ARCTIC SDI
Arctic Spatial Data Infrastructure

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ARCTIC SDI
Arctic Spatial Data Infrastructure

A high level Introduction

Technical Deep Dive

Stakeholder Engagement & OGC Interoperability Opportunities

Arctic SDI activities we won't cover today:

- **Need for Guidelines, Standards, Policies, Cookbooks, etc.**

Q&A

Arctic SDI is based on voluntary commitments
by the National Mapping Agencies
from 8 countries that border the Arctic Circle

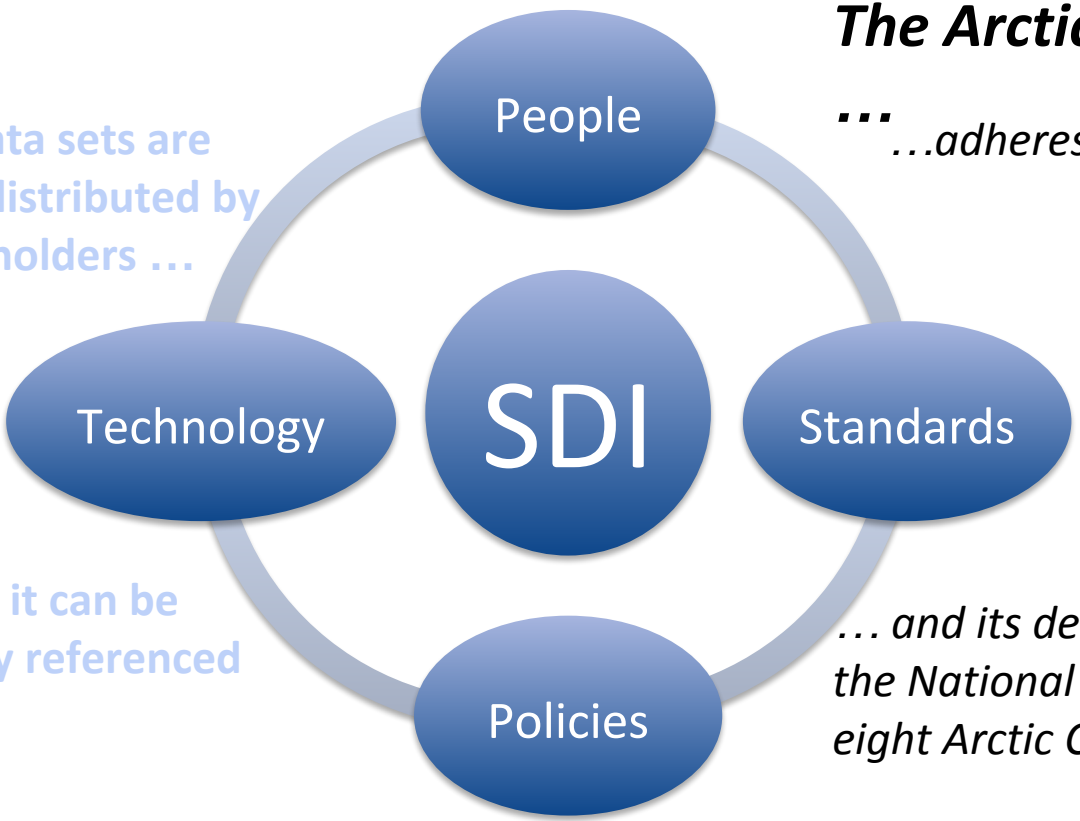
There is a signed MoU towards cooperative development of an Arctic SDI.

- Earth Sciences Sector of the Department of Natural Resources Canada
- Danish Agency for Data Supply and Efficiency
- National Land Survey of Finland
- National Land Survey of Iceland
- Norwegian Mapping Authority
- Federal Service for State Registration, Cadastre and Mapping of the Russian Federation
- Swedish Mapping, Cadastral and Land Registration Authority
- U.S. Geological Survey

A Spatial Data Infrastructure

Allows sharing geospatial data in an efficient and flexible way

Important data sets are produced and distributed by many stakeholders …



… most of it can be geographically referenced

The Arctic SDI

…

…adheres to Open Data Standards

… and its development is facilitated by the National Mapping Agencies of the eight Arctic Countries.

What are the benefits of participation in Arctic SDI?

Remember that time that you *really* wanted to find that dataset, or map, you had seen before?

Remember how much time you were looking and you were (or weren't) successful?

- **Geospatial data and the maps you could generate (on the fly) will always be accessible!**
  - **Data can be used, and re-used in ways we can now only dream of!**
  - **As common data layers evolve consistent visualization becomes possible**
    - ***… Promotes collaboration with access to any data provider: public & private sector data, NGOs and Academia***

What's the difference between an SDI and a Geoportal?

