



The Digital Ocean, Big Ocean Data
and Ocean Cloud Computing

Engaging private industry to deliver Hope for Ocean sustainability

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30 November 2017



*"The Ocean Sustainable Development
Goal (SDG 14): Business Leadership
and Business Opportunities"*



Halifax, Canada / 29 November - 1 December 2017

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The challenge (2016)

- ▶ How do we bring all this data together and empower users with information so that they can make decisions?
 - ▶ Without those same users having to invest huge sums in infrastructure and 'technology expertise training'
 - ▶ The remote sensing industry hasn't changed in 30 years - still selling pixels.
- ▶ What is needed?
 - ▶ Storage: 'The Cloud'; (the easiest bit) eg Amazon,
 - ▶ Common access points, eg GEOSS, MapMart, CloudEO, DigitalGlobe BGDX
 - ▶ (Big Data) Analytics including AI <coming fast>
 - ▶ <missing layer>: integrate, fuse, access to actionable intelligence
 - ▶ Question for the audience?
 - ▶ **Who is defining and delivering your Information and Intelligence requirements?**
- ▶ A tidal wave of data is upon us. Yes it could reveal a new whole dimension to our understanding of the Oceans. Do we have the necessary surfboards to ride it or will it just crash all over us?



Credit: capetowndailyphoto.com



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What is the average surface temperature of the moon

Google Search I'm Feeling Lucky

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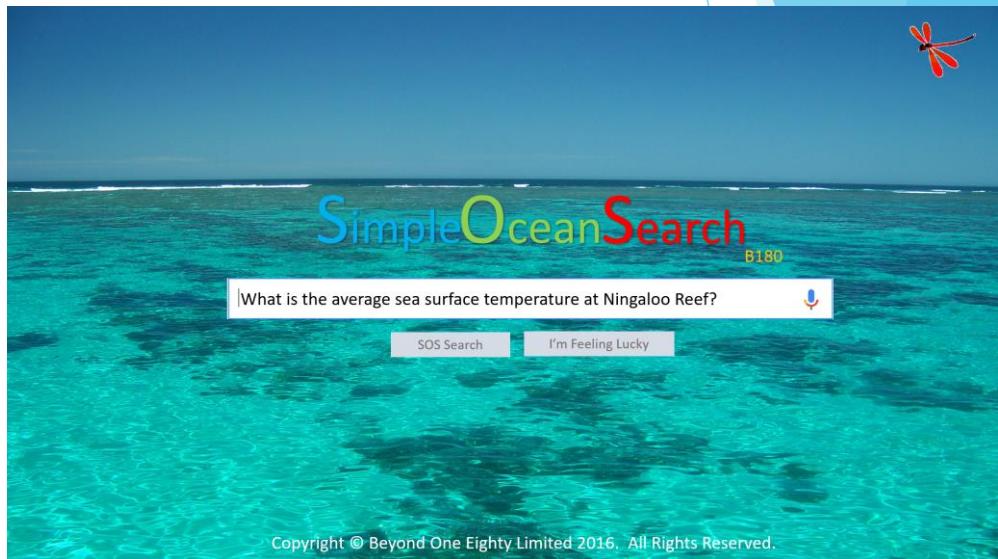
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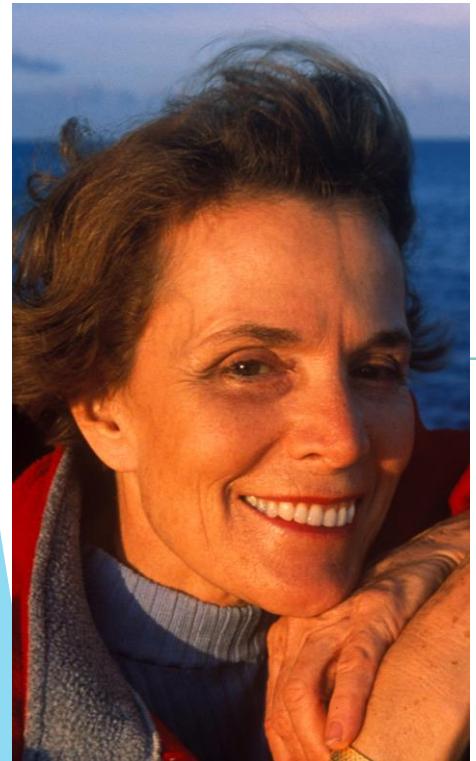
What is the average sea surface temperature at the Ningaloo Reef?

