TÜRKİYE İSTATİSTİK KURUMU

MEDOS: A Shiny Application for Seasonal Adjustment of Short-Term Statistics

Dr. M. Fatih TÜZEN

The 12th International Conference Use of R in Official Statistics
27-29 November 2024, Piraeus, Greece

TÜRKİYE İSTATİSTİK KURUMU

Methodology and Tools for Seasonal Adjustment

TRAMO-SEATS: TRAMO (Time Series Regression with ARIMA Noise, Missing Observations, and Outliers) and **SEATS** (Signal Extraction in ARIMA Time Series) are statistical methods used for time series analysis, particularly for seasonal adjustment and decomposition of economic data.

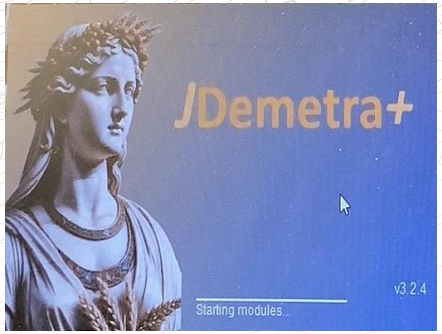
JDemetra+ is an open-source software developed by Eurostat and the National Bank of Belgium for seasonal adjustment and time series analysis. It implements two primary methods:

- TRAMO-SEATS
- X-13ARIMA-SEATS

https://github.com/jdemetra

https://jdemetra-new-documentation.netlify.app/

JD+
Time Series Software for Official Statistics



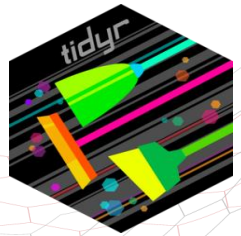
The Seasonal Adjustment Automation System (MEDOS)

The Seasonal Adjustment Automation System - **MEDOS** is a useful tool for units within TURKSTAT that want to produce and publish seasonally and calendar adjusted time series, starting with a few statistical topics and adding new statistical topics as needed over time.

- ✓ Productivity Increase
- ✓ Consistency and Standardization
- ✓ Reducing Human Error
- ✓ Central Government
- ✓ JDemetra+ Integration
- ✓ Fast and Efficient Processing
- ✓ Advanced Reporting
- ✓ Flexibility
- ✓ Data Visualization
- ✓ Quality Assurance

Software and Packages

- ✓ **MEDOS** was created with **R** programming language.
- ✓ **MEDOS** is a **Shiny** application that runs on **Shiny Server** installed on a remote machine and can only be accessed through the **TurkStat network**.
- ✓ Seasonal adjustment models are determined using **JDemetra+** desktop software and the relevant results are generated by triggering the **JWSACruncher** tool in **MEDOS**.