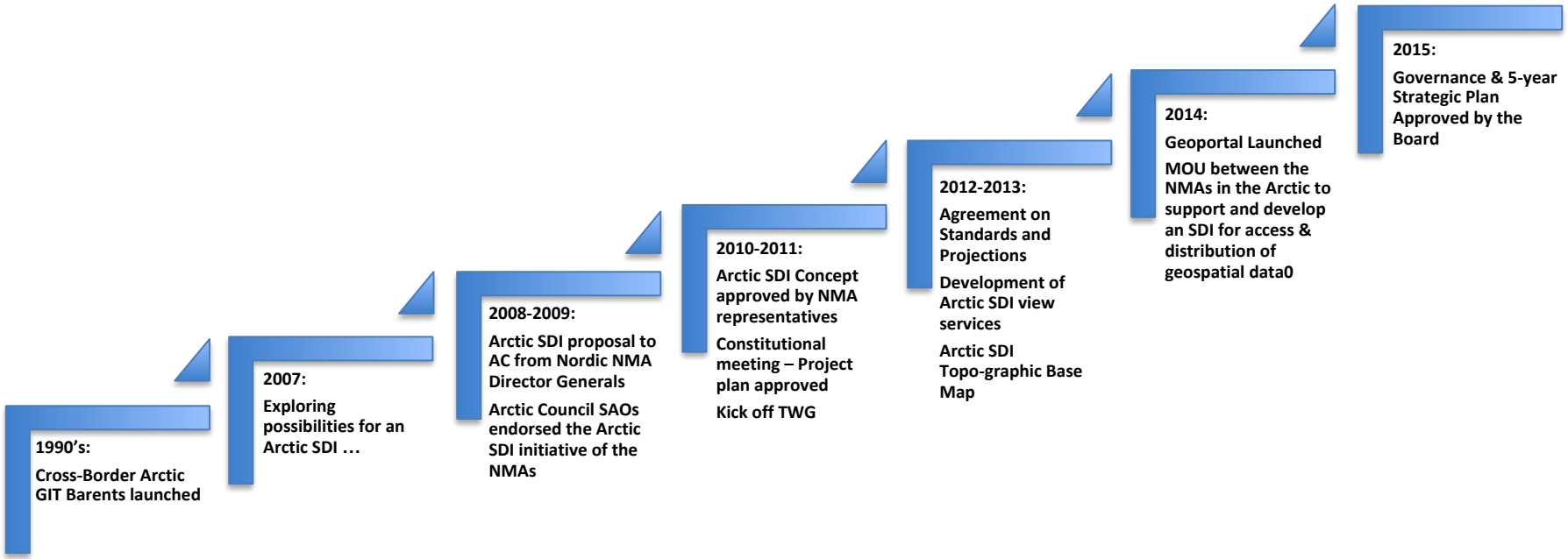
Spatial Data Infrastructures are like transportation infrastructures …
Roads, for example

- **Data is like the vehicles …**
  - **Cars vs. Trucks; All-Wheel Drive vs. 4-Wheel Drive; Sedan vs. All-Terrain Vehicle**
- **Effective delivery of different data types require different standards, or protocols**
  - **Time Series/Temporal data vs. Raster data vs. Vector data, etc.**

Geoportals are tools which can access data in the infrastructure

Standards based vehicles can be driven on any standard road!

Arctic SDI: A Brief History



Monitoring, management, emergency preparedness and decision making responses to impacts of climate change and human activities require accessible and reliable data

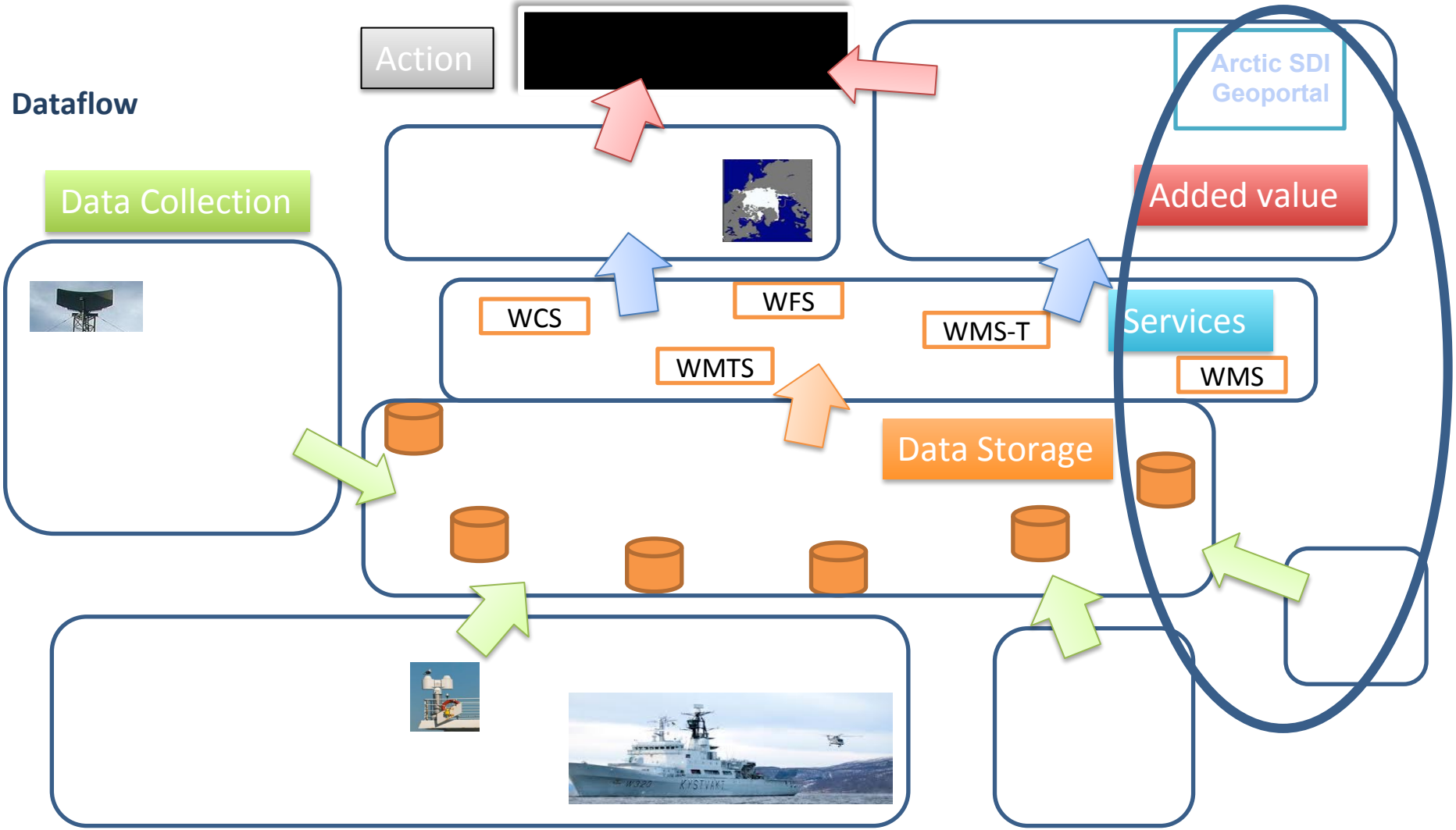
Arctic SDI Strategic Plan 2015-2020: 6 Objectives