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TEDPrize

Wishes big enough
to change the world

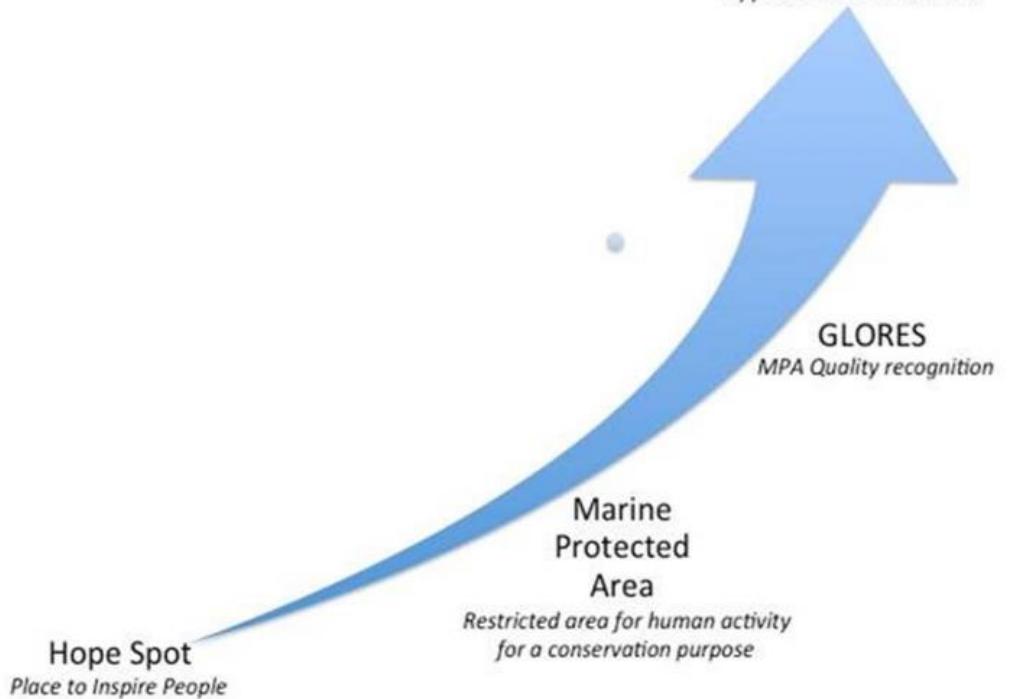
“I wish that you would use all means at your disposal - films! expeditions! the web! more! - to ignite public support for a global network of marine protected areas, hope spots large enough to save and restore the ocean, the blue heart of the planet.”

Dr. Sylvia Earle, 2009



Strong Protection of 30% of
the Ocean by 2030

Approved IUCN motion 53





Problems to be addressed

01

Disparate,
duplicate and
incomplete data.
Too much to
manage.