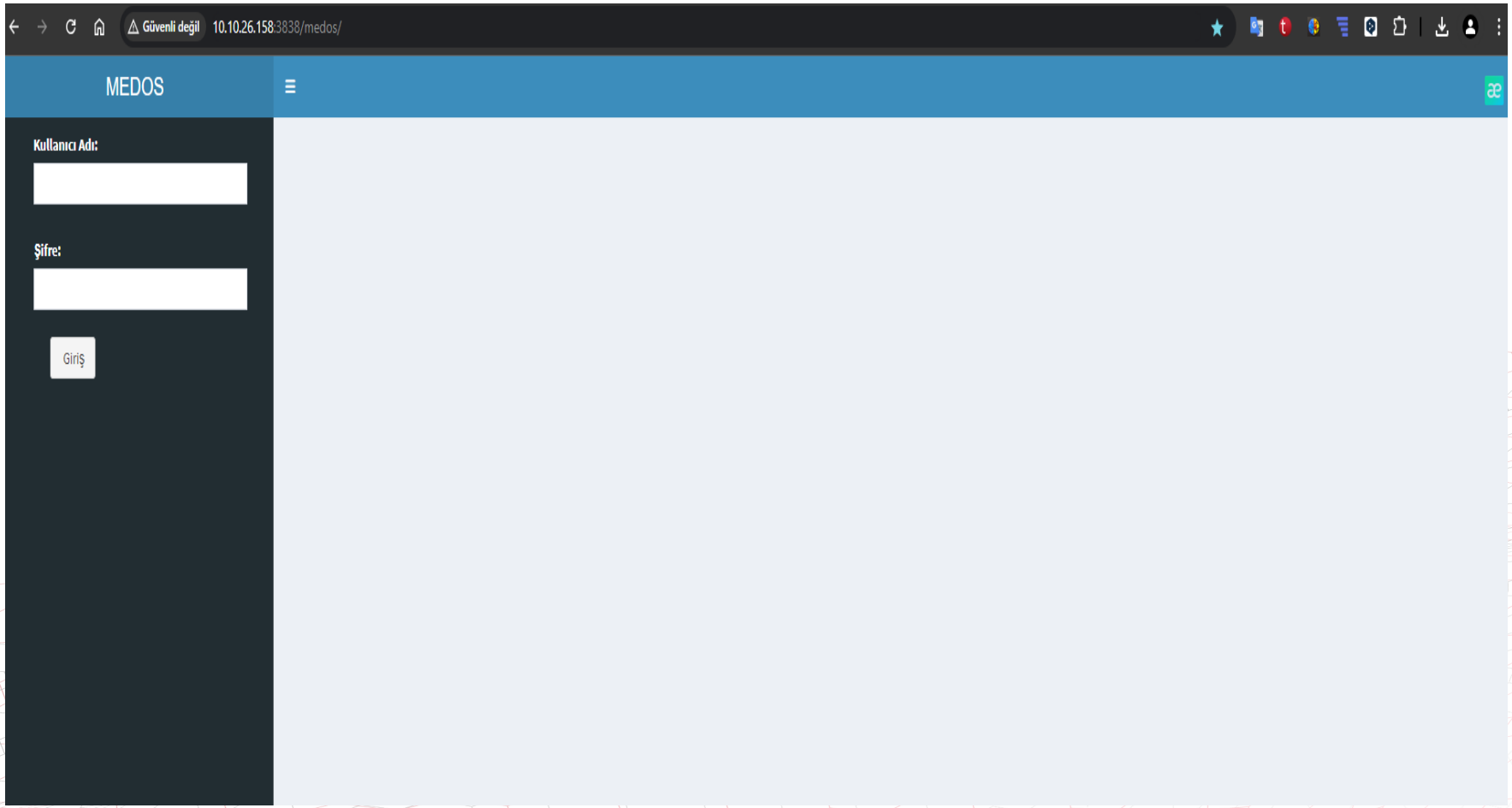



✓ Shiny	✓ dplyr	✓ readr	✓ plotly
✓ Shinydashboard	✓ lubridate	✓ purrr	✓ tibble
✓ Shinyjs	✓ zoo	✓ ggplot2	✓ Readxl
✓ RJDBC	✓ tidyr	✓ rCharts	✓ stringr
✓ RODBC	✓ data.table	✓ readr	
✓ DT	✓ openxlsx	✓ emayili	