Main Content of the Arctic SDI

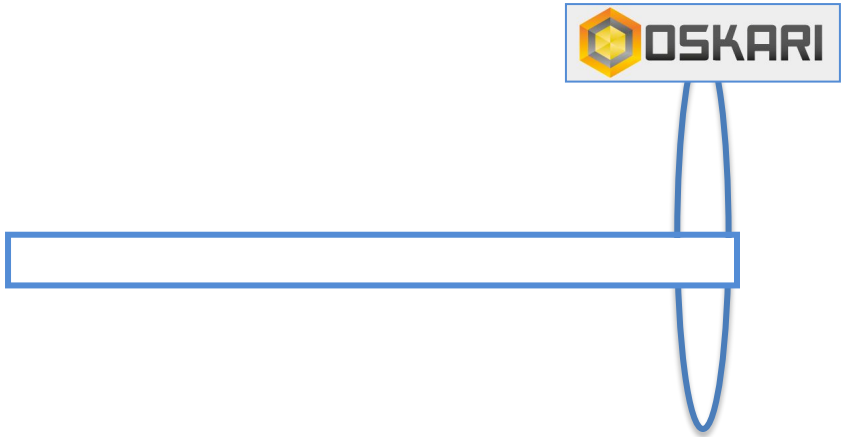
The Arctic SDI is an infrastructure that provides a web portal with easy access to:

- A geoportal for geospatial data viewing and discovery
- A searchable metadata catalogue
- Authoritative reference data as a Web Map Service (WMS) 1:250.000
- Thematic data (birds, icecover, ship routes, land cover change, flora etc.)

