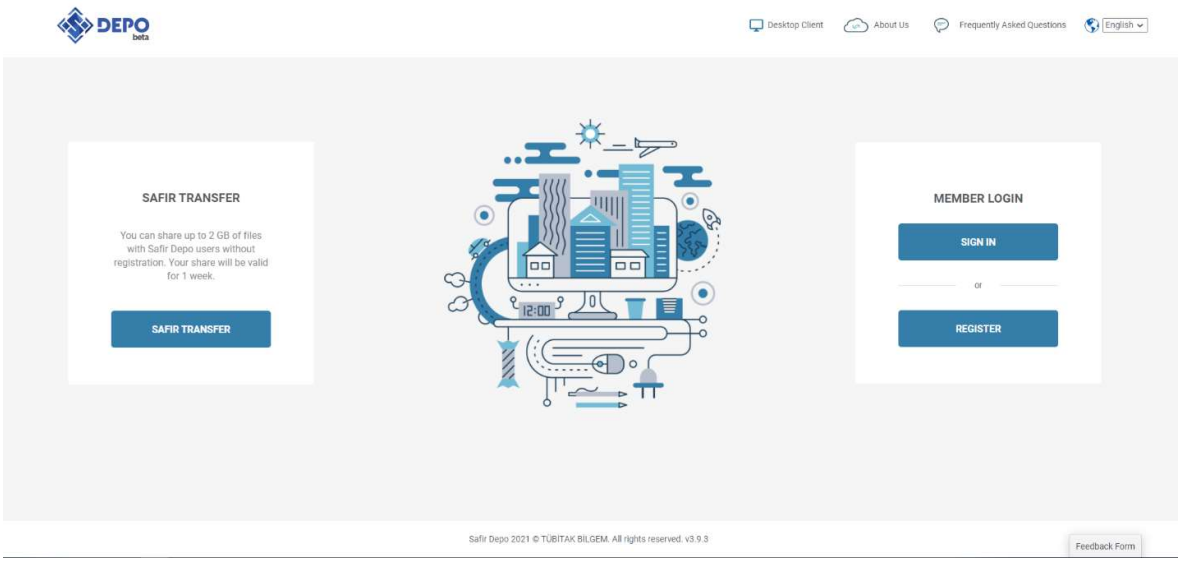
In SaaS - Cloud Software Services category of IDC ANALYZE THE FUTURE Turkey Cloud Technology; “Safir Depo Academic Project” is ranked as 1st in which “Safir Depo” product developed by TÜBİTAK BİLGEM B3LAB is used, and in Cloud Transition category; “Safir Bulut – Blockchain Research Network Project” is ranked as 2nd in which “Safir Bulut” product developed by TÜBİTAK BİLGEM B3LAB is used.

ABOUT Safir Depo

Safir Depo (Safir Storage) is a national and secure cloud storage application developed by TÜBİTAK BİLGEM B3LAB. You can access your files stored in Safir Depo anytime from anywhere over the internet via smartphones, tablets, or computers.

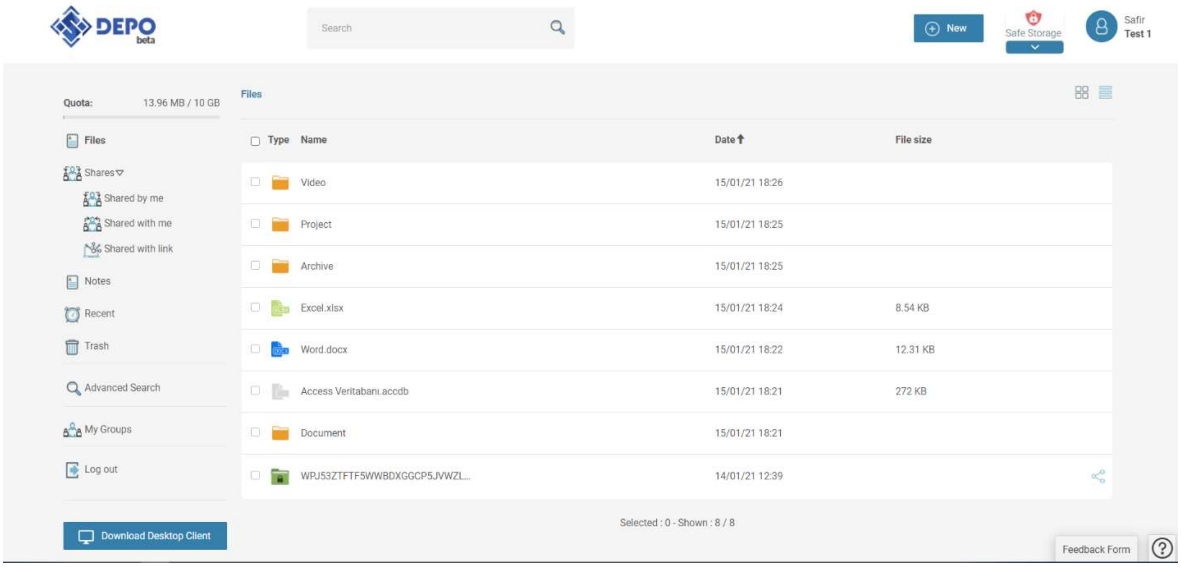
In addition to performing file operations such as creating folders, moving, and renaming all documents, audio files, photographs, and videos that had been uploaded to Safir Depo; you can also view documents online, edit them and do versioning, and thanks to the sharing feature, files/folders in Safir Depo can be easily shared with anyone.

