CURE Portal

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LEAD AUTHOR
Tomas Soukup (GISAT)

CO-AUTHORS
Katerina Jupova (GISAT), Michal Opletal (GISAT), Pavel Vlach (GISAT), Vojtech Dubrovsky (GISAT), Miroslav Kopecky (GISAT), Martin Babic (GISAT), Johannes Schmid (Geoville), Mario Dohr (Geoville)

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1 INTRODUCTION

1.1 Purpose of the document

This document accompanies the Deliverable D4.5 – the CURE Portal – a final delivery of activities in Task 4.5. It summarizes main elements of concept and provides overview of a final implementation of the web-based portal, demonstrating the capacity and application potential of the CURE application solutions. The CURE portal is accessible at http://portal.cure-copernicus.eu/.

This document also outlines the role of the CURE Portal in ongoing project dissemination and promotion activities and potential for further evolution to full-fledged service.

1.2 Definitions and acronyms

Acronyms

API	Application Programming Interface
GUI	Graphic User Interface
UI	User Interface

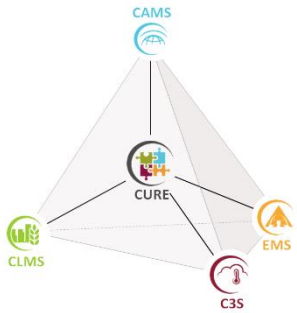
2 CONCEPT AND DESIGN

2.1 Main elements of the concept

According to the CURE project description, Task 4.5 foresees "implementation of a CURE web-map portal, to demonstrate the **capacity** and the **application potential** of the CURE application solutions. Cross-cutting demonstration cases shall be accessible and queried via an interactive portal with data visualization and light analytics tools". Activity is led by GISAT with participation of GEOVILLE.

Based on this rather broad specification, the overall concept of the CURE portal design and implementation has been developed concentrating on two important elements of an initial request – service capacity and application potential.

First, the CURE portal demonstrates the **application potential** and associated added value of all CURE services based on the mapping results and analytics developed for the front-runner and follower cities cooperating within the CURE projects. The aim of this part of the CURE portal content is to support users in (i) understanding service rationale and service use case, (ii) exploring information products generated by services (iii) realizing an added value of CURE services based on Copernicus resources for their particular needs.



As part of application potential demonstration, it also addresses and highlights for user an important **integration aspect** – an integration of several Copernicus services inputs (cross-cutting services – see famous CURE services conceptual illustration on Figure 1), an integration of Copernicus and local city data (global/local scales integration) as well as an integration of individual services results or service chaining (integrated assessment).

Figure 1. Conceptual illustration of CURE (Copernicus for Urban Resilience in Europe) development as a cross-cutting structure, based on products derived from four different Copernicus Core Services: CLMS, CAMS, C3S and EMS, reflecting urban resilience and urban sustainability dimensions.

This part of the CURE portal is designed and implemented by means of interlinked **interactive storylines** for each CURE application.

Second, the CURE service **capacity** element is demonstrated on the CURE portal to highlight the consortium effort and investments done to the overall automation of the CURE services production within the project, focused on (i) generic access to Copernicus resources via Copernicus Core Services Interface (CCSI), (ii) streamlining and dockerization of the individual

CURE services and (iii) set-up of the dedicated cloud processing infrastructure and on-boarding of individual service on the CURE Engine.

As such, an user interaction and new service activation is supported by provision of a simple web-based **production dashboard/job scheduler** for communication with production system via services APIs. This part is considered as proof-of-concept demonstration, but ready for further scaling or deployment to more robust infrastructure for a full-fledged interactive operational production services in future.

2.2 Design

As outlined above, two main requirements have been reflected in the initial design of the CURE portal as sketched on Figure 2 below.