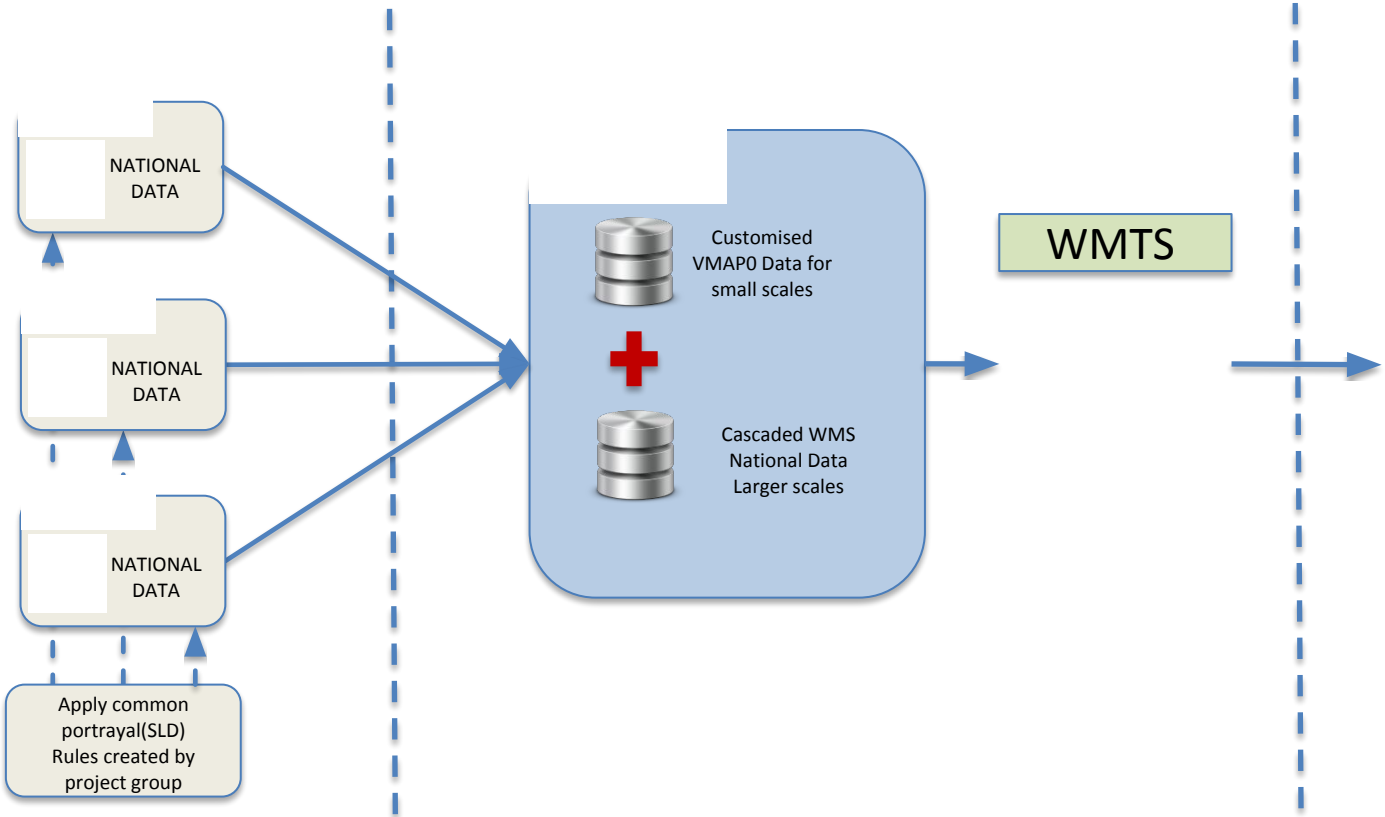
Dataflow


Action
[redacted]
Arctic SDI Geoportal
Added value
Data Collection
WCS
WFS
WMS-T
Services
WMTS
WMS
Data Storage

