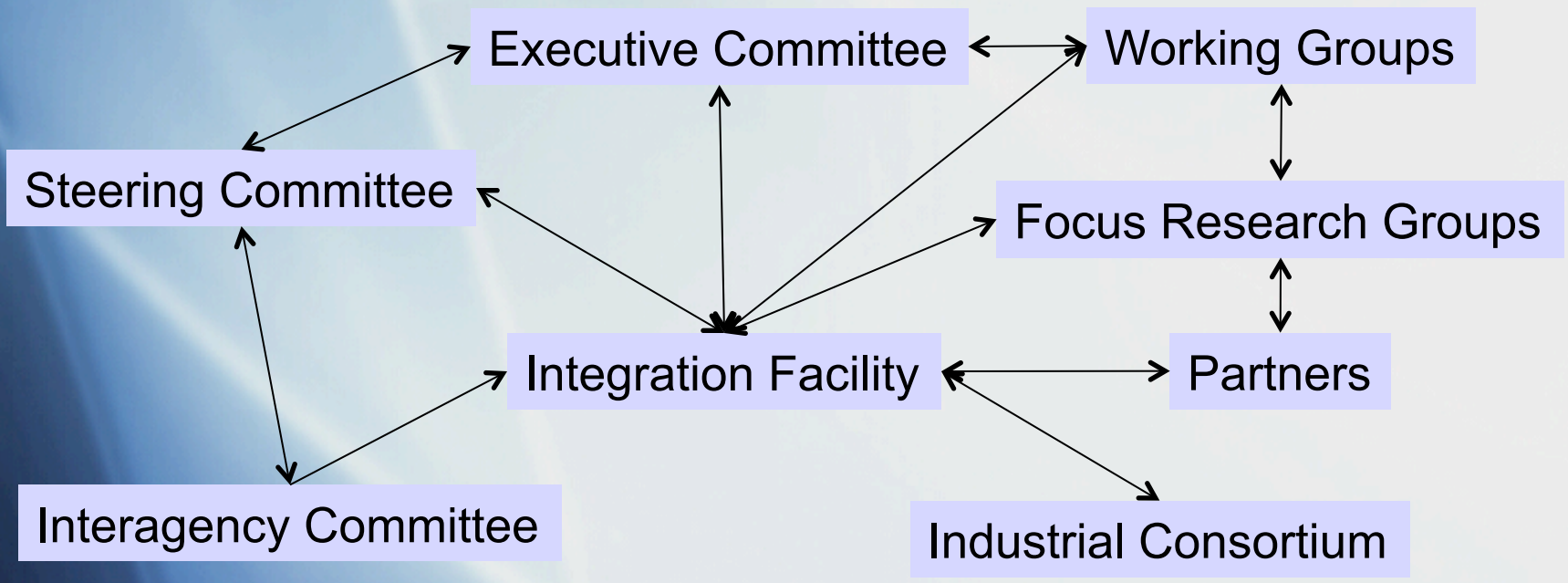
CSDMS

COMMUNITY SURFACE DYNAMICS MODELING SYSTEM

- Cyber effort to develop, integrate, disseminate & archive software & supporting data, **able to simulate the movement of fluids, sediment and solutes**, through evolving landscapes, seascapes, and their sedimentary basins.
- Dynamical models configured to be linkable & tailored to specific landscape-basin evolution problems, at specific temporal and spatial scales.
- Partnerships with related computational programs, field campaigns and laboratory experiments.

CSDMS Governance Structure



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CSDMS Working Groups & Focus Research Groups

Terrestrial

Tucker/CIRES
109 members
70 institutions
11 countries

Coastal

Murray/Duke
74 members
55 institutions
13 countries

Marine

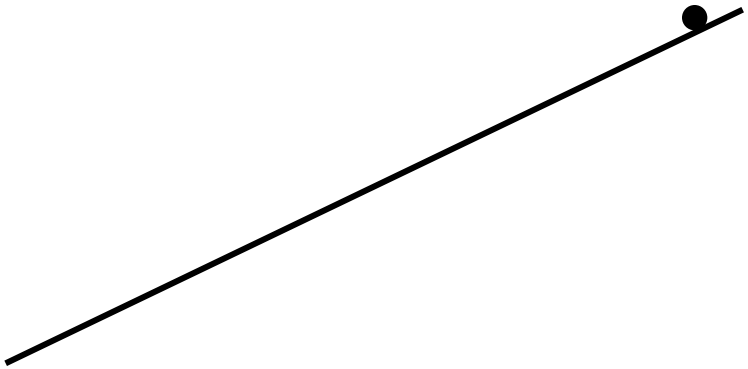
Wiberg/VIMS
61 members
50 institutions
8 countries