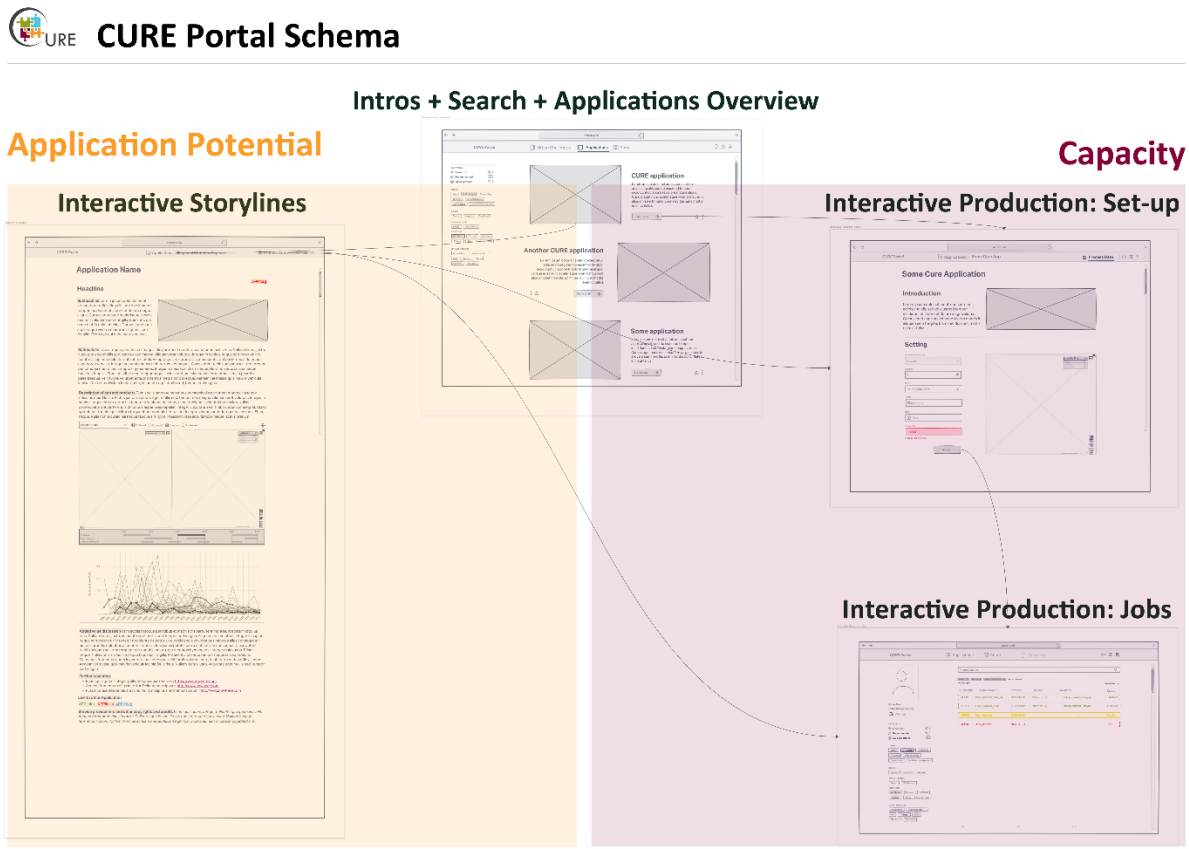


Figure 2. General schema used for the CURE Portal Design reflecting the main portal concept elements: application potential and service capacity demonstration.

Intro + Search + Applications Overview

This web page guide user with the CURE project context, urban policy challenges and the CURE applications contribution to their challenges. It also give an overview of all services provided by the CURE project with base information. In addition it allows interested users to filter the CURE services according different relevant aspects.

This page is the entry point for both (i) exploring application potential of individual services and their showcases as well (ii) initiate new service production, inspect your jobs status and download your results.

Interactive Storyline

Each CURE application is presented in the form of specific storylines as defined in cooperation with the each service provider via standardized questionnare and other supporting media. Although individual in content and tailored for particular service, all storylines follow the same template with the rules how information is structured. This supports quick adoption time for our story telling for users, especially when exploring multiple services at once. This approach also results in more logical information flow and such in a transparent experience. This is further supported with interactive elements - maps and analytics, where certain level of functional and content structure harmonisation was applied as well.

On technical level, applications have an access to the same source of data, which can be a single mapping server, database, or filesystem. Separation of storylines into individual applications allows using app-specific visualizations, setting of the charts, and interactive elements to maximally emphasize the added value of the products. This approach allows avoiding the competition of different and often contradictory needs and requirements emerging from a variety of CURE products/services. Another advantage is that future changes in the visualization in one interactive storyline will not affect other ones. On the other hand adding new data for another city might support several storylines at once.

Interactive Production: Set-up

This interface allows users to initiate a new service production for selected CURE application. For eligible (signed and logged in) users, it provides different forms from service parameters specification (e.g. form fields or mapping windows for AOI selections). The complexity depends on particular CURE application requirements. As mentioned this part required deployment of user management system within the portal to steer and manage users interaction with the production system (the CURE Engine). This user management system retrieves user identification and authentication and tokens.

Interactive Production: Jobs

This part manages production jobs initiated by particular user. User can inspect a current status of the jobs and identified any irregularies. Users have also the ability to download the products or delete them. The functionality demonstrates the power of the user direct interaction with the CURE services on-boarded on production system via APIs, but the implemented interface of the production dashboard and job scheduler is on simple proof-of-concept level (scalled to budget). Full-fledged interactive production portal as part of production system has been beyond the CURE project scope.

3 IMPLEMENTATION

This paragraph outline the current implementation of the CURE portal delivered as D4.5 (access on Wednesday 31 August 2022). Some contents details might evolve reflecting further consortium partners or users feedback.

3.1 Main Page

A landing page of the CURE Portal provides tabs (links) to several context information pages, to individual CURE applications storylines, cities used for demonstration, service production request (optional – for logged in users only) and some additional settings. Each tab item is shortly explained below (from left to right).

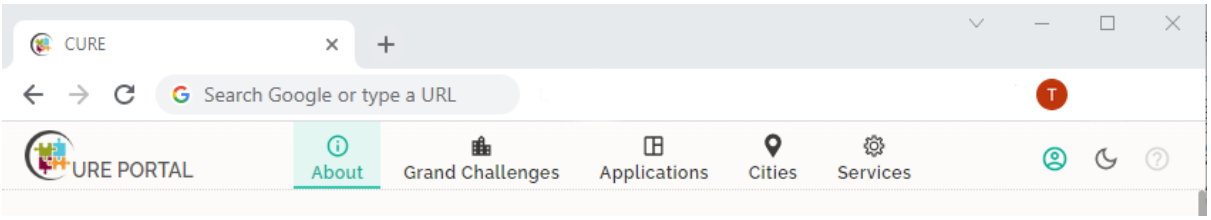


Figure 3. Landing CURE Portal page tabs snapshot.

About – provides context to the CURE project. Potential entry point to individual services storylines.