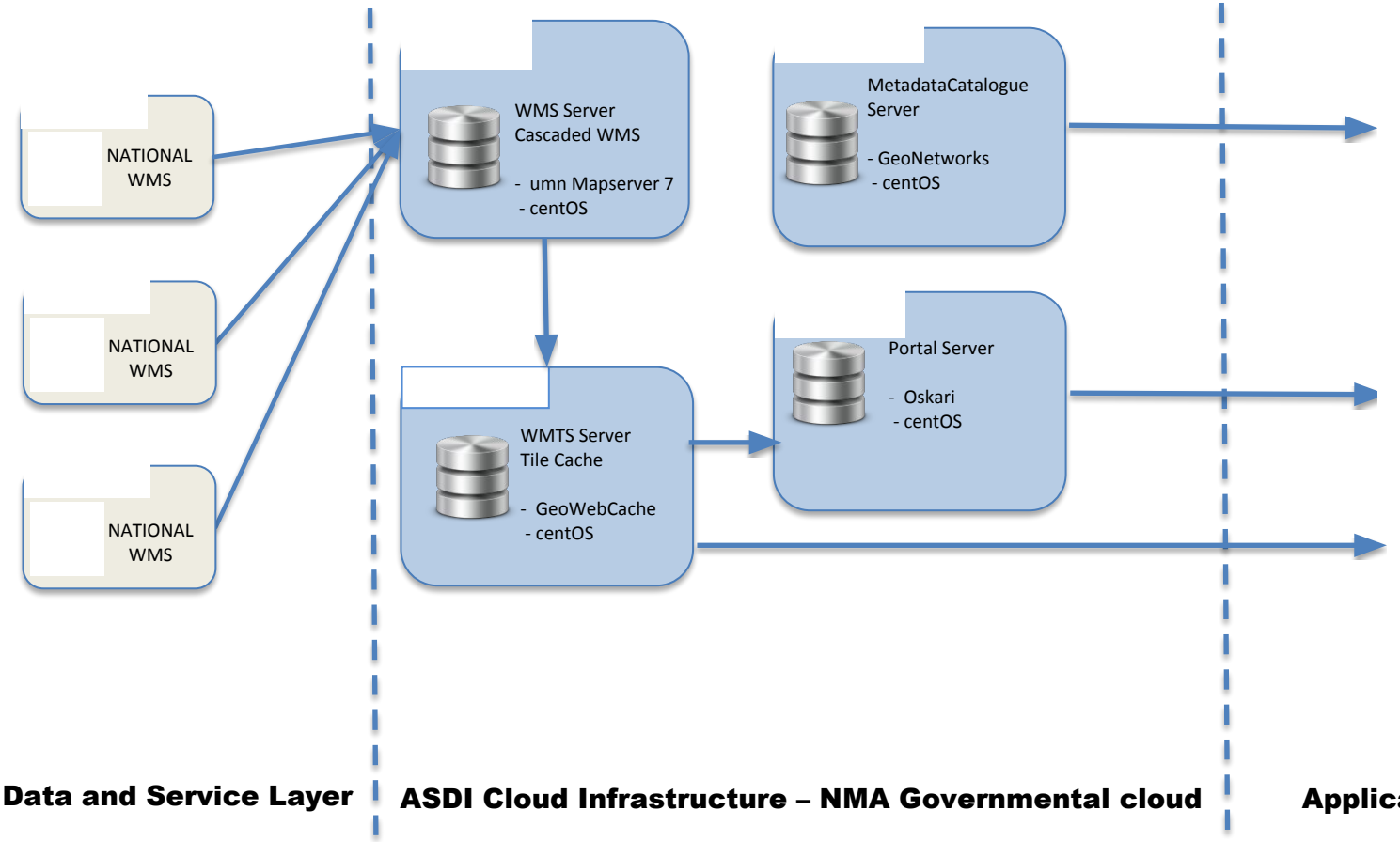
Architecture



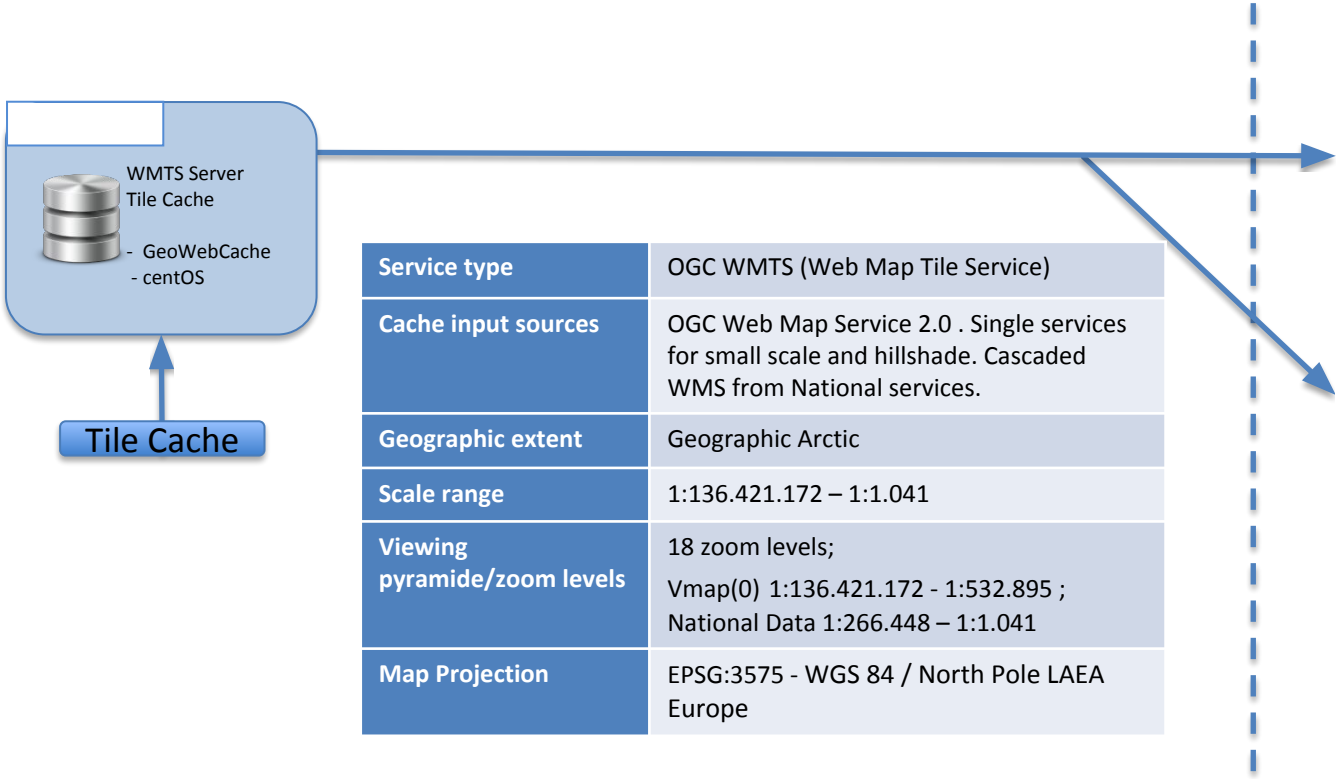
Arctic SDI Service Infrastructure



Arctic SDI Cloud Infrastructure



Arctic SDI Topographical Basemap Tile Cache



Service type	OGC WMTS (Web Map Tile Service)
Cache input sources	OGC Web Map Service 2.0 . Single services for small scale and hillshade. Cascaded WMS from National services.
Geographic extent	Geographic Arctic
Scale range	1:136.421.172 – 1:1.041
Viewing pyramide/zoom levels	18 zoom levels; Vmap(0) 1:136.421.172 - 1:532.895 ; National Data 1:266.448 – 1:1.041
Map Projection	EPSG:3575 - WGS 84 / North Pole LAEA Europe

www

Arctic SDI Topographic Basemap – Basic concept

Map type	Arctic Reference Map
Aim of map use	A reference background map to enable professional users to display their data in client applications such as websites, GIS and increasingly mobile devices and background data for other types of applications
Map content	General description of the man-made and natural landscape with specific interest for transport infrastructure, administrative boundaries, hydrography, location of settlements, relief and land cover information
User	Professionals and general public
Map function	Discovery, information, cognition, communication, and social function
Map use situation	Indoor (desktop) / (outdoor (mobile))
Area of interest	Geographic Arctic
Scale	Pyramid of digital maps at different zoom levels. Scalerange : 1:136.421.172 – 1:1.041
Output medium	Arctic Topographic BaseMap View Service (WMTS)
Source Data	Digital vector data from VMAP0 and national contributions from the 8 Arctic countries , Digital Terrain Model /Hillshade from GMTED2010