Safir Depo can use the "Software as a Service" (SaaS) method as its commercial alternative. Safir Depo also provides an opportunity for institutions to have private services by being installed in their private clouds. With this private cloud option, Safir Depo continues to provide high and easy accessibility features of cloud storage software. In parallel, it ensures that users’ files are stored within the institution by being installed on the customers’ servers hosted in their data centers.



By being developed entirely on open-source software and libraries, Safir Depo does not require special hardware with high computing or storage capacity; it can run on standard servers instead. Thanks to its horizontal scalable feature, it can flexibly adapt to capacity increases. It can effectively use the resources assigned with its load balancing feature in medium and large-scale installations and offers its customers recommended architectures from the data center to the software configuration without a "Single Point of Failure" and "accessibility" feature.

By including all of the industry standard features such as file upload/download, folder creation, copying, moving, deleting, and renaming like similar products, Safir Depo also allows its users to use the software easily with its user-friendly interface. You can read/view/watch/listen to your documents/pictures/videos/music files on your browser without downloading them to your computer.



Safir Depo usage is increasing rapidly in public institutions and the private sector, especially where data content and security are particularly critical. Safir Depo, which was included in the Presidential Cabinet's 1100 Daily Development Plan and opened for pilot use in 3 universities, has been started to

be used by nine universities through the ULAKBİM data center. In 2018, it was started to be used by all TÜBİTAK personnel through our Gebze data center, and it is being actively used.

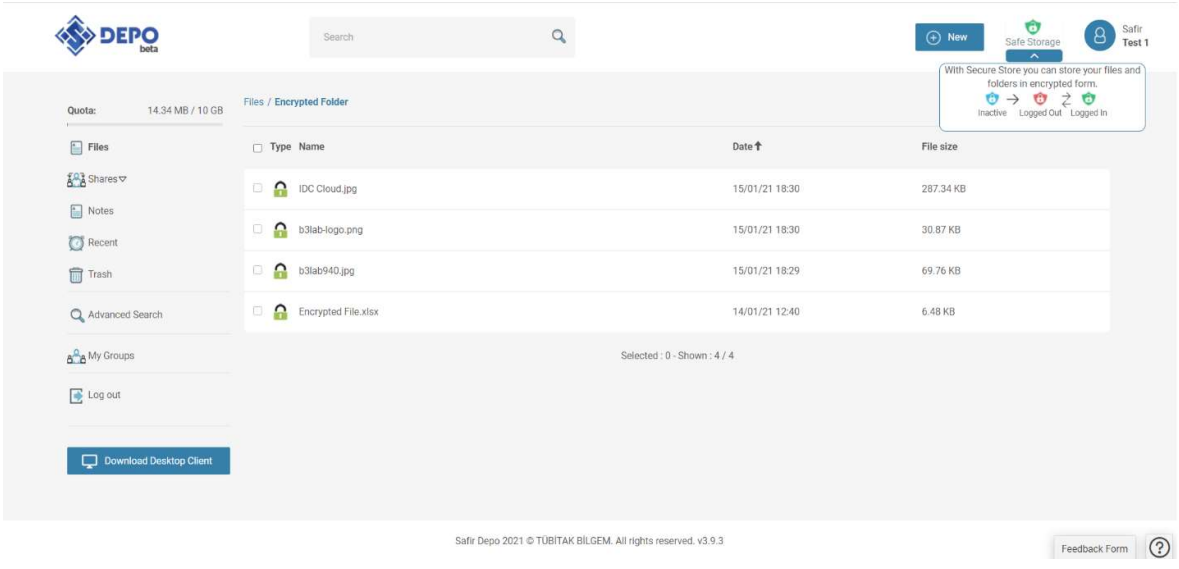
It is installed in various public institutions as proof of concept, and it started to be installed in Live environments after these studies. Finally, it was included in the integration studies as the cloud object storage component of the National Communication Platform, which was planned in the initiative of the Presidency Digital Transformation Office.