Grand Challenges - provides policy context to the main city challenges and link to the CURE services contributing to solutions. Potential entry point to individual services storylines) with focus on three main areas: Climate Change Mitigation, Climate Change Adaptation and Healthy Cities.

Applications – provides link to the CURE applications overview page. The main entry point to individual services storylines (described in detail below).

Cities - provides link to the CURE front-runner and follower cooperating cities. Potential entry point to individual services storylines.

Services (optional) – provides link to service production interface allowing users to initiate a new service production. Available for logged in users only.

User Log in – user log in / lof out area

Light/Dark template switch – allows user to switch between light and dark template for overall web page.

Help – guidance for user interaction

3.2 CURE Applications Overview Page

Application tab provides link to the CURE applications overview page. As mentioned, all services are shortly introduced here using synompsis aimed on service topic. This page is the main entry point to individual services storylines (using Explore green button). In addition users can filter individual applications using several pre-defined filters (see left part on Figure 4 below), focused on challenges response (in line with City grand challenges described in Cities tab), topics specifying more detailed focus and Copernicus Core services used (reflecting cross-cutting aspect).

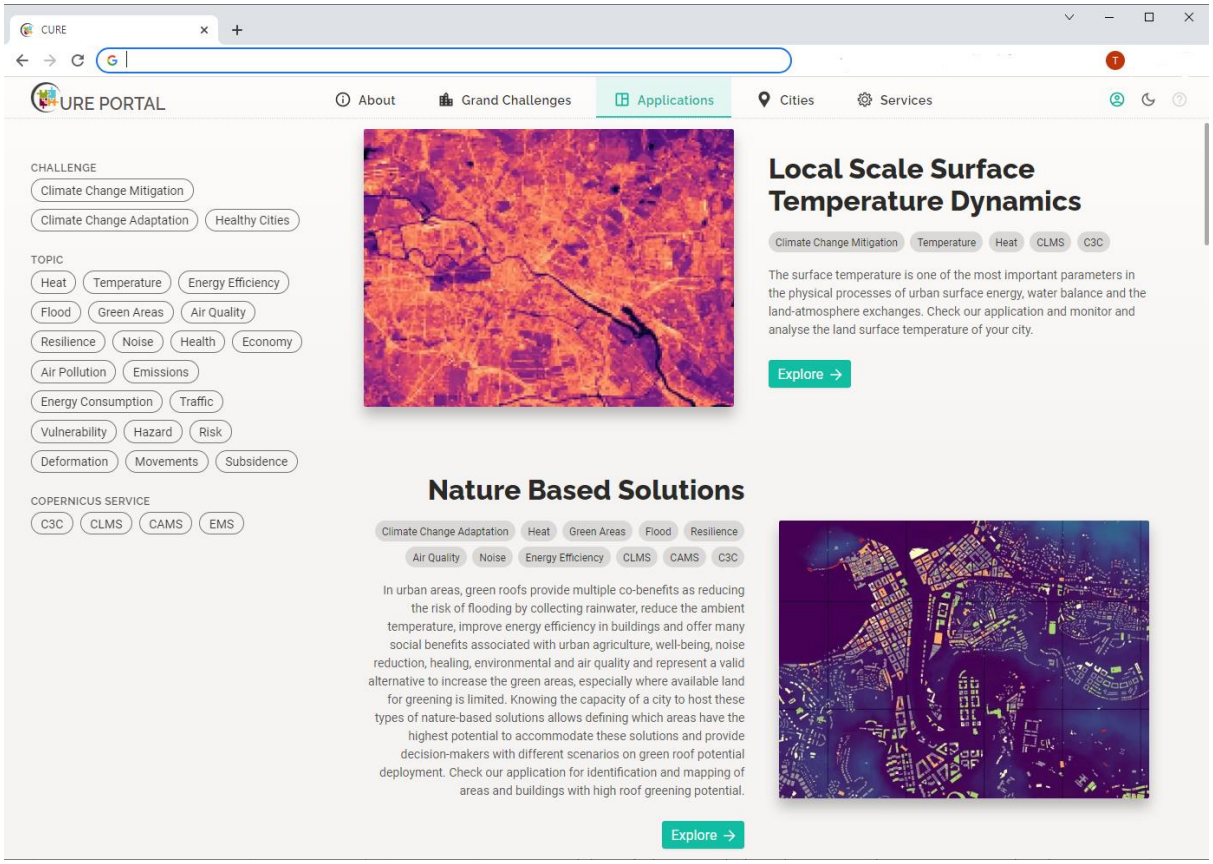


Figure 4. CURE Portal – Application overview page.

Relevant tags from all filter groups are included for each application, so users know at any moment, which filter(s) has been applied (see example on Figure 5. below). Filters or filter groups are extendable.

