INTRODUCTION TO SCIENTIFIC VISUALIZATION AND DATA SHARING

Amit Chourasia

Sr. Visualization Scientist, Visualization Group Leader

San Diego Supercomputer Center, UCSD

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INTENDED AUDIENCE LEVEL

Beginner for visualization

Data sharing session will be useful for all level attendees

TUTORIAL OUTCOME

Jump start attendees with visualization

- Provide understanding of standard visualization techniques,
- Application scenarios
- Best practices
- Gain proficiency in creating sophisticated visualizations using VisIt
- Conduct remote visualization on Comet.
- Learn to use SeedMe platform for data and visualization sharing.

REQUIREMENTS

1. Computer + mouse with scroll wheel (laptop trackpads are difficult to use for 3D navigation)
2. **VisIt software**
    a. **Visit (version 2.9.2, yes please install this version, not the latest)** https://wci.llnl.gov/codes/visit/executables.html
    b. Download sample Data, (Unzip sample data to your Desktop)https://wci.llnl.gov/codes/visit/2.3.0/VisItClassData.zip
    c. Comet host file: http://users.sdsc.edu/~amit/comet-profile.zip
3. Account on SeedMe.org

AGENDA

SESSION 1: Visualization Fundamentals 45 mins

- Introduction to Visualization
- Visualization Techniques
- Application Examples
- Best Practices **Q & A: 5 mins**

SESSION 2: Hands on Visualization with VisIt 55 mins

- VisIt Introduction
- VisIt basics (how VisIt works, one plot & 2 operators)
- Visit plot survey

Q & A: 5 mins

SESSION 3: Remote Interactive Visualization 55 mins

- Expressions
- Commands and Scripting
- Moviemaking
- Remote Visualization (network permitting)

Q & A: 5 mins

SESSION 4: Data sharing using SeedMe.org 25 mins

- Command line interaction with SeedMe.org

Q & A: 5 mins

ADJOURN

AGENDA

8:00 am SESSION 1: Visualization Fundamentals 55 mins

• Introduction to Visualization

• Visualization Techniques

• Application Examples

• Best Practices **Q & A: 5 mins**

9:00 am SESSION 2: Hands on Visualization with VisIt 55 mins

• VisIt Introduction • VisIt basics (how VisIt works, one plot & 2 operators) • Visit plot survey

Q & A: 5 mins

10:00am Break 30 min

10:30 am SESSION 3: Remote Interactive Visualization 55 mins

• Expressions • Commands and Scripting • Moviemaking

• Remote Visualization (network permitting)

Q & A: 5 mins

11:30 am SESSION 4: Data sharing using SeedMe.org 25 mins

• Command line interaction with SeedMe.org

Q & A: 5 mins

ADJOURN

TUTORIAL AGENDA & GOALS

Session 1 (45 mins) - Lecture

Visualization concepts

Visualization use cases

Best practices in visualization

Session 2 (60 mins) – Hands on

Introduction to VisIt software - Perform basic tasks in VisIt

Session 3 (30 mins) – Hands on

Perform sophisticated tasks with VisIt

Remote visualization with VisIt on Gordon

Session 4 (30 mins) – Hands on

Learn to share results ubiquitously using SeedMe.org

COMMON MISCONCEPTIONS

- I am not an artist thus can't do viz
- Viz is an art, not science or engineering
- Viz is a one time task
- Viz SU's are insignificant
- Viz is useful only for presentation/communication

SESSION 1: VISUALIZATION FUNDAMENTALS