Cyber/Numerics

Tao Sun/ExxonMobil
43 members
31 institutions
6 countries

EKT

Campbell/NCED
21 members
18 institutions
3 countries



Carbonate

Burgess/U. London
15 members
10 institutions
3 countries

Chesapeake

Voinov/CCMP
8 members
5 institutions
USA

Hydrology

Famiglietti/UCIrvine
33 members
25 institutions
5 countries

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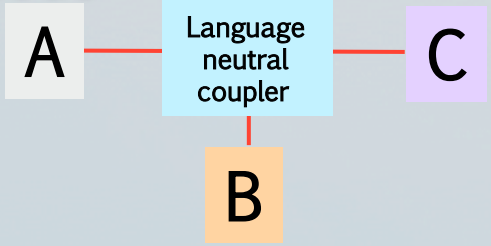
CSDMS REPOSITORIES

DATA Repository

1) model initializations or boundary conditions: total 26
2) benchmarking or testing standalone models: total 0
3) CSDMS framework validation experiments: total 0

Model/Tool Repository

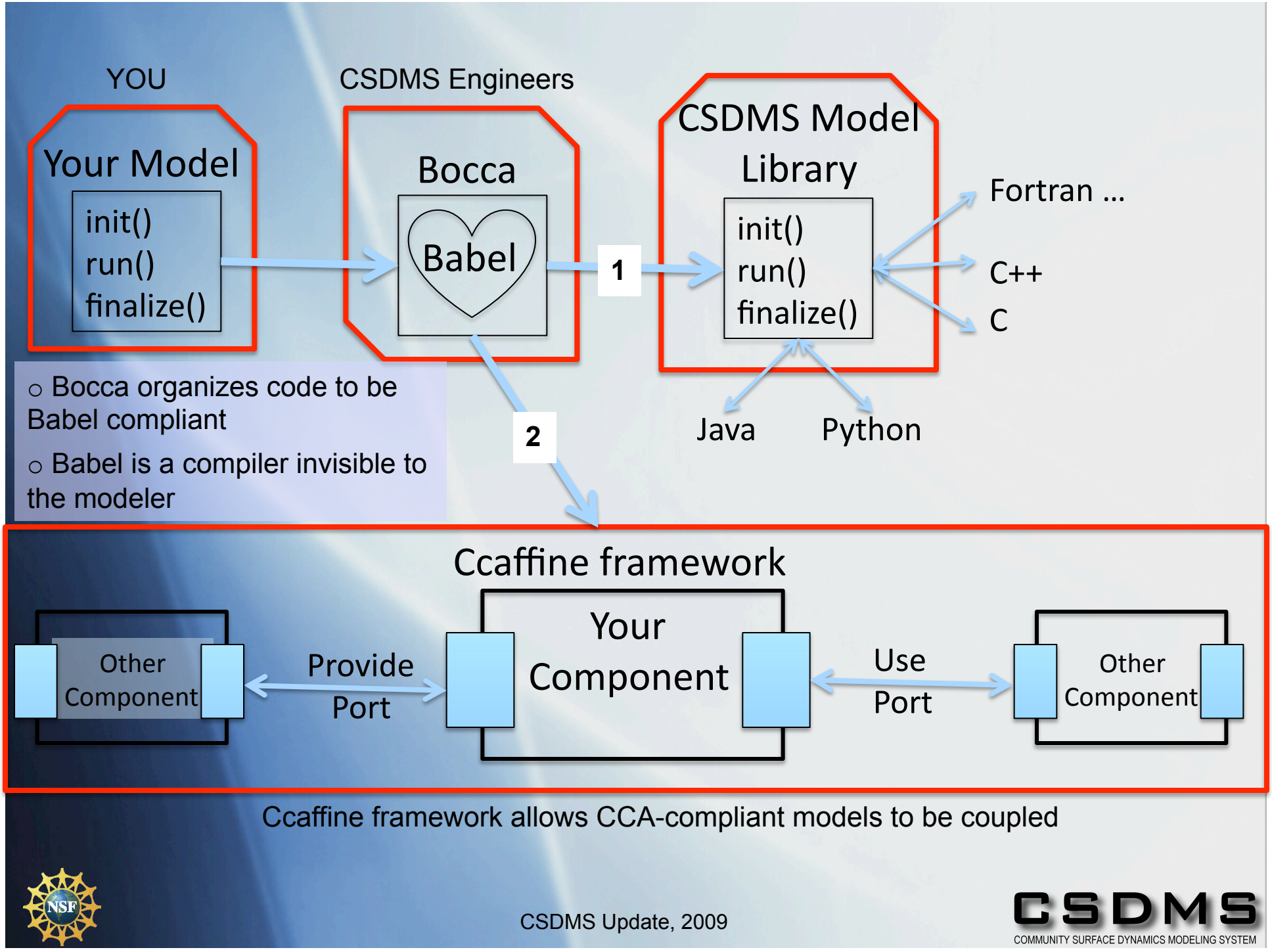
	Models+	Metadata	Source code
Terrestrial	78	55	42
Coastal	68	29	12
Marine	28	14	9