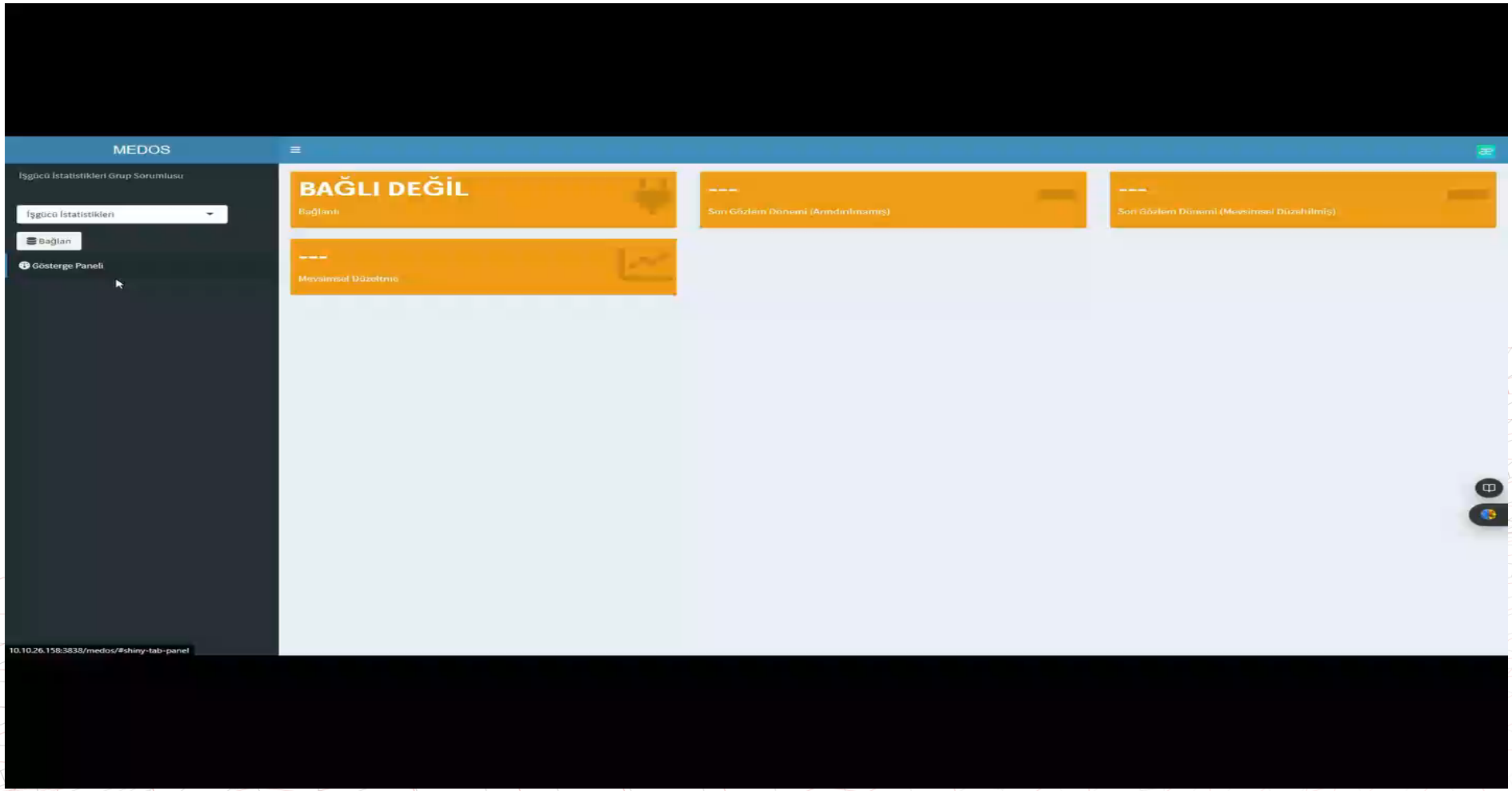
Seasonaly Adjusted Statistical Topics at TURKSTAT

No	Statistic	Start Year of Data	N. of Time Series	Direct / Indirect
1	Quarterly Gross Domestic Product	2009	59	Indirect
2	Foreign Trade Index	2013	232	Direct
3	Foreign Trade Statistics	2013	28	Indirect
4	Labour Input Index	2009	512	Indirect
5	Labour Force Statistics	2014	24	Indirect
6	Trade Sales Volume Index	2010	41	Indirect
7	Turnover Index	2009	276	Indirect
8	Industrial Production Index	2010	236	Indirect
9	Services Production Index	2017	28	Indirect
10	Paid Employee Statistics	2009	221	Indirect
11	Consumer Confidence Index	2012	18	Indirect
12	Sectoral Confidence Index	2011	16	Indirect
13	Consumer Price Index	2005	15	Indirect