02

Incomplete
Nomination
Process
implementation

03

Laborious methods
to share, report,
and publish

04

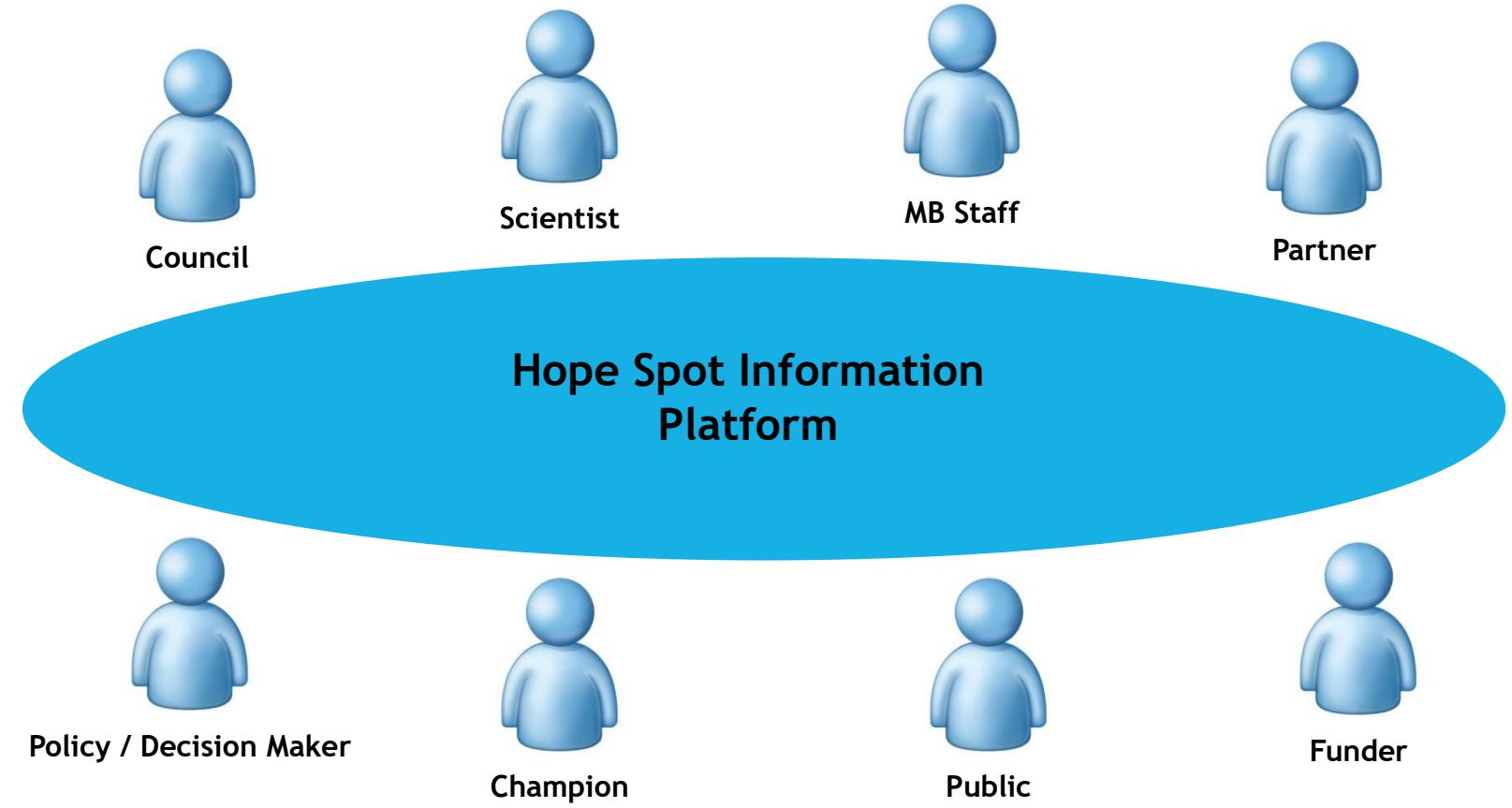
Isolated system,
not linked to other
Ocean data

05

Too many
technologies and
lack of support



Stakeholders to support





HOPE SPOT EDUCATION (i.e. ROOTS & SHOOTS)

HOPE SPOT PARTNER COLLABORATION

- Science
- Policy
- Mapping

PARTNER PROJECTS

- LME (IUCN)
- MPAtlas (MCI)
- Pristine Seas (National Geographic)
- Ocean Legacy (PEW)

JOINT FUNDING MASH UPS

- Coral Restoration
- Blue Carbon
- Illegal Fishing

Hope Spot WebMaps

Hope Spot Story Mapping

Hope Spot Report Dashboards

Hope Spot DB Management

Hope Spot Nomination Process

Map/Data APIs

Hope Spot Database

ETL/ Link Functions

Ocean Science
Data

Social Media
Data

Photos

Video

Descriptive
Text

Maps



Hope Spot Information Platform: key design principles

More than just a
Nomination Process
Workflow

A Hope Spot
Database

- Single Point of Truth
- GeoSpatial
- Open

Easy access

Simple way to
publish information
across the Web

Uncomplicated
Reporting

Integration with
other systems and
datasets



The HSIP is an open cloud database with a set of ‘pluggable’ components.