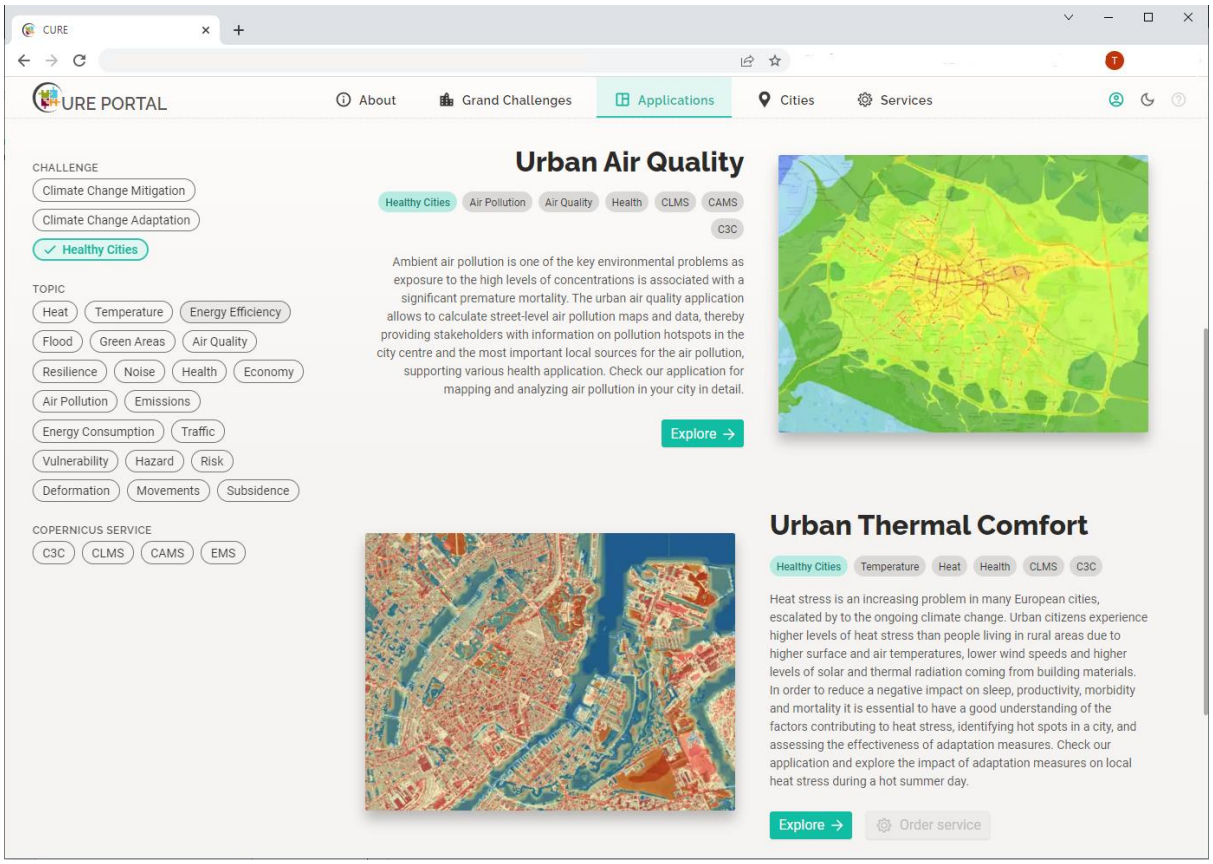


Figure 5. CURE Portal – Application overview page (with applied filter).

3.3 Application Storyline Page

Entering the individual storylines web presentation is divided to two parts (see Figure 6 below). Left part includes all text explanation describing various aspects of a selected CURE service and its application, plus the navigation through the storyline. Right part includes all interactive elements (maps and analytics) demonstrating text described features of a service on selected visualisation on real and live data. User can interact with the data and generate his own views and insight. Functionality of interactive part is mostly harmonised, but some specific application needs resulted in specific functionality in some storylines.

In addition, upper part allows user quickly to switch between cities (if data for cities available) or even switch between application without a need to go back to CURE Application Overview.

As mentioned, the content of the textual part is standardized including following paragraphs: **Service Rationale**, **Added Value Discussion**, **Further Resources** and **Service Provider Info and Other Copyrights and Credits.** For each storyline service specific showcases are then defines

focusing on the most interesting features of demonstrated service from users' point of view. These showcases are then accompanied with interactive elements to exemplify these features. At least one showcase is currently implemented for each application, but mostly there are multiple. Storyline structure is extendable and additional showcases might be added based on consortia partners or users' feedback.