CSDMS presently offers >200,000 lines of code

Education Repository

Model Simulations (1); Educational PPTs (15); Reports & docs (15); Image Gallery (140); Workshop PPTs (66)



- Bocca organizes code to be Babel compliant
- Babel is a compiler invisible to the modeler

Ccaffine framework allows CCA-compliant models to be coupled

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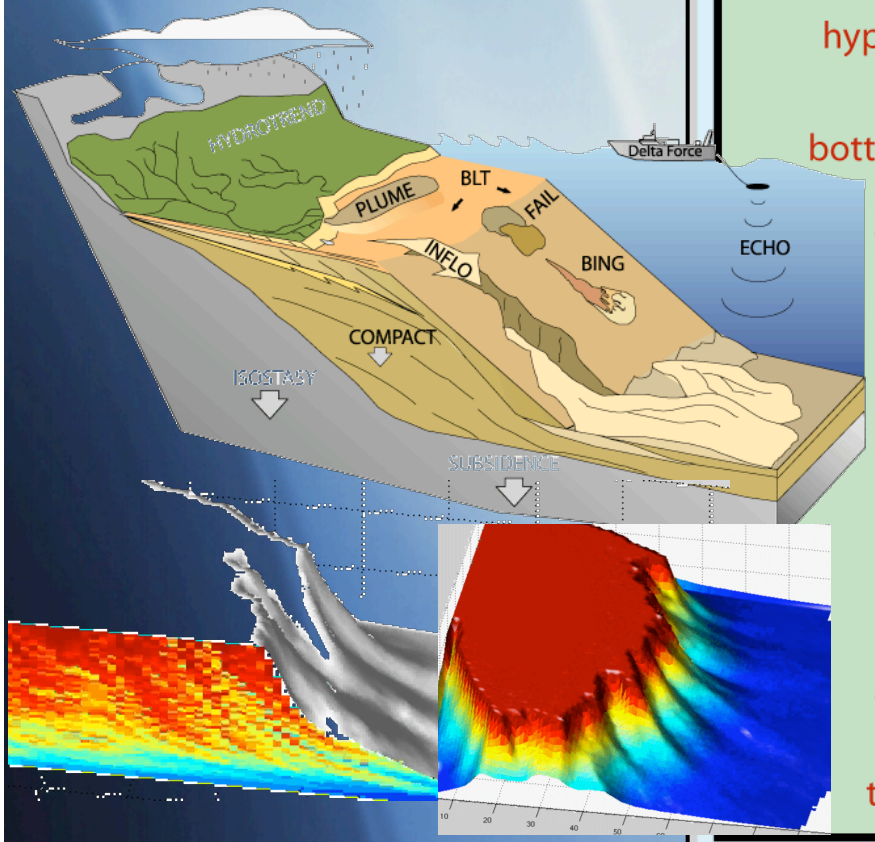
SedFlux Component Modeling Scheme



