Progress of WGISS Carbon Community Portal Report to WGISS -50

Goal: To support CEOS Carbon Science Mission by providing easy discovery of and access to carbon-related data resources in CEOS member agencies

The Objectives: 1) enable carbon community to easily find their interested data in the CEOS agency collections brokered by both CWIC and FedEO; 2) allow searching and accessing data within collections using CWIC and FedEO with keywords, spatial and/or temporal constraints; and 3) provide common discovery and access of all CWIC partner holdings targeting at the CEOS Carbon Community

Summary of progresses since WGISS-48 in September 2019:

- Public release of CWIC Carbon Portal and subsequent revisions. Current version is Version 1.1
- Collected new requirements and inputs from the CEOS and GEOSS carbon science community and responded to requirements:
- Allowed searching of ECV and CDRs with additional filters
- Enabled interoperability with Open Data Cube (ODC)
- Released the white paper (architecture) on portal support to CEOS chair initiative
- Improved performance by server-side proxy and caching, adopting the Accessibility
 Insights for Web tool, GCMD hierarchical search
- Improved accessibility compliant to Web Content Accessibility Guidelines (WCAG) 2.0
- Explored the possibility of repurposing the portal to support other CEOS initiatives (e.g., coastal initiative)



Next steps: Enhances the portal to support new requirements from CEOS, GEOSS, and Global Carbon Project; Enhances interoperation with Open Data Cube; Explores the support to other CEOS Initiatives.

Summary of Contributions to CEOS Carbon Community

- Closely collaborate with CEOS Carbon Task and Global Carbon Project in the development of the portal to ensure it is useful for the community
- Collaborators are involved in
 - Define requirements
 - Design, test, evaluation
 - Use in their studies
 - Provide feedbacks for refinement and improvement
- Revisions of the portal was released to CEOS carbon community for use in July 2019
- The portal has been highlighted in the home page of the Global Carbon Project with a live link (See the screen capture right)
- Enabled support to CEOS Chair Initiatives on Forest Initiative and Open DataCube connection





Extended summary of progress

- Milestone 1: Demonstrated CWIC Carbon Portal at WGISS-48, Oct. 9, 2019
- Milestone 2: Released the white paper (architecture) on portal support to CEOS chair initiative, Jan. 2020
- Milestone 3: Released the version 1.1 of the portal, and deployed it in September 2020
- Progresses:
 - Testing and evaluation of the released portal
 - Collected new requirements and inputs from the carbon science community: Linking Open Data Cube (ODC)
 - Analyzed the new requirements and inputs to design the implementation approaches: Testing ODC API and designing metadata and data exchange interfaces with ODC
 - Implemented new requirements: Metadata harvesting at both collection and granule levels
 - Analyzed requirements from CEOS and VNSC for supporting the CEOS chair initiative
 - Prepared a white paper (architecture) to describe the feasibility and approaches for the portal to support the chair initiative.
 - Participated in GEO Week in November to integrate CWIC and the portal with GEOSS.
 - Improved performance of server-side proxy and caching logic for fetching contents under the Cross-Origin policy
 - Improved the portal accessibility by using the Accessibility Insights for Web tool
 - Improved efficiency by using the IndexedDB provided by web browser
 - Appended matching counter at each filter, including GCMD keywords
 - Improved performance of hierarchical GCMD keywords filter
 - Applied analytics by using the Google Analytics
 - Explored the possibility to repurpose the portable to support other CEOS initiative, such as CEOS Coastal Initiative

Progress

- Performance improvement Local Cached CWIC and FedEO Collections
 - o Both carbon-related and Full collections
 - o Transfer compressed cached metadata to reduce network traffic
 - o 15MB -> 2MB for Full CWIC
 - o 280MB -> 29MB for Full FedEO
 - o Changeable to use cached or on-demand searching
 - o Exclude global is truly working



Performance Improvements



CESS



- Progress
 - User interface improvement -Filter and keywords tag UI interaction
 - o All selected filters are shown at the keywords tag area
 - o Keyword tag manipulation





- Progress
 - User interface improvement Showing Processing Progress Status Bar
 - o Progress monitoring
 - o Asynchronous image producing
 - o Do not need to wait the portal usage until finishing producing
 - o Can be performed multiple producing coincidentally



UI improvements

CESS

- Progress
 - User Preference Setting -Initial Configuration
 - o Set default initial Map Center and Zoom-level
 - o Selectable default initial searching engine
 - o Selectable individual products as well as Toplevel category



UI Improvements



• Progress

- Support metadata from ODC Prototyping with VODC
 - o Vietnam Open Data Cube
 - o Both Collection and Granule level
 - o Totally 39 collections (6 for Tasks, 33 for products)
 - o Supporting additional links





Content Enhancement



White paper for GEO Chair Forest Monitoring

- White paper on architecture
 - Initial version on Dec. 1, 2019
 - Released on Jan. 14, 2020
 - Architecture Design following ISO/IEC 10746



Adaptation of the CEOS WGISS Carbon Community Portal for the Forest Monitoring Initiative in Mekong - Architecture