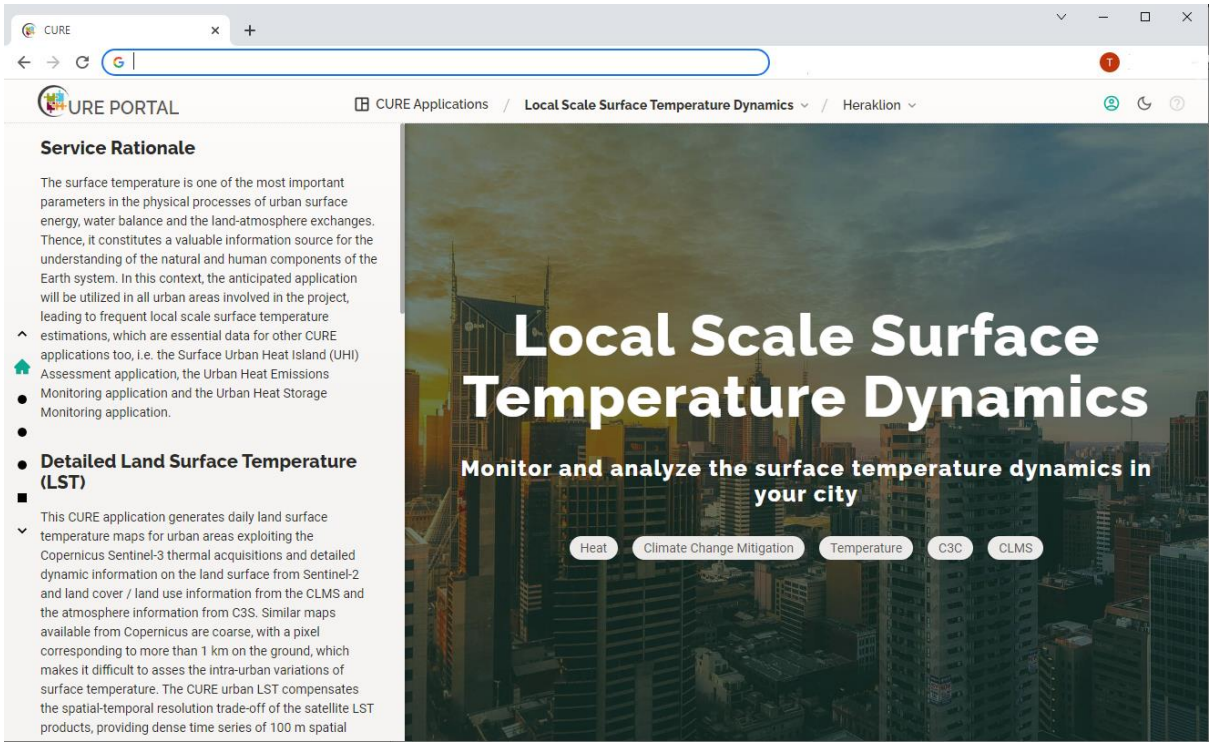


Figure 6. CURE Portal – Storyline page (Example for CURE LST Service).

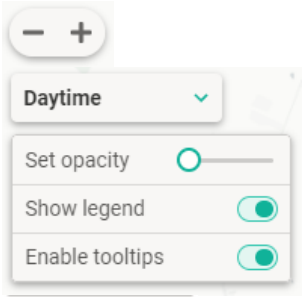
3.4 Application Showcase

On example below, showcase explains, how CURE Land Surface Temperature (LST) service might support users' decision making on user defined (therefore relevant) units (e.g. plots, neighbourhood blocks, districts). Detailed pixel-based results from LST service can be aggregated for such specific analysis. Interactive visualisation presents CURE LST results on CLMS Urban Atlas blocks. A user can hoover on the map to explore aggregated land surface temperature values per blocks, inspect differences between daytime and nighttime temperatures or compare it with actual land use to see how green areas matter.

Standard functionality in interactive elements is prepared in very intuitive way, so don't require much explanation. Nevertheless, please find below the main elements commented:

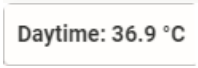
change of the background layer

two inter-linked windows / slider switch



zoom in / zoom out (works also using a mouse slider)

layer name and some layer settings



value on cursor (hoover)

legend

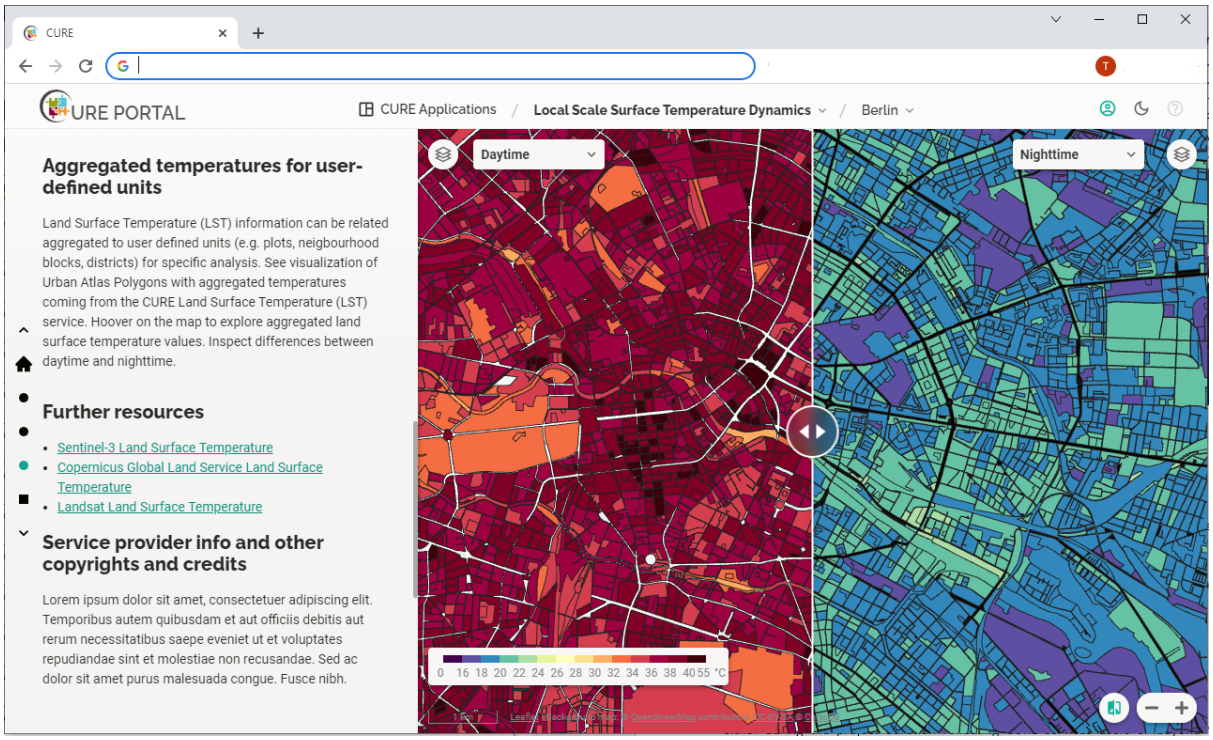


Figure 7. CURE Portal – Showcase (Example for CURE LST Service).