Hydrological Data or Model (e.g. HydroTrend)
daily Q, Qs, Q, Cs, grain size, river velocity, river channel size
+
Ocean State:
sea level, waves, tides, currents, sea temperature & salinity

Delta Models:
distributary channel dynamics, channel hydraulics, bedload dynamics
longshore transport, tidal dynamics

River Plume Models:
hypopycnal plume dynamics, hyperpycnal plume dynamics

Shelf Transport Models:
bottom boundary layer dynamics (wave, current interactions)
fluid muds, upwelling, downwelling

erosion, deposition, seafloor properties, stratigraphy

Geotechnical Models:
compaction, porosity, permeability,
excess pore pressure, plasticity, sediment viscosity

Slope Stability Models:
sediment strength, potential failure planes
earthquake loading, sediment loading

Failure volume and properties

Gravity Flow Models:
Turbidity Current dynamics, Debris flow dynamics

erosion, deposition, seafloor properties, stratigraphy

Geophysical Models:
tectonics (folding, faulting), isostasy, flexural response

Acoustic Models:
sound scattering and attenuation

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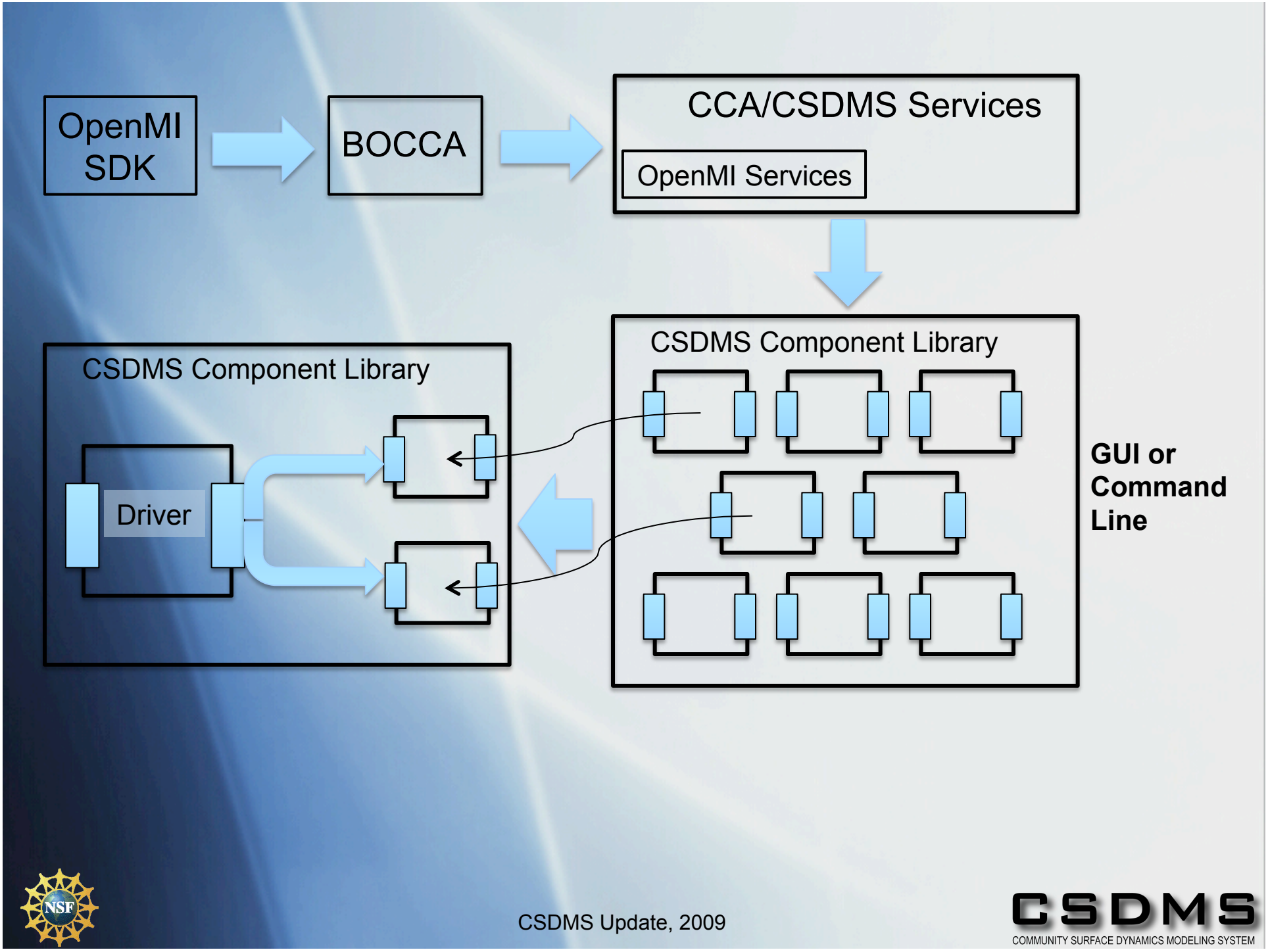
OpenMI SDK
BOCCA
CCA/CSDMS Services
OpenMI Services
CSDMS Component Library
CSDMS Component Library
Driver
GUI or Command Line