Secure Storage

In the product, in which industry-standard security measures have already been integrated, file transmission is provided over the secure HTTPS communication protocol. In addition to this security level, it offers a "Secure Storage" feature. Whenever Secure Storage is enabled, Safir Depo enables files to be transmitted to the client-side (based on the user preference; on the internet browser, on the mobile applications, or on the client computer for desktop application) over the internet line in encrypted form. Thanks to this feature, it prevents many security vulnerabilities listed below. Exposure of the transferred files in "Man in the Middle" attacks that can be performed on the used network line is also prevented. The threat of capturing files before encryption is eliminated.

In the secure storage feature, the encryption keys of your files are re-encrypted by the chain key method with the keys of the owner and the people shared and then stored in the system. Thanks to this, if an encrypted file is shared with different people after encryption, the file is not needed to be downloaded to the client and re-encrypted with appropriate user keys.

Instead, whenever there is a change in the shared contacts (sharing with a new stakeholder or terminating sharing with a person), “the encryption key of the file” is decrypted and updated by encrypting it with the keys of the current shared users. This way, there is no need to download the file to the client, re-encrypt it and send it back to the server. Especially in case of sharing has to be changed for a large-sized encrypted file, making changes in sharing of encrypted files takes place instantly with the described method. This saves a lot of processing time and network traffic.