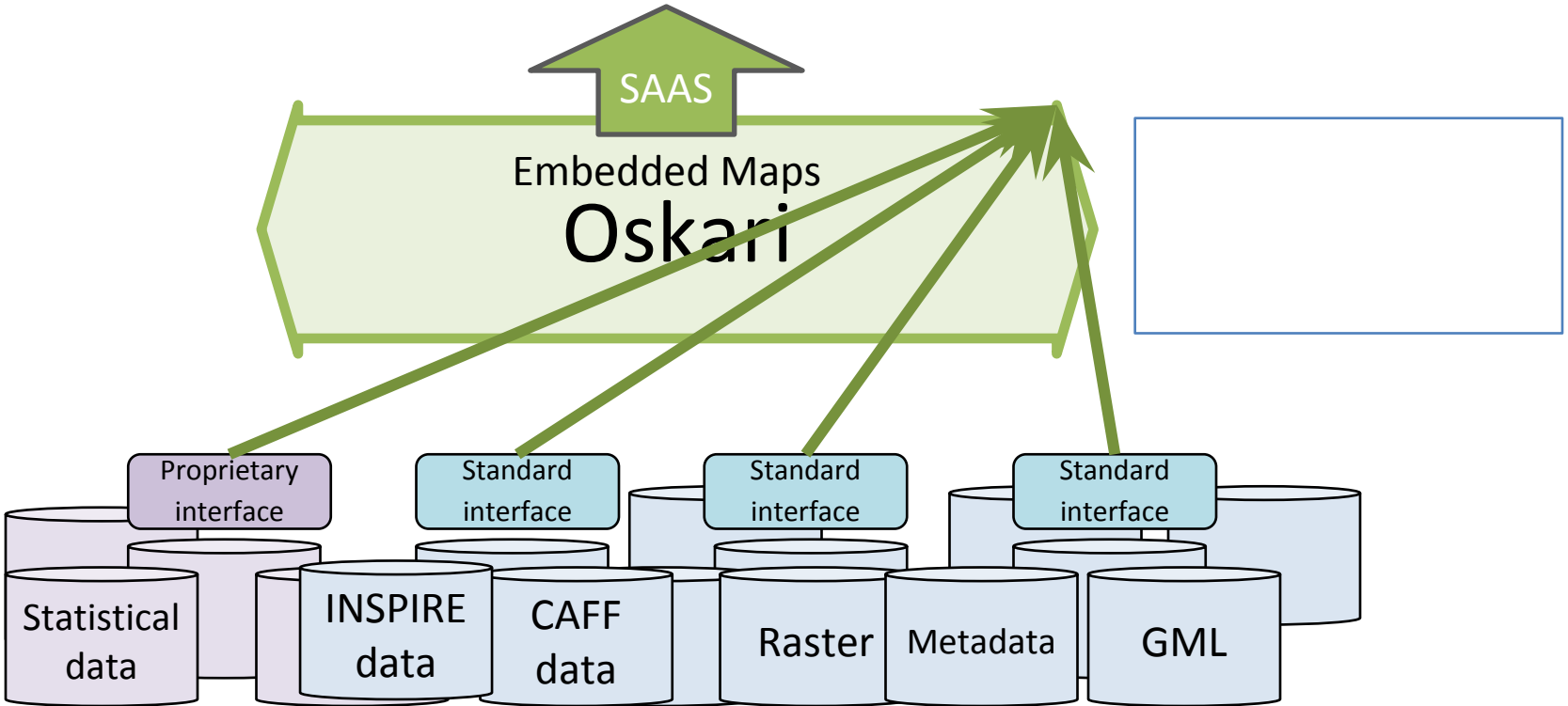
Oskari - Geoportals and Embedded maps

- For setting up Geoportals or Web GIS systems
- For creating Embedded map clients onto other websites very efficiently – like Google Maps on steroids
- For setting up advanced web-based tools, such as decisionmaking support services and data analysis tools
- Utilizes distributed SDIs via standard OGC interfaces, along with other data sources
- Multilingual – English, Swedish & Finnish full coverage, 15 other languages with partial coverage
- Open Source (MIT) - see oskari.org and Oskari GitHub for more info

Users of Oskari

- European Location Framework Showcase App
- **Arctic SDI Geoportal**
- Statistical data Geoportal ”Liiteri” for the Finnish ministry of Environment
- The Regional Council of Southwest Finland Geoportal
- City of Tampere Geoportal, Citizens’ Services Map + many more
- Finnish National eGovernment services
- National Land Survey of Finland eServices
- Finnish Transport Agency data download service
- Permit Services for Municipalities (Lupapiste)
- Unemployment Services Finland mol.fi
- Helsinki Region Environmental Services Authority Geoportal