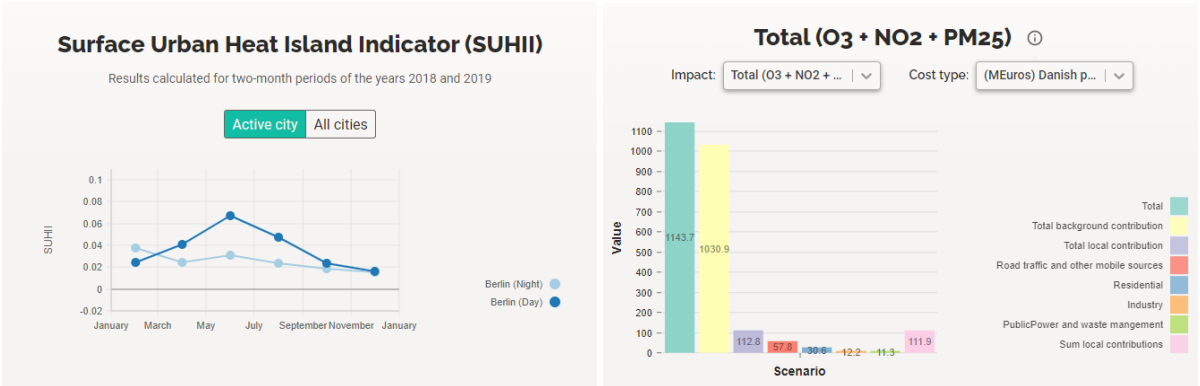


Figure 8. CURE Portal – Showcase (Example for CURE Surface Urban Heat Island Service & CURE Health services).

Interactive elements are not restricted to mapping ones. Various analytics in form of graphs or table are included, but this time more tailored for specific application storyline needs (see examples on Figure 8 above). Another example of customised showcase for more complex data on urban CO_2 emissions is presented on Figure 9 below.

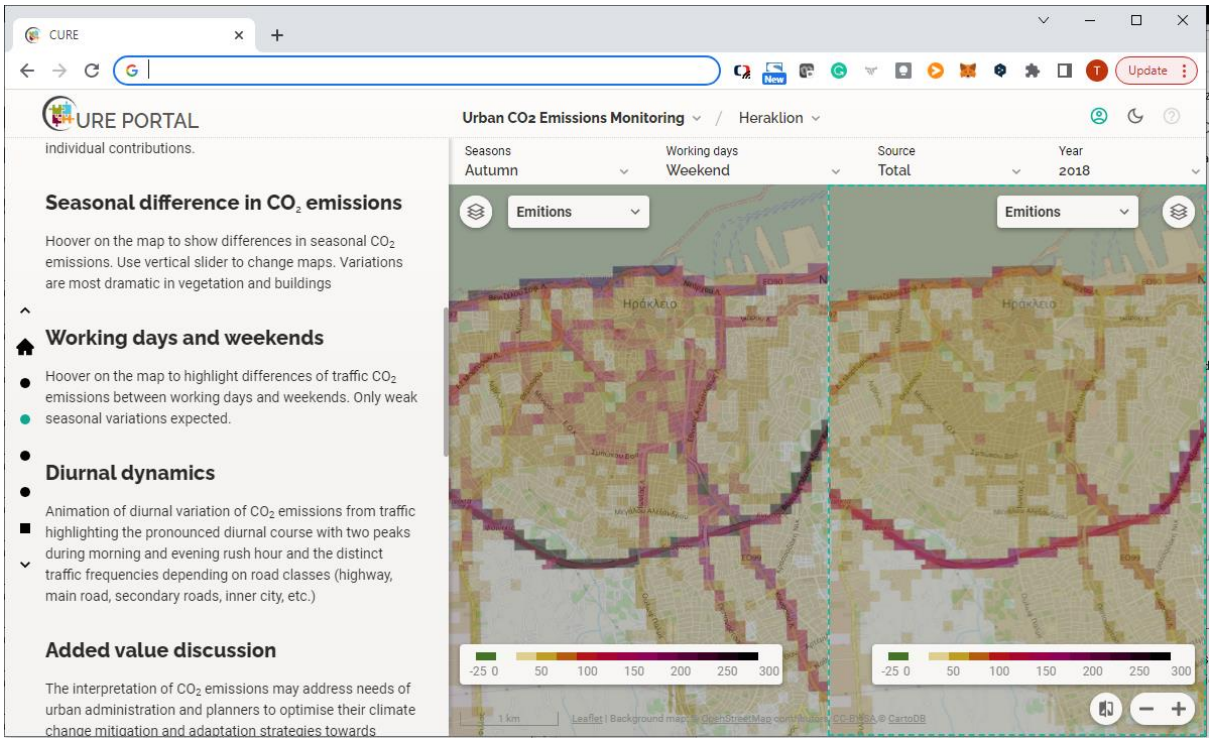


Figure 9. CURE Portal – Showcase (Example for CURE Urban CO2 emission monitoring service). Comparison of total emissions in Heraklion in Autumn, 2018: Working days (left) vs Weekends (right).