Document Identifier: Release Date: Edition: Edition Date: Responsible Party: Audience: CWCCP4Mekong_Architecture_V0.2.0 January 14, 2020 0.2.0 January 14, 2020 General Science and Technology Solutions, Inc. Stakeholders of CWCCP project and Forest Monitoring Initiative (CEOS Chair Initiative)

Server-side proxy and caching logic

- Function improvement Improved performance of server-side proxy and caching logic
 - Transcoding Java version of servlets to Java 8 or higher
 - Do not fork a process for external tool when invoking proxy request
 - Efficient cache management, reduced response time, less memory usage on server-side



Finalizing version 1.0 of the port

- Stability improvement Finalizing version 1.0 of the portal
 - Deployed Version 1.0 in May 2020
 - Deployed Version 1.1 in September 2020
 - Clean up testing codes and console monitoring logs
 - Applied JavaScript minifier to deployment version only – making smaller and clear



Codes



The Portal Accessibility

- Accessibility improvement Checked Web Content Accessibility Guideline (WCAG) 2.1
 - Checked by using Accessibility Insights tool (compatible with WCAG 2.1)
 - o Passed all checklist on FastPass
 - o Checked in Assessment checklist
 - o Adjusted higher color contrast ratio at each text content
 - o Appended alternative message or title at each required element
 - Passed Nu Html Checker (v.Nu) tool
 - o Checked HTML / CSS validation on source code level



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- Efficiency improvement Stored precached datasets into IndexedDB
 - Pre-cached datasets are stored Into client-side storage
 - Do not use network traffic for pre-cached datasets after storing into IndexedDB
 - Keeps up to date each stored dataset automatically at initial time



Using IndexedDB



Filter Matching Cour

ges/main.html

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CEOS WGISS Carbon Community Portal

Checked Atmospheric

Matching count: 248

Function improvement – matching counter at each selected filter

- Shows matching counter at the end of each selected filter
- Helps end-user to understand how many • entries belong to each selected filter
- Shows accumulated count at any upward • parent filter if a filter is selected



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Hierarchical GCMD Keywords Fi

- Performance improvement Improved hierarchical GCMD keywords filter
 - Each keyword is representative of all children keywords
 - When all children keywords are selected, "Aerosols" will be a representative the parent keyword will become a representative keyword
 - Removes all marginal keywords which were reducing performance



All children of "Aerosols" are selected



Demo of Open Data Cube Connectivity

- This demonstration is for Connectivity with Open Data Cube
- Demo Scenario:
 - Step 1) go to the portal URL

https://gis.csiss.gmu.edu/carbon/cwicport/ Or http://cloud.csiss.gmu.edu/carbon/cwicport/

- o Both are same service endpoint of the portal
- Especially for the Africa Region, the following URL is initially customized for the region

http://cloud.csiss.gmu.edu/carbon/africa/

Type the Portal URL



Demo of Open Data Cube Connectivity

- Demo Scenario (Cont.):
 - Step 2) Checked "Africa Regional DC" at Predefined of Catalog filter
 - Uncheck all other catalogs may be helpful to reduce total number of matching datasets
 - Step 3) Click "Options" button, and set Spatial and Temporal restrictions
 - Spatial Range type West 33.5, , North: 3.0, East: 34.0, South: -3.5
 - o You can also use Bbox drawing tool or upload a shape file
 - o Temporal Range set April 15, 1999 to Dec. 26, 2016
 - o You will get totally 8 Results





Demo of Open Data Cube Connectivity (3/7)

- Demo Scenario (Cont.):
 - Step 4) Scroll down and click the title of "NDBI-NDVI-NDWI" entry
 - o You will get totally 6 granule-level searching result







- Demo Scenario (Cont.):
 - Step 5) Check "Urbanization Query (LANDSAT_7, Tanzania, Max NDVI Pixel)" and then click "Retrieve Data" button
 - o You will get a dialog box for "Confirming Retrieve Data"





Demo of Open Data Cube Connectivity (5/7)

- Demo Scenario (Cont.):
 - Step 6) Review the parameters, and click "GetFile" button
 - o You will get a "Retrieve Data File" dialog box
 - After reached the end of the Progress
 Bar, you will get an image file link for
 downloading

060badc_f4a6_4014_b62f_84d7c86286

Identifier: b0194d9c-954d-412a-86ce-f0535e121203 Author: Box: -4.05 33.5W -3.5N 34.0E

Urbanization Query (LANDSAT 7, tanzania, Most Recent Pixel)

ownload NetCDF

GeoTIFF Details

Download NetCDF

d GeoTIFF Details

Cancel Job

Progress Bar

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Demo of Open Data Cube Connectivity (6/7)

- Demo Scenario (Cont.):
 - Step 7) Download the image file and/or click "Add Layer"
 - o You will see the file name on the Layer selector, and the image will be shown on the base map
 - You can see a statistical information by clicking a button which is on rightside of the image file name



Demo of Open Data Cube Connectivity

- Demo Scenario (Cont.):
 - Step 8) Layer Manipulations
 - o You can select a layer by clicking the name in the Layer menu
 - You can recall Get File dialog by clicking "Download" button in toolbar
 - o You can change opacity by clicking "Layer Opacity" button
 - o You can see statistical information and charts