MEDOS - Mainpage



MEDOS – Connection Screen

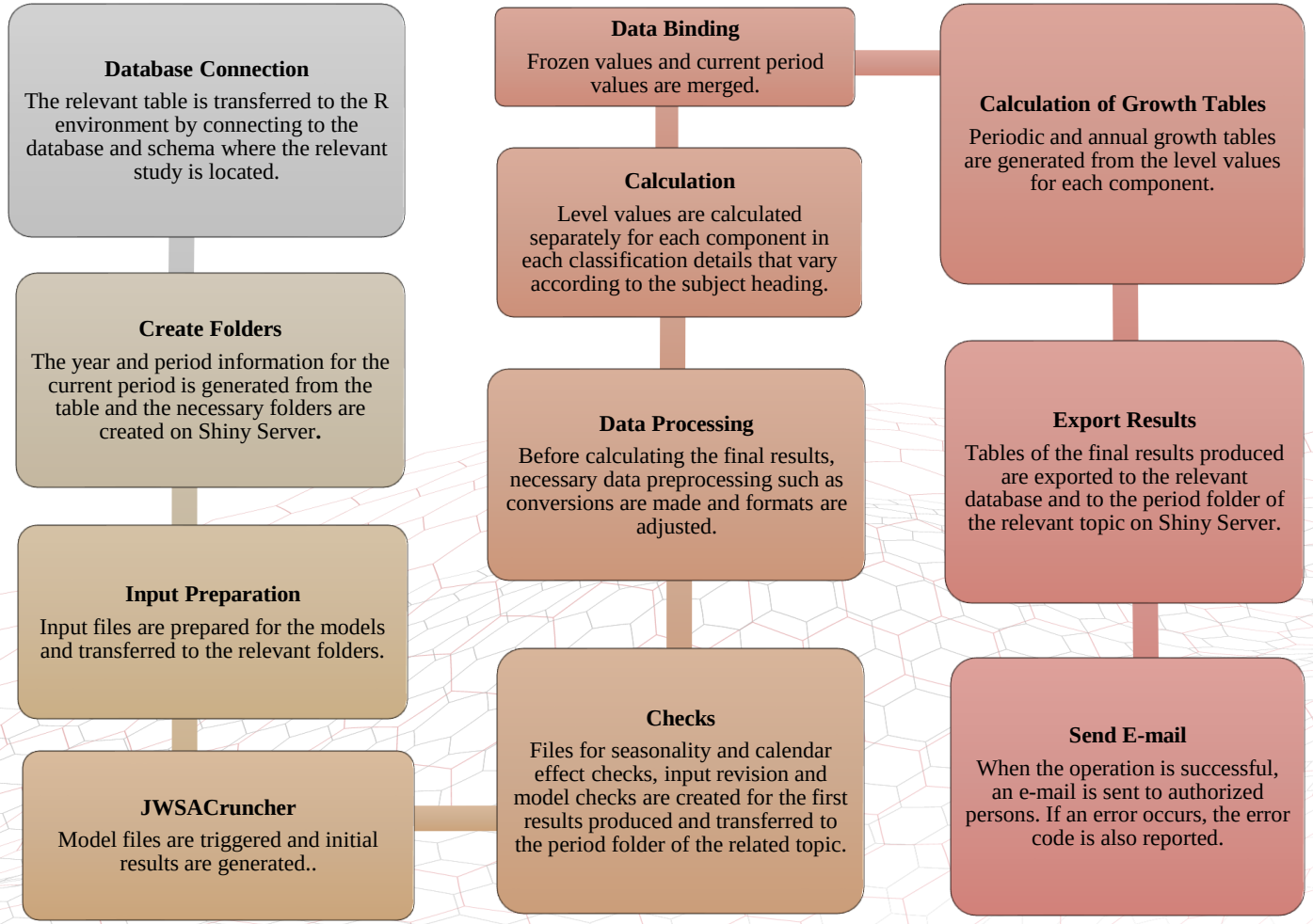


MEDOS - Run

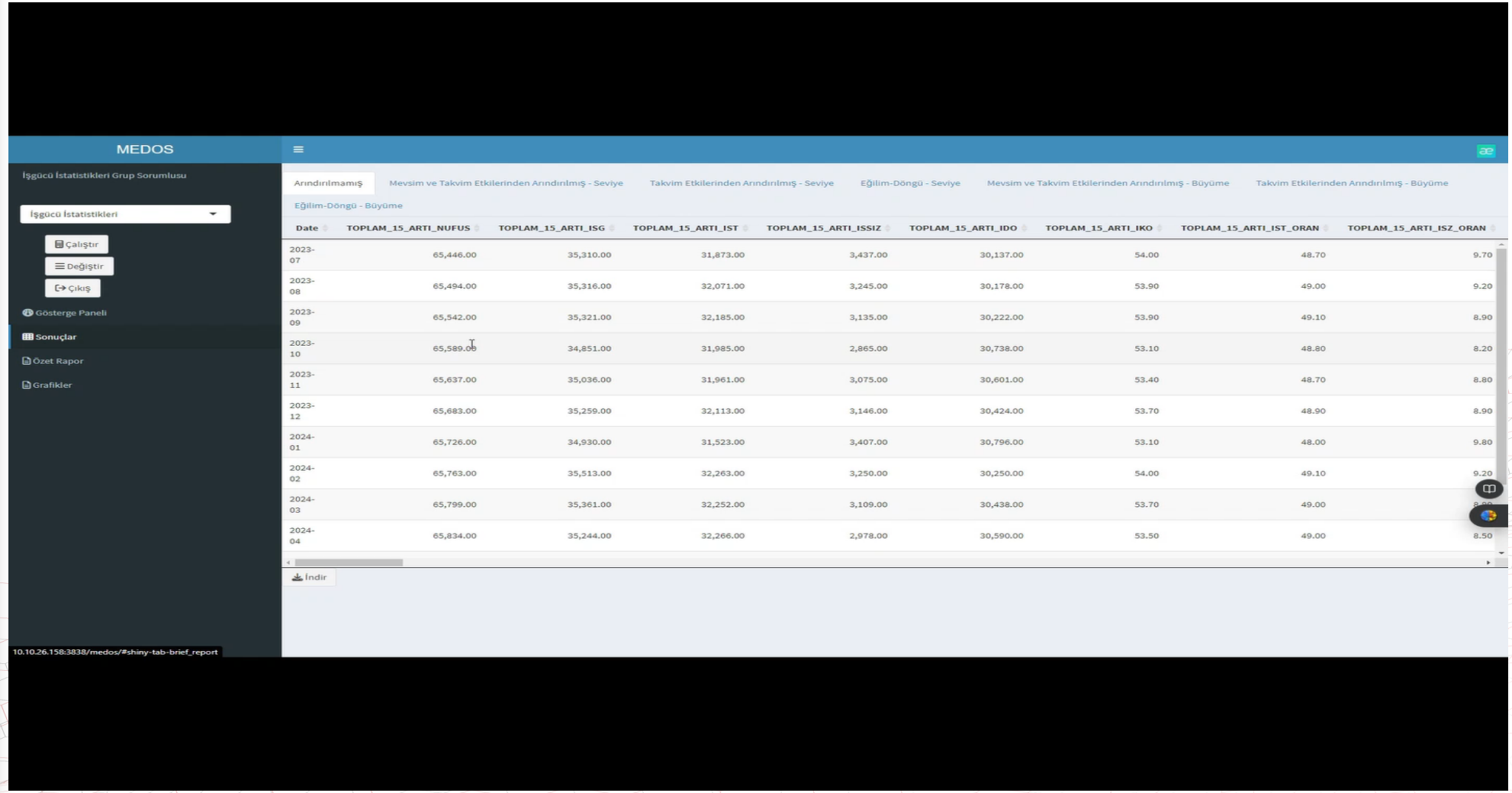

MEDOS
İşgücü İstatistikleri Grup Sorumlusu
İşgücü İstatistikleri
Çalıştır
Değiştir
Çıkış
Gösterge Paneli
Sonuçlar
Özet Rapor
Grafikler
BAĞLI
Bağlantı
2024-7
Son Gözlem Dönemi (Arındırılmamış)
2024-7
Son Gözlem Dönemi (Mevsimsel Düzeltilmiş)