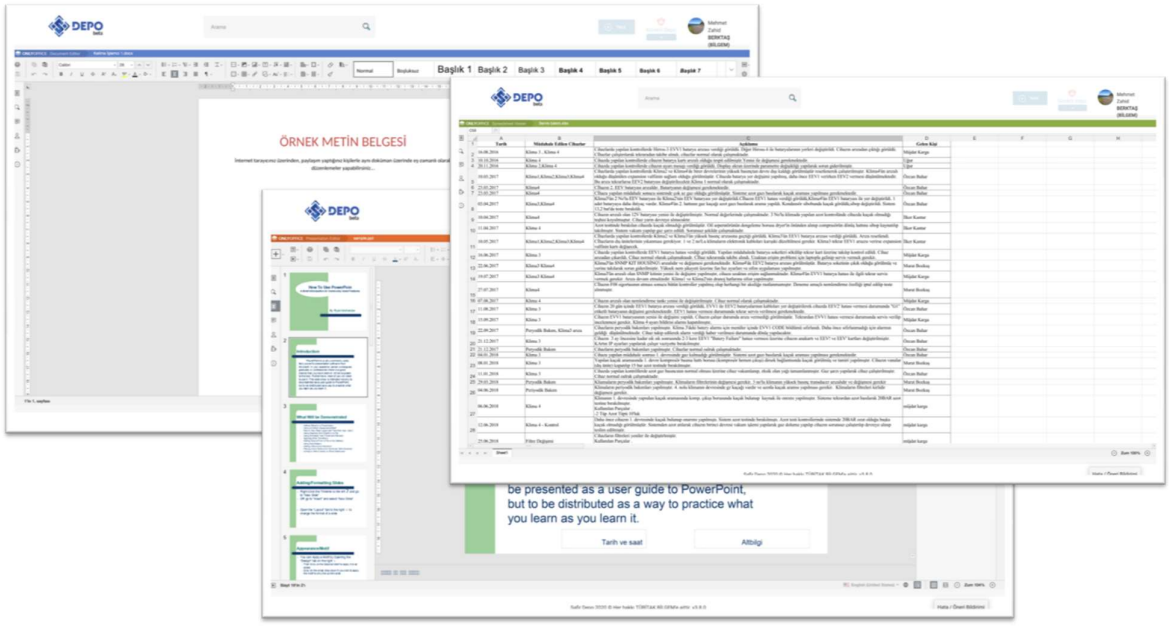


File Sharing

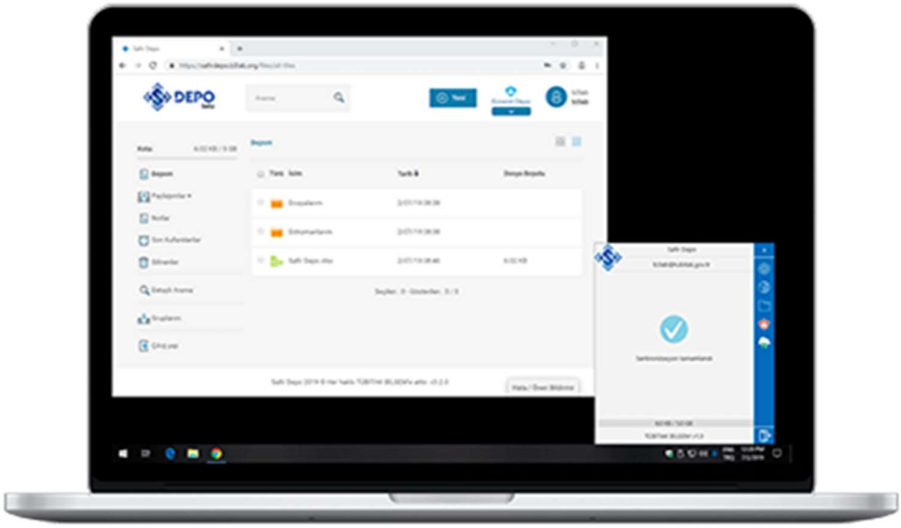
One of the most useful features of cloud storage software is that it allows you to easily share your files with third parties. You can share your files that are already stored in the cloud, with the people you want at the authorization levels, without re-uploading / sending the file. The sharing feature, which provides great convenience to users, especially when using mobile devices and large files, has been developed as two scenarios in Safir Depo.

The private Sharing option allows you to share your files with other Safir Depo users with permission to view or edit them. Thanks to this feature, you can share your files in seconds, which allows users to create their sharing groups and share documents easily with all users within the group at once.

The Connection Sharing option allows you to share your files with people who are not Safir Depo users. If you forward the link address created as a result of the sharing process to the person you want, the person will be able to access the file you shared by just clicking the link without being a Safir Depo member and logging in. Safir Depo works integrated with online office editors. By double-clicking on the office documents in your space, you can edit your office documents in open document format and other commonly used formats with online office editors that will be opened in your internet browser. In addition, you can work on your shared office documents simultaneously with the people you share. Safir Depo, which is set to work integrated with the open-source OnlyOffice in the default installation, can work seamlessly with the open-source LibreOffice Online if desired. Every change in your file is stored in Safir Depo as a new version of that file, independently of whether you have updated your file yourself or a different person with authority to change it has updated. You can revert to the old versions of your files at any time and undo the changes you have made.



Safir Depo Desktop Client



Safir Depo desktop application provides all the features related to file operations as the web application do. As soon as the desktop application is opened, it automatically synchronizes with your web application account. As the process is done, the two-sided synchronization process continues, so your files and folders are always up to date in your account.



TÜBİTAK BİLGEM
April 2016 – 2019
CONSULTANT, SOFTWARE ARCHITECT

I worked on several projects at the Software Testing and Quality Evaluation Laboratory in TÜBİTAK BİLGEM. The laboratory conducts activities to increase software project quality via its independent software test and software quality evaluations. It also exercises functional tests, software quality analyses, usability tests, load and performance tests, and assessments of conformity to standards. The project aims to develop a Testing as a Service (TaaS) platform that presents an extensible toolset on the cloud for testing, analysis, and validation of both cloud-based and traditional applications. The platform contains the following tools:

1. Performance Testing as a Service (PTaaS)

Performance Testing as a Service (PTaaS) is a cloud-based performance testing platform for traditional software applications and cloud-based services, implying high-performance requirements. The service simulates real-world web usage traffic via the cloud computing infrastructure. It facilitates large-scale virtual user creation by making more computing resources accessible to users. PTaaS enables a scalable, distributed performance testing service utilizing Apache JMeter. Using this web-based application, users can easily perform all test phases. Users can define a test environment and create/upload any JMeter test following a few steps; PTaaS automatically configures a virtual environment and runs all tests.