Browser-based Applications with Maps and Indicators

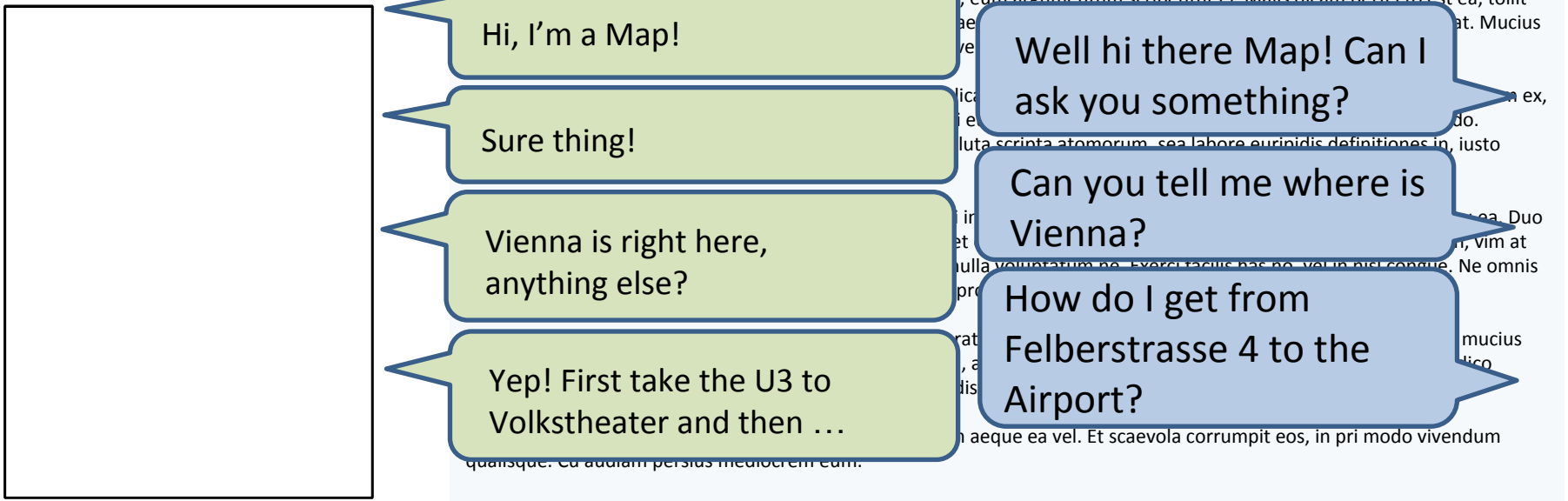


RPC – Remote Procedure Calls

Enable communication between the map and parent web page

Web Page

Embedded Map



http://oskari.org/examples/rpc-api/rpc_example.html

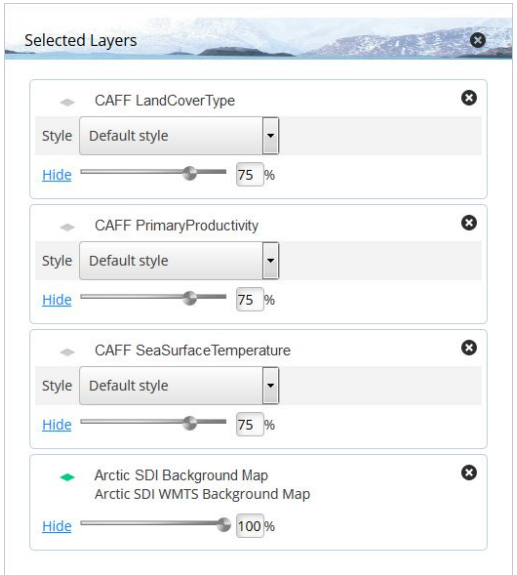
Features

- OGC WMS, WMTS, WMS-T, WFS, CSW & ESRI REST support
- Embedded Maps with RPC API
- Integration to gazetteer / address / find nearest APIs
- Legend display with support for WMS styles
- Printout (WMS, WMTS, WFS)
- Integration with statistical data
- Spatial Analysis using GeoTools
- My Places and My Datasets
- Save my View
- Locate me -tool
- Marker and Link tools
- Measure distance and area
- Feature selection tool for WFS
- Change projection –tool
- Layer administration tool
- Layer Rights management tool