2009 Meetings & Workshops & Conferences

1. Hydrology FRG meeting, Boulder, CO, Jan.20-21
2. Carbonate FRG meeting, Boulder, CO, Jan. 26-27
3. Terrestrial WG meeting, Boulder, CO, Feb. 2-3
4. CSDMS Steering Committee Meeting, Boulder, CO, Feb. 4
5. Coastal WG & Marine WG, Charlottesville, VA, Feb 25-26
6. CSDMS Executive Committee Meeting, Santa Barbara, CA, Mar. 2
7. Cyber-informatics & Numerics WG Meeting, Santa Barbara, Mar. 3-4
8. *Chesapeake FRG Meeting, Annapolis, Mar 22-25 ??*
9. Modeling Turbidity Currents, Santa Barbara, CA, June 1-3
10. AAPG (June 7-10, Denver)
11. IAMG (Aug 23-28; Stanford)
12. River, Coastal, Estuarine Morphodynamics, Santa Fe, Arg, Sep. 20-25

Membership has its privileges

- Advantages in staying current for education and application
- Opportunities for integrated & collaborative proposals
- Recognized service opportunities; academic & public recognition for code development
- Penetration of one's models, data & simulation products; Increased outreach and knowledge-transfer opportunities
- Interaction with industry, NGO partners & government agencies
- Mechanism to fulfill Federal requirement that states that code developed on Federal $ is to be both open-source & made public
- Access to the CSDMS-dedicated HPC Cluster (>6 Tflops) with links to Tier 3 (150 Tflops) & Petascale (Tier 2) high performance computers

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Year 1 & 2: CSDMS organization, governance & communications established

Year 2 & 3: Model Architecture, Framework, and Interface Standards (i.e. for coupling) advanced

Year 3 – 5: Advanced simulations in a High Performance Computing environment

Hydrology Focus Research Group Goals:

Define short, medium and long term goals within the CSDMS program

Identify & describe the OS-hydrological models, and their possibilities within CSDMS (PPT summary of findings, Paper)

Identify OS-hydrological model limitations; develop plans to rectify

CSDMS Integration Staff

James Syvitski
Executive Director

Scott Peckham
Senior Software Architect
WGs: Cyber, Hydrology, Chesapeake

Eric Hutton
Software Engineer
WGs: Cyber, Marine, Coastal

Irina Overeem
EKT Scientist
WGs: Industry, EKT

Albert Kettner
Cyber Scientist
WGs: Terrestrial, Carbonate

Beichuan Yan
Software Engineer

Mark Hannon
Ph.D. Student

Scott Bachmann
Ph.D. Student

Yun-zhen (Jane) Chen
Visiting Ph.D. Student

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Marlene Lofton
Executive Assistant

Chad Stoffel
System Administrator

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