2. Test Automation as a Service (TAaaS)

Test Automation as a Service (TAaaS) is a cloud-based test automation platform for both traditional software applications and cloud-based services, which require a wide range of tests across diverse environments. The service allows high-volume regression tests and iterations via the cloud computing infrastructure. It automatically scales and distributes test scripts using Selenium. Users can readily select multiple test environments from combinations of various OSs and browsers and create/upload any Selenium script; TAaaS automatically configures the environment and automates all test executions. TAaaS also offers compatibility testing with multiple versions of Web browsers and operating systems. It enables increased test coverage through cross-platform capabilities. This web-based application allows users to accelerate test cycles and increase testing capacity without managing any infrastructure.

3. Usability as a Service (UaaS)

Usability as a Service (UaaS) is a cloud-based usability evaluation platform for both traditional software applications and cloud-based services that address many users. UaaS enables a comprehensive usability evaluation service with a large variety of evaluators. The service evaluates software applications according to well-known standards/guides/recommendations (ISO 9241-151, KAMIS, Nielsen Heuristics, etc.). Users can select an evaluator from a diverse list of evaluators from real-world user profiles accessible. User can choose any software product for evaluation and define an evaluation type and evaluator profile in only a few steps; UaaS automatically sends a request to evaluators with an evaluation guide and display results calculated from all evaluators' scores. Using this web-based application, users can easily perform all evaluation phases.

Responsibilities in the Projects

I worked as a software architect on the project. I implemented the core subdomains in the project. I delivered training to the team on MicroService Architecture and other topics from the technology stack, such as Spring Boot, Spring Data, and Spring for Apache Kafka, etc.



TÜBİTAK BİLGEM
April 2014 – March 2015
CONSULTANT, SOFTWARE ARCHITECT

Although today's computing systems present powerful solutions to process big data with the help of recent advances in cloud computing technologies, many problems remain unsolved due to a lack of acceptable algorithms. For instance, searching for a lost plane or damage assessment after an earthquake on a high-resolution remote sensing satellite image are unsolved problems. In recent years, to solve such unsolved problems, a group of experts and nonexpert people called a crowd has been utilized. An expert in the group is not expected to solve the whole problem. Instead, the geospatial image is partitioned in space, and each expert in the pool studies the partition assigned to him/her. The solution to the original problem is obtained by merging the partial solutions. There are two open issues: i) How to partition the space and how to distribute the partitions to the crowd, and ii) How to merge the partial solutions. We devise several algorithms to address these issues, introduce our web-based platform, and crowd-sourcing implementation. Post-disaster images are divided into little pieces and sent via a web-based platform with previously identified users. Users fulfill their duties by examining the images and marking them according to the type of operation. The same image tile can be sent to more than one user. Consequently, the system examines the markings of users and produces a final report automatically by using statistical algorithms to evaluate the markings of users. The results might be related to information about the number of locations of damaged buildings, the location of closed roads, wrecks, and landslide flood-prone areas, etc. can be acquirable in minutes.

With the help of remote sensing technologies, aerial image data captured for wide areas can be processed and analyzed more quickly and economically and produce affirmative results. In this project, customized remote sensing software was produced in terms of the needs of AFAD to use in disaster management and decision support systems. They are developed with the cooperation of AFAD -TUBITAK (The Scientific and Technological Research Council of Turkey).

VISKON-CS is the first crowd-sourcing platform in Turkey. The team has no experience in Java and developing Web Applications. Initially, I delivered the training to the team. We developed two modules: The Administration Module and the Client Module. The administration Module is a classical Java EE 6 Web Centric project based on JSF 2, Prime Faces 5, CDI, Local EJB, and Hibernate 4 with JPA 2. The Client Module is basically an HTML 5 Web Application using KnockoutJS on the client side and Java EE 6 for Restful Web Service on the server side. I developed JSF 2 components for Interactive Web Map and Map Drawing using Leaflet.