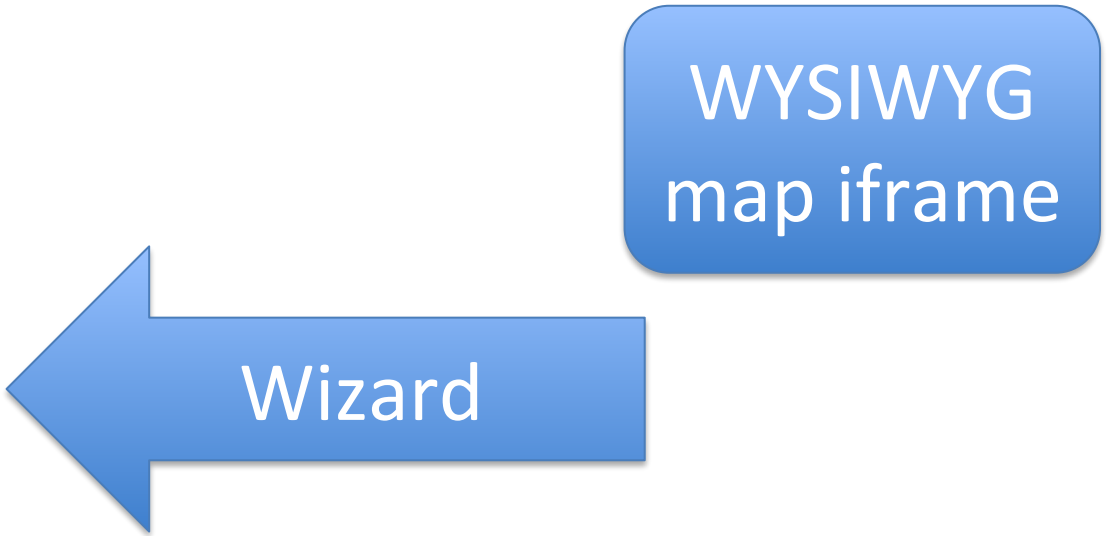
Location Search

Metadata Search

Map Layers & Coordinate Tool

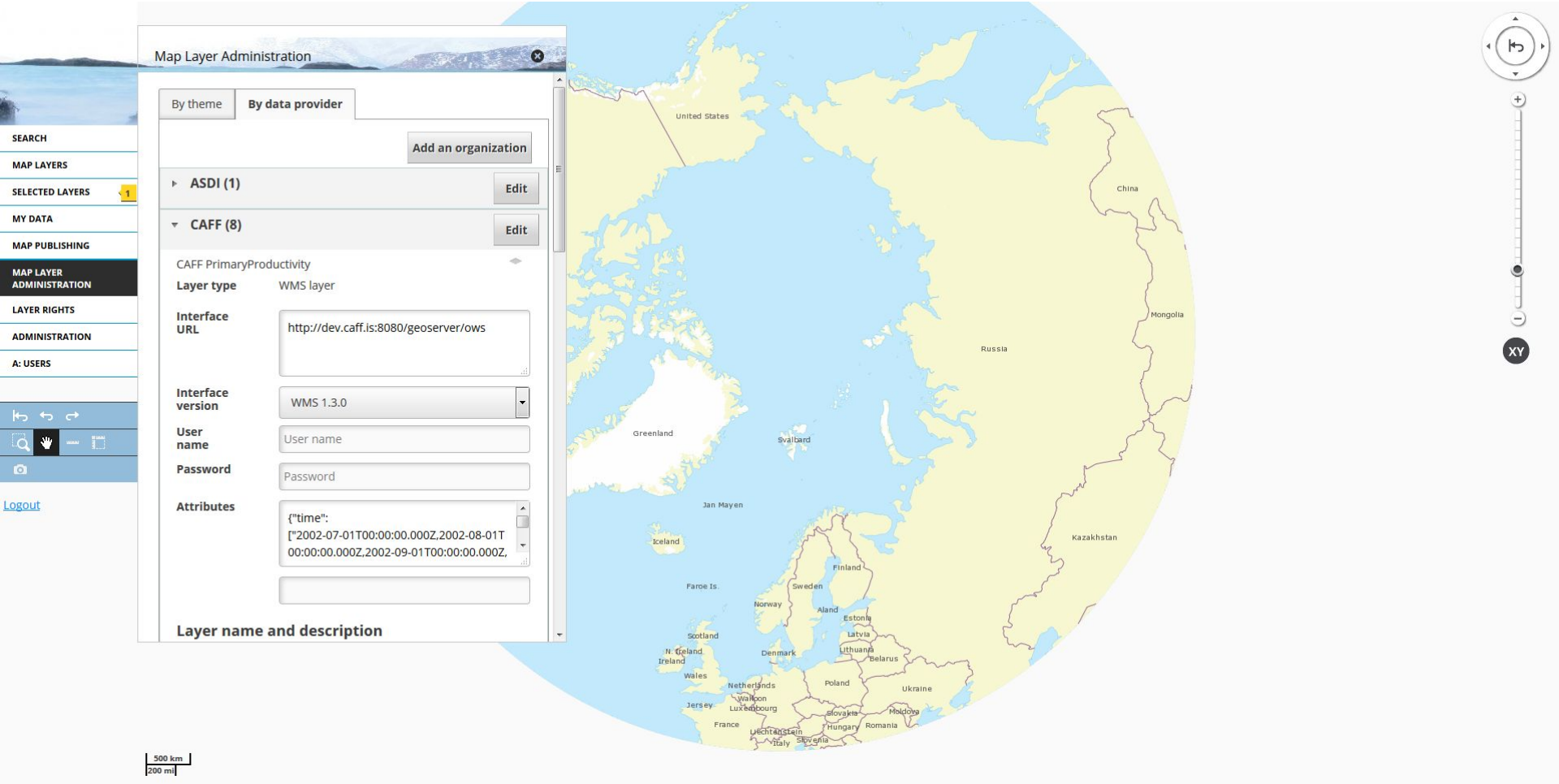


Embedded Maps Wizard



Your Own Maps

Geoportal Administration



Time Series (WMS-T)

Spatial and Statistical Data combined

Spatial Analysis: Change calculation

Spatial Analysis: Spatial Join

Open Geospatial Consortium:
OGC Interoperability Pilot:
Arctic SDI Standards and Communication Pilot

The goal of the Arctic SDI OGC Pilot part of the is to demonstrate the diversity, richness and value of SDI Web services to Arctic SDI stakeholders.

- Sponsored and funded by USGS and NR Can,
- Supports the Arctic SDI 5-year Strategic Plan, Objective 4 Technical and Data Interoperability
- Outcomes will inform activities of Arctic SDI Working Groups

Arctic SDI OGC Interoperability Pilot

Open Geospatial Consortium - Arctic SDI Interoperability Pilot

Arctic SDI OGC Pilot: Organized in Two Phases

Phase One: Collects input and data across the entire Arctic, in order to develop:

- An inventory of available geospatial Web services across the Arctic with the intent to capture a wide range of thematic data layers.
- A plan that evaluates constraints & delineates core components that best define an Arctic SDI architecture.
- Development of a scenario to highlight value
- An RFQ and Request for participation

Arctic SDI OGC Pilot: Organized in Two Phases

Phase Two will:

- Be based on the output of Phase One
  - The detailed plan,
  - the proposed technical architecture to be implemented
  - the suggested scenarios and use cases will be scalable to the Arctic

- Allow for an iterative pilot connected with OGC Testbed-12 activity
  - The Testbed will be used to test interoperability of *data services and tools from across the Arctic*

The RFI on the OGC Arctic SDI Interoperability Pilot is due on the streets any day. It is open to all responses …

Thank you for your attention!

☺

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In Summary

The 8 National Mapping Agencies have come together and signed a MoU to cooperate because

- Improved access to geospatial data can help us better to predict, understand and react to changes in the Arctic.
- Responses to the impact of climate change and human activities in the Arctic requires accessible and reliable data to facilitate monitoring, management, emergency preparedness and decision making.
- Important data sets are produced and distributed by many stakeholders – public and private sector – and most of it can be geographically referenced.

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Improved access to geospatial data can help us better predict, understand and react to changes in the Arctic.

Visit arctic-sdi.org