3.5 Services Page

As described above, beside storylines focused on demonstration and promotion of application potential of the CURE services, there is a second important element of the CURE Portal demonstrating the CURE service **capacity** to provide selected services in streamlined and automatized way regularly or based on users' request.

This is obviously an important aspect of any service in general, especially when aiming for operational service status as in the case of the CURE services. Moreover, this part was also implemented of the CURE portal to highlight the consortium activities towards the overall automation of the CURE services production, focused on (i) generic access to Copernicus resources via Copernicus Core Services Interface (CCSI), (ii) streamlining and dockerization of the individual CURE services and (iii) set-up of the dedicated cloud processing infrastructure and on-boarding of individual service on the CURE Engine. This might be otherwise hidden in the technical documentation.

As seen on Figure 10, after log in to the CURE Portal an user interaction and new service activation is supported by provision of a simple web-based **production dashboard/job scheduler.**

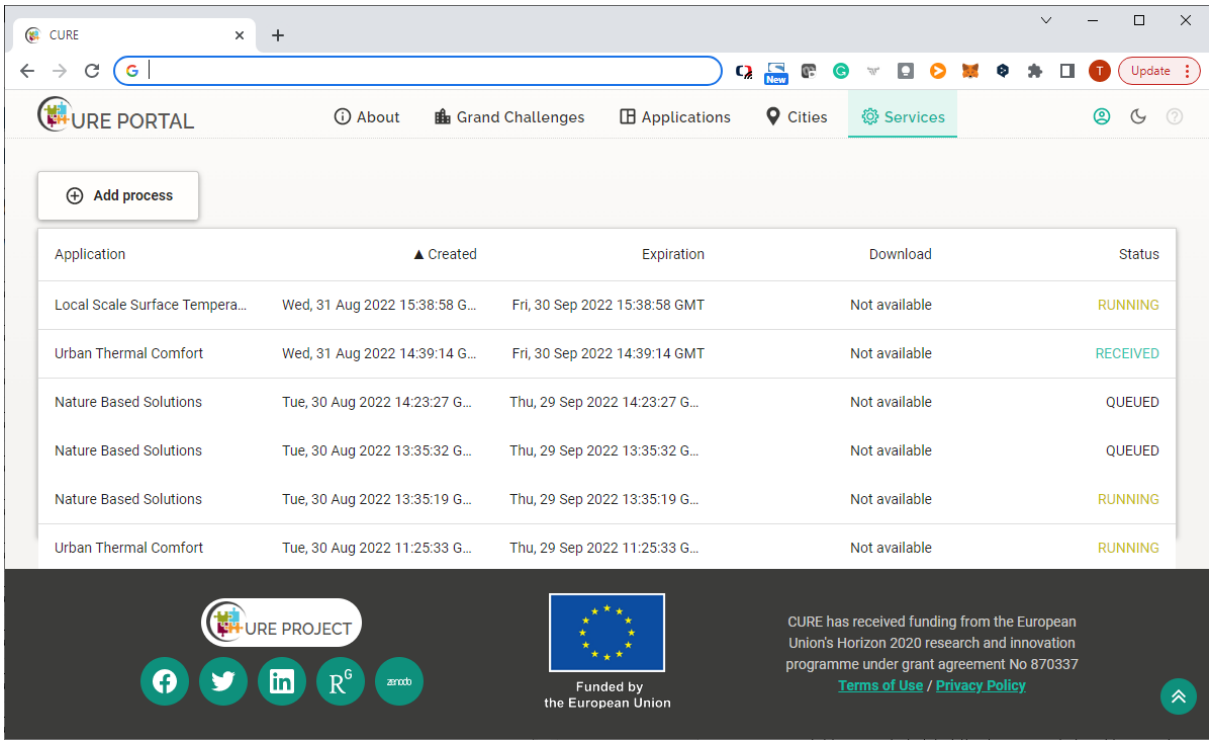


Figure 10. CURE Portal – web-based production dashboard/job scheduler.

This enables user-driven web-based communication between the CURE Portal and the CURE production system via dedicated services APIs. User can initiate new process by clicking Add process button (see Figure 11 and 12). User can also monitor status of his processing jobs, again harvesting actual status of each processing job via the CURE services' APIs.