These components will be embedded within the Mission Blue Website and also combined in an ‘application’ for Mission Blue staff and selected partners

Hope Spot Info

Name: Saint Vincent & the Grenadines Marine Area
Local Name:
Full Info: All

Owner

Hope Spot Details

Location

Map

Marine Area

SB Inc in collaboration with respective stakeholders would develop a net of Marine Managed Areas (MMAs) for 1) Ecotourism to discover more marine life and acknowledge contributing to marine wildlife protection. MMA design for 2) Artisanal fishing and Mariculture is to implement a Marine Reserve with no-take or no fishing zones - to protect vulnerable habitats and secure spawning grounds for various marine species. The MMA will be developed to support local communities and job security, ocean protection and exploration and ecosystem. The Hope Spot nomination will bring international recognition, additional financing and best practices in the area.

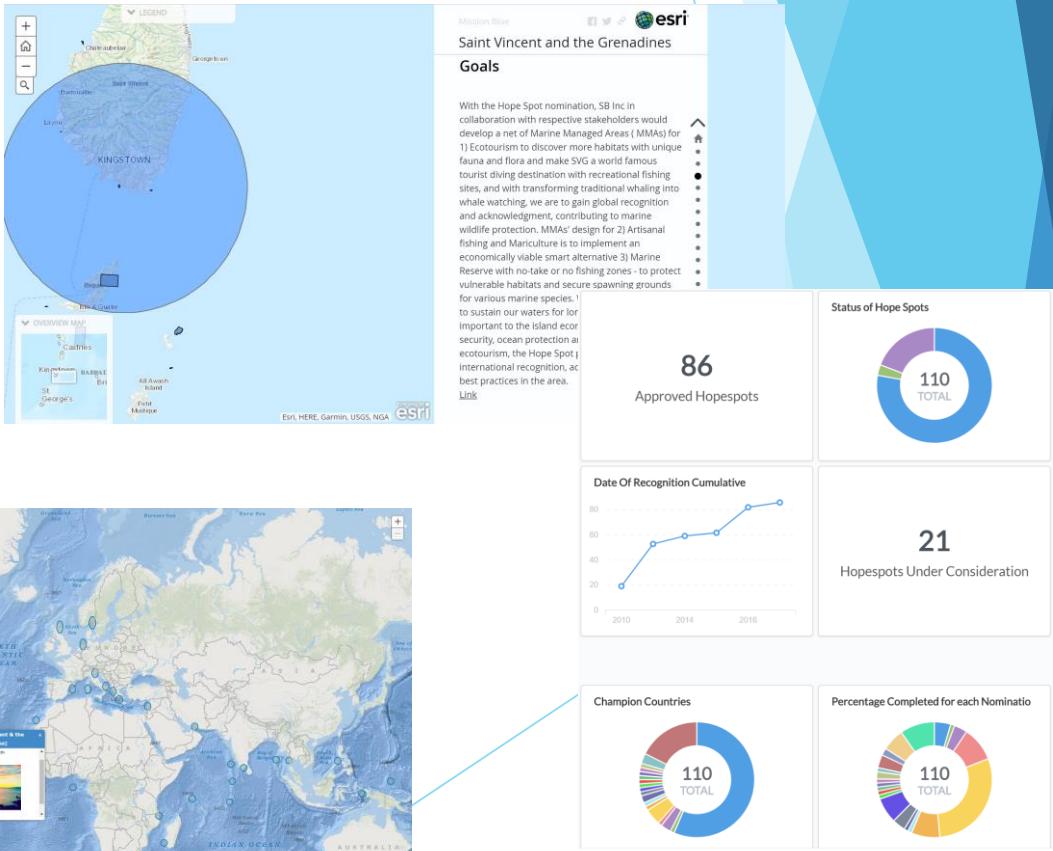
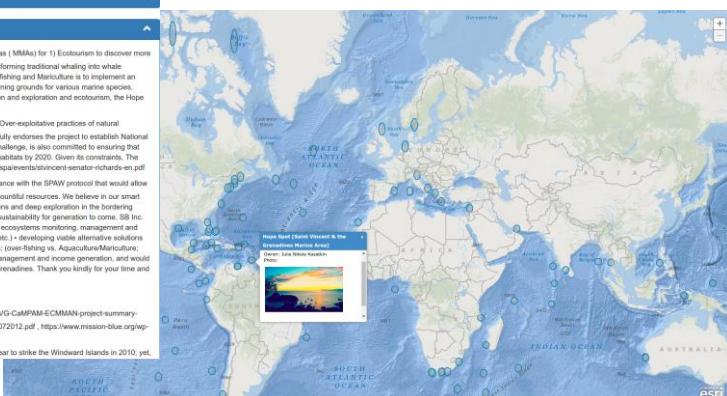
Government Interest: The government seems to be divided into two camps of Supporters for Marine Protected Areas and Supporters of Over-exploitative practices of natural resources to achieve a short-term economic goal. SVG therefore recognizes the need to develop a sustainable finance mechanism and fully endorses the project to establish National Trusts for Protected Areas, which will contribute to addressing some of the issues highlighted above. SVG, in support of the Caribbean Challenge, is also committed to ensuring that 10% of its marine area is effectively managed by 2012 and the expansion of its Marine Protected Area System to include 20% of marine habitats by 2020. Given its constraints, The Government of St. Vincent and the Grenadines needs to take a leadership role in the development of the MMA and the implementation of the proposed MMA.