Mevsimsel Düzeltme
10.10.26.158:3838/medos/#shiny-tab-panel

MEDOS – Progress of Process

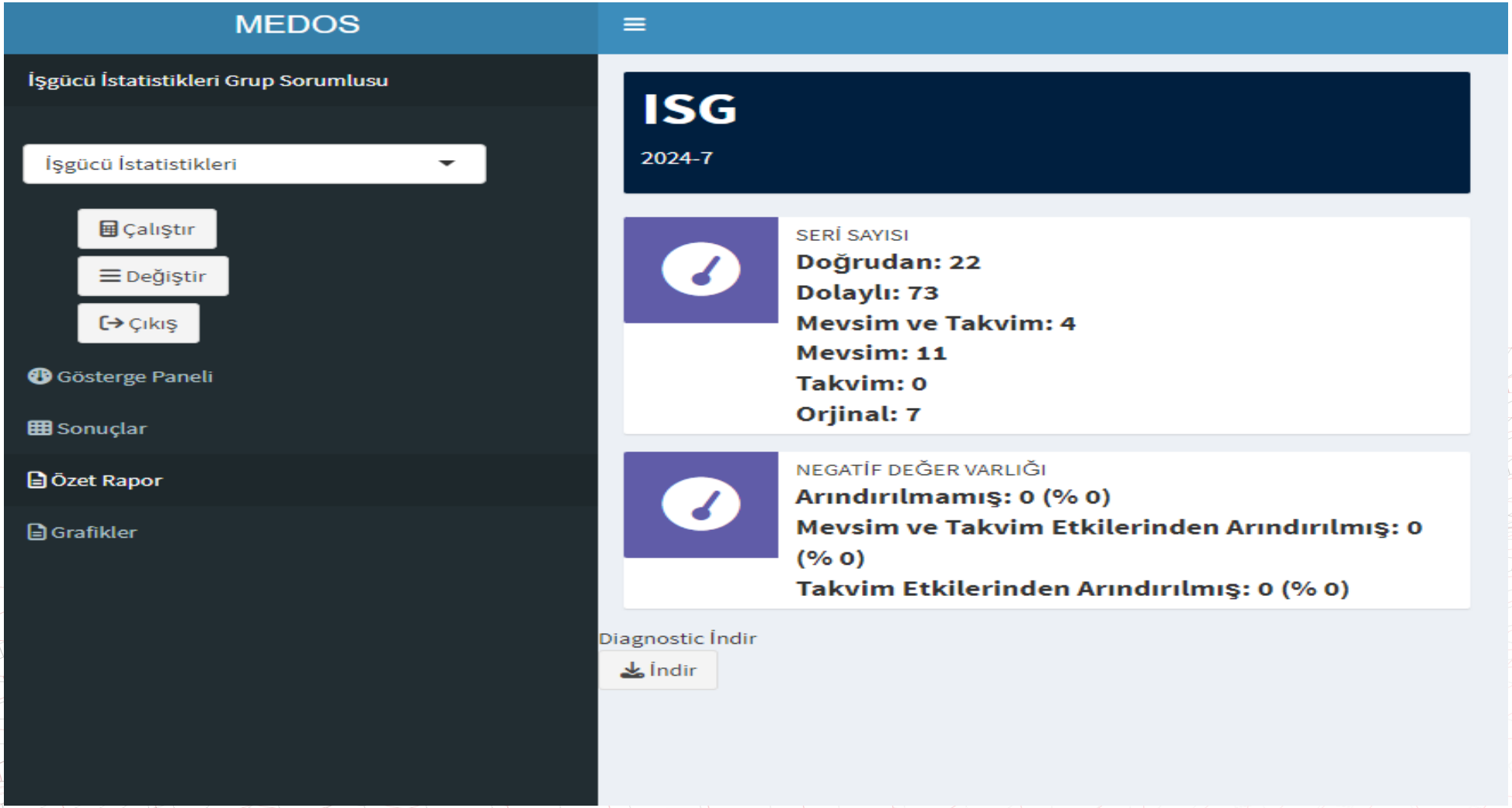


MEDOS – Results as Tables

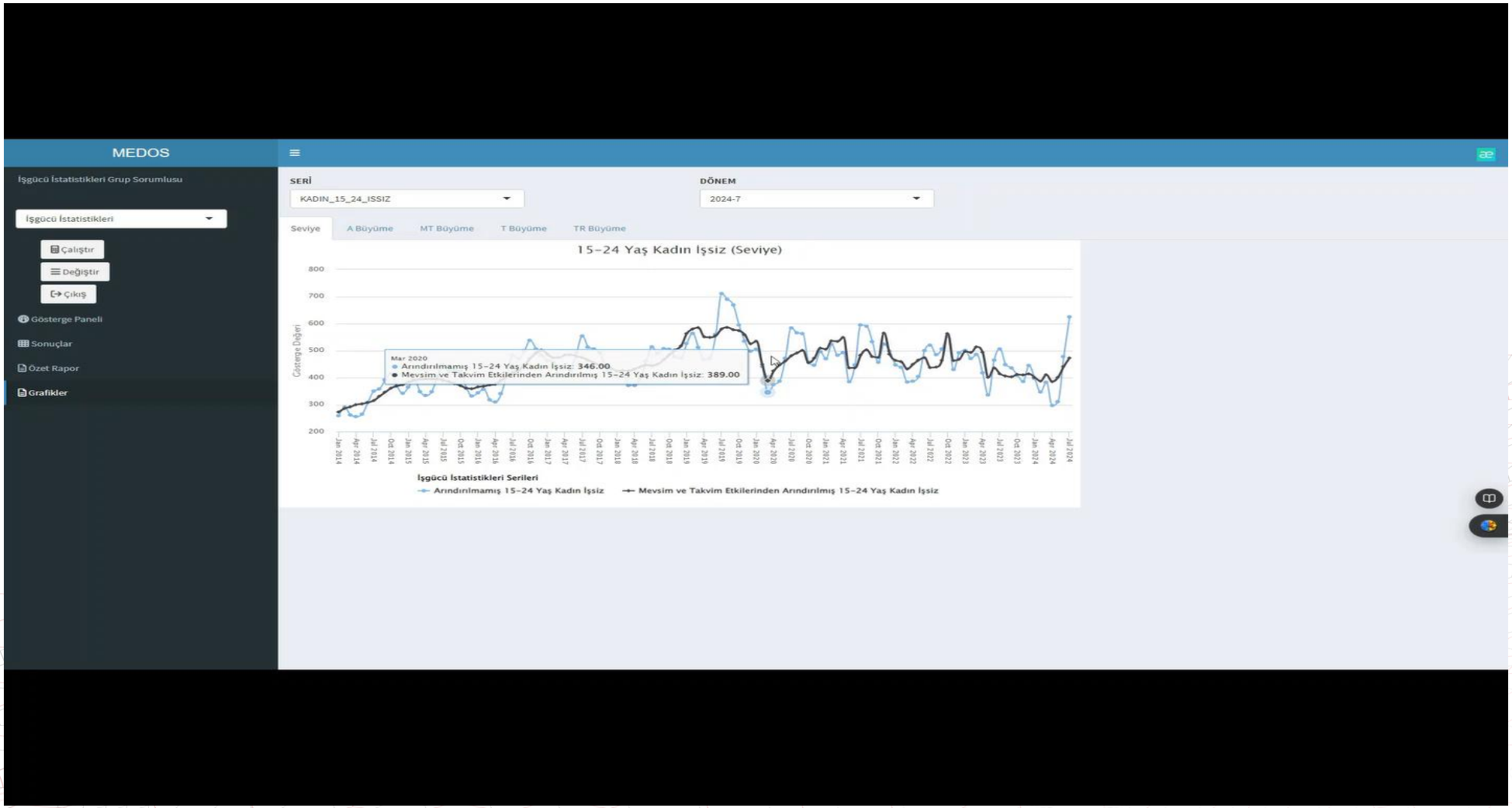


Date	TOPLAM_15_ARTI_NUFUS	TOPLAM_15_ARTI_ISG	TOPLAM_15_ARTI_IST	TOPLAM_15_ARTI_ISSIZ	TOPLAM_15_ARTI_IDO	TOPLAM_15_ARTI_IKO	TOPLAM_15_ARTI_IST_ORAN	TOPLAM_15_ARTI_ISZ_ORAN
2023-07	65,446.00	35,310.00	31,873.00	3,437.00	30,137.00	54.00	48.70	9.70
2023-08	65,494.00	35,316.00	32,071.00	3,245.00	30,178.00	53.90	49.00	9.20
2023-09	65,542.00	35,321.00	32,185.00	3,135.00	30,222.00	53.90	49.10	8.90
2023-10	65,589.00	34,851.00	31,985.00	2,865.00	30,738.00	53.10	48.80	8.20
2023-11	65,637.00	35,036.00	31,961.00	3,075.00	30,601.00	53.40	48.70	8.80
2023-12	65,683.00	35,259.00	32,113.00	3,146.00	30,424.00	53.70	48.90	8.90
2024-01	65,726.00	34,930.00	31,523.00	3,407.00	30,796.00	53.10	48.00	9.80
2024-02	65,763.00	35,513.00	32,263.00	3,250.00	30,250.00	54.00	49.10	9.20
2024-03	65,799.00	35,361.00	32,252.00	3,109.00	30,438.00	53.70	49.00	8.80
2024-04	65,834.00	35,244.00	32,266.00	2,978.00	30,590.00	53.50	49.00	8.50

MEDOS – Summary Report



MEDOS - Graphs



MEDOS – Planned Activities

- ✓ Inclusion of 3 different statistical topics in MEDOS by the end of 2024
- ✓ Integrating seasonal adjustment and revision reports into MEDOS so that they are automatically generated in different formats according to the desired subjects and period
- ✓ Automatic generation of the releases

TÜRKİYE İSTATİSTİK KURUMU

Teşekkürler

fatih.tuzen@tuik.gov.tr