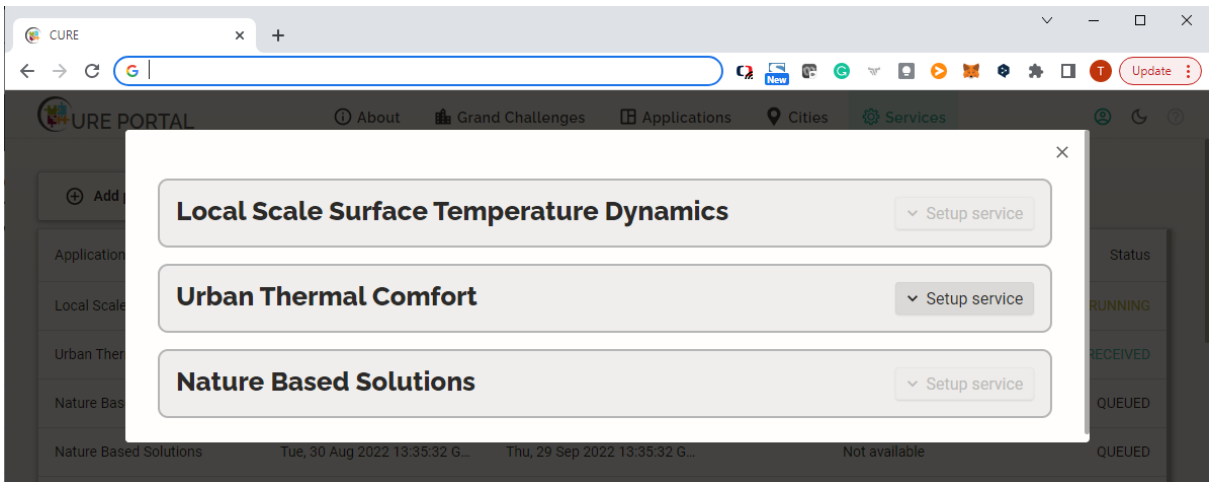


Figure 11. CURE Portal – new processing job selection and specification.

New processing service request parameters are mirroring the CURE Service API specification as developed on the processing platform (CURE Engine) by Geoville. CURE Service API is based on a Microservice architecture. See documentation in D4.2 for more details.

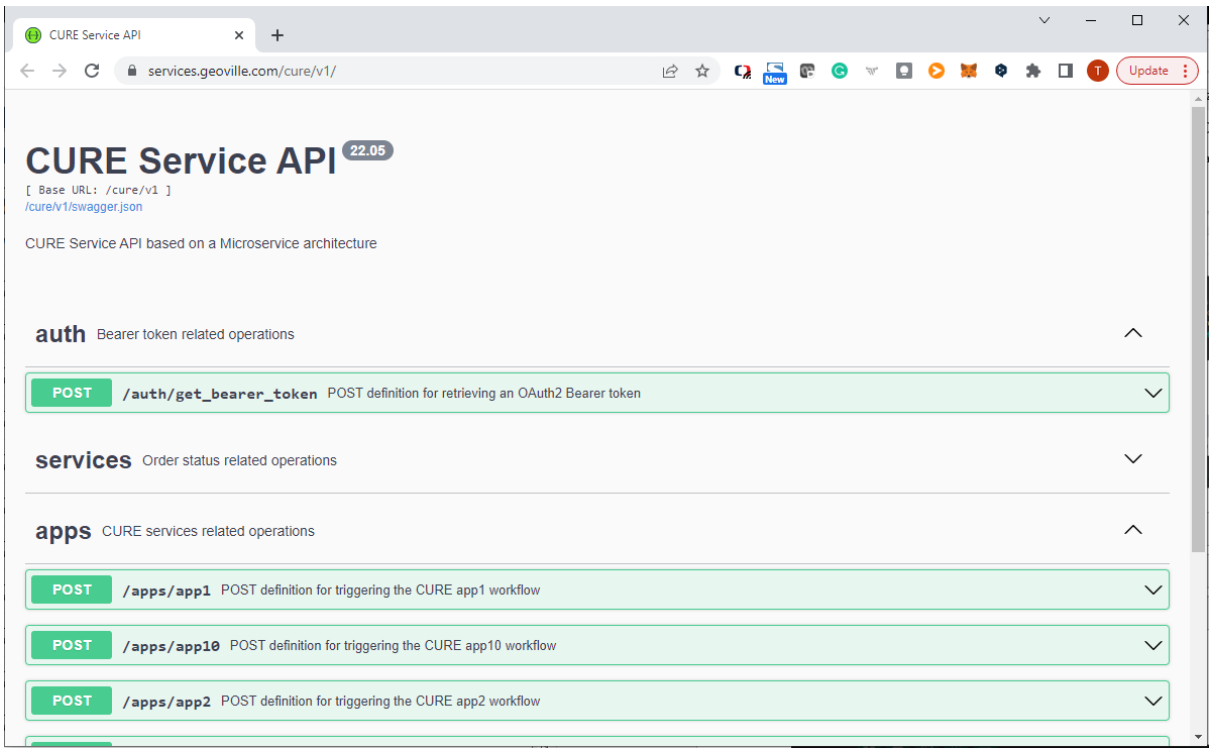


Figure 12. CURE Service API – standard specification for new processing job request.

This part is considered as proof-of-concept demonstration, but ready for further scaling or deployment to more robust infrastructure for a full-fledged interactive operational CURE production services in future.

3.6 Responsive approach

The overall CURE Portal is implemented in responsive approach i.e. web creation makes use of flexible layouts, flexible images and cascading style sheet media queries. The goal of responsive design is to build web pages that detect the visitor's screen size and orientation and change the layout accordingly, so the same or similar user experience is achieved on multiple consumer platforms. Additional optimalization is still foreseen.

4 CONCLUSIONS

Actual CURE Portal implementation reflects the initial CURE project requirements foreseen in the implementation plan i.e. demonstrating both the capacity and the application potential of the CURE application solutions via an interactive portal with data visualization and analytics tools. Activity is led by GISAT with participation of GEOVILLE. The CURE portal is accessible at http://portal.cure-copernicus.eu/.

Obviously, the actual scope of implementation has been also driven by the resources available for T4.5, but the overall concept as well as implementation framework is flexible enough and expendable so the portal content and functionalities might be further enhanced or evolved either during the project duration reflecting CURE services users or beyond the project duration based on expected CURE services further evolution and integration into general Copernicus information streams. The CURE portal is also considered as a cornerstone supportive elements in upcoming dissemination, demonstration and business development activities.