Hope Provided: With SBIG producing as a Hope Spot, Saint Vincent Inc., respective agencies and regulatory bodies will ensure compliance with the SPAW protocol that would allow SVG residents to openly join the international community and contribute considerably to the protection of the magnificent Ocean and its beautiful resources. We believe in our smart model. Granted the right to protect and restore the Ocean in the Territorial and Contiguous Zones, we could then develop business solutions and deep exploration in the bordering Exclusive Economic Zone and High Seas, enriching our nation and ensuring prosperity and abundance of the resources while practicing sustainability for generation to come. SB Inc. will promote and execute best practices and training for sustainable coastal management, marine conservation, and responsible tourism. In turn, developing viable alternative solutions such as self-determined marine conservation projects directed at transforming environmentally damaging industries into eco-friendly ones, (over-fishing vs. Aquaculture/Mariculture; CleanTech solutions) - developing and implementing guidelines for the establishment of protected/mangaged areas for Ecotourism, their management and income generation, and would suggest collaboration with Mission Blue to establish a base for Ocean and Marine Life Exploration and Protection in St. Vincent and the Grenadines. Thank you kindly for your time and consideration. Sincerely, SB Team.

Special Info:

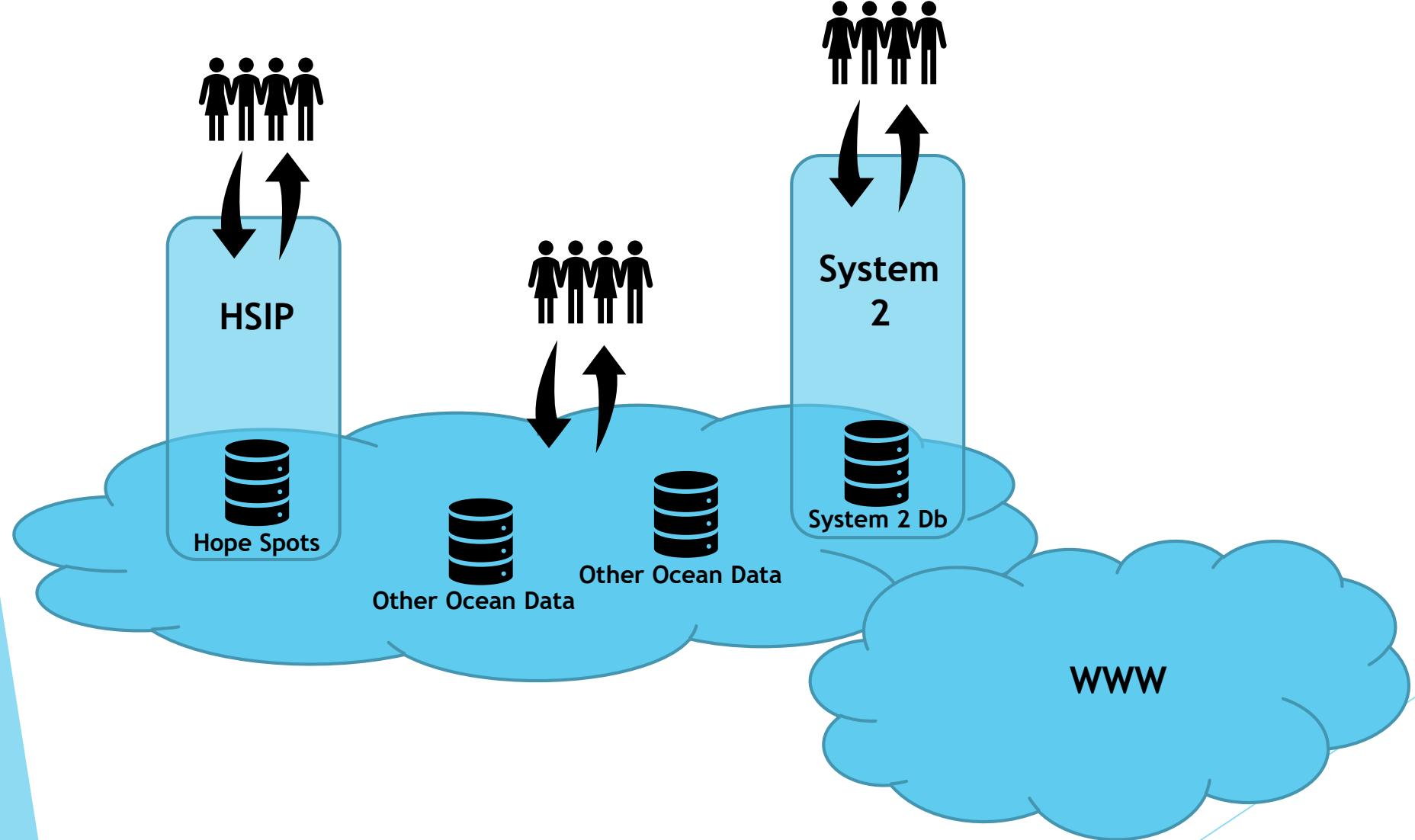
Other Resources: <https://www.mission-blue.org/wp-content/uploads/gravity-forms/1-955e4d7e11558cd2948a27c302c205/2016/08/SVG-CampPM-ECMMA-project-summary-2015.pdf>; <https://www.mission-blue.org/wp-content/uploads/gravity-forms/1-955e4d7e11558cd2948a27c302c205/2016/08/SVGReport2012.pdf>; <https://www.mission-blue.org/wp-content/uploads/gravity-forms/1-955e4d7e11558cd2948a27c302c205/2016/08/NPSP-SVG-Protected-Areas-Gap-Analysis-2007.pdf>

Threat: The threat of seasonal hurricanes is always apparent. Hurricane Tomas was the latest recorded tropical cyclone on a calendar year to strike the Windward Islands in 2010, yet,





HSIP and underlying Ocean Data Centre Architecture



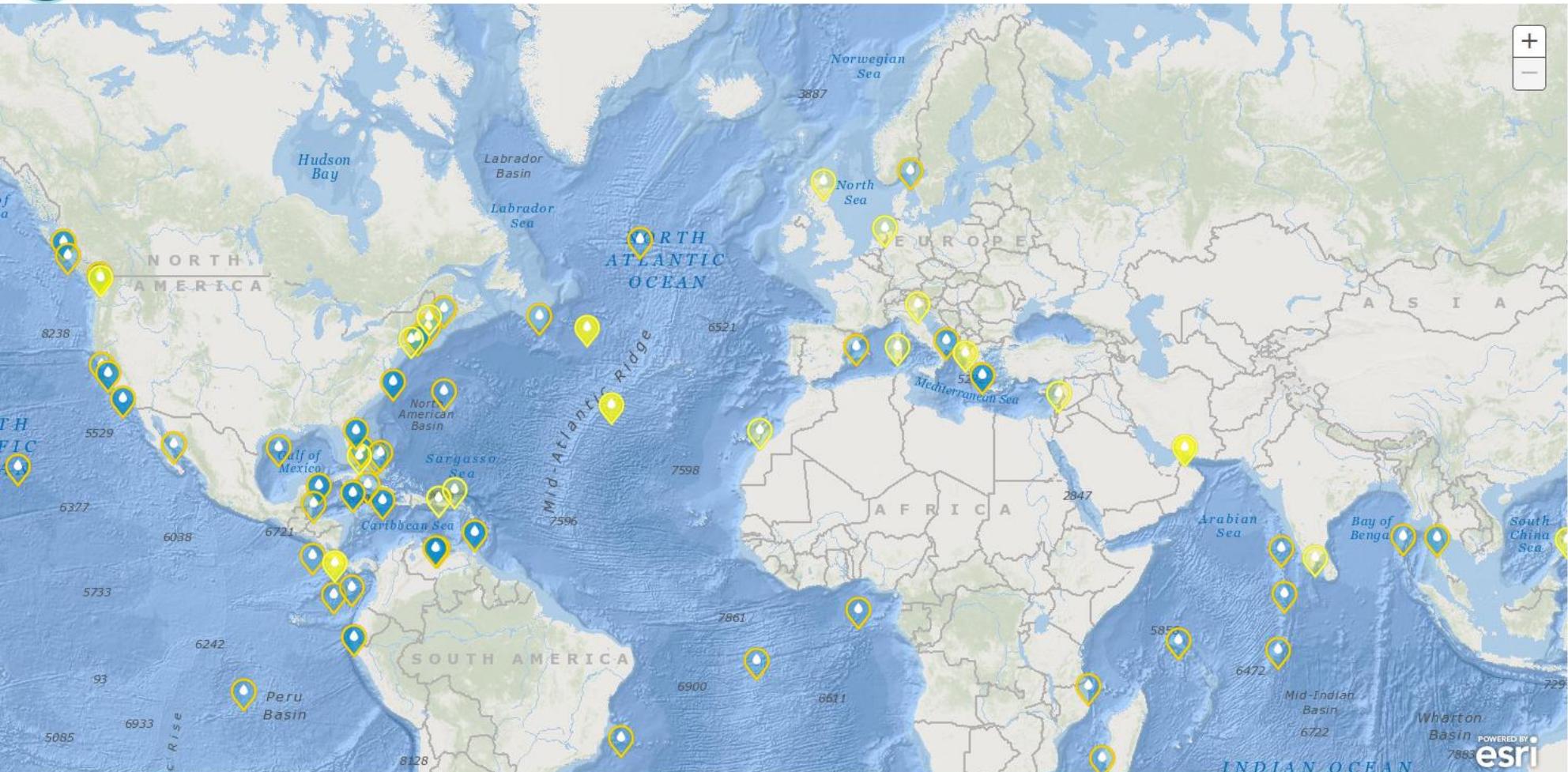


Platform Architecture

- ▶ Base (Data) Layer
 - ▶ Cloud-based
 - ▶ Open source
 - ▶ Scalable 'Big' data (MongoDB) database technology
 - ▶ Data and procedures
 - ▶ API
- ▶ Information Layer
 - ▶ Cloud-based
 - ▶ Esri ArcGIS Online
 - ▶ Open source BI tool (Metabase)
- ▶ User Layer
 - ▶ Web deployed (pages and/or inserts)
 - ▶ Customised Maps and Forms (Javascript, Esri API, Metabase Cards and Dashboards)



manatee



Approved HopeSpots

86

Approved HopeSpots

Powered by Metabase

HopeSpots Under Consideration

21

HopeSpots Under Consideration

Powered by Metabase

Date Of Recognition Cumulative



Powered by Metabase

MB Executive
Hope Spot Approval

ArcGIS Online
Blogs

Metabase
Hope Spot Nomination

Hope Spot Search & Manage
Hope Spot Atlas





“If people don’t think you’re crazy then your dreams aren’t big enough!”

This is more than a Hope Spot Management System

It is a:

- ▶ Hope Single Point Of Truth Database and Awareness Factory

And it can become a:

- ▶ Federated System of Record for Oceans
- ▶ A ‘yellow pages’ for Ocean Data,

Which is truly:

- ▶ Open, transparent and available to all which contains both
- ▶ Crowdsourced and Curated Content



Framing questions

- ▶ What are the status, trends and forecasts for the development of the Digital Ocean, Big Ocean Data and the use of Cloud Computing for ocean sustainable development?
- ▶ What are the benefits (economic, sustainability, maritime security, etc.) from a Digital Ocean that produces Big Ocean Data and harnesses Cloud Computing in support of Agenda 2030, and what are the challenges to achieving these benefits?
- ▶ What are the opportunities for industry leadership and collaboration in advancing the most beneficial progress in the Digital Ocean, Big Ocean Data and Cloud Computing for ocean sustainable development - at national, regional and global scales - and what should industry do to best engage other ocean stakeholders?



It's people, not technology

Thank you for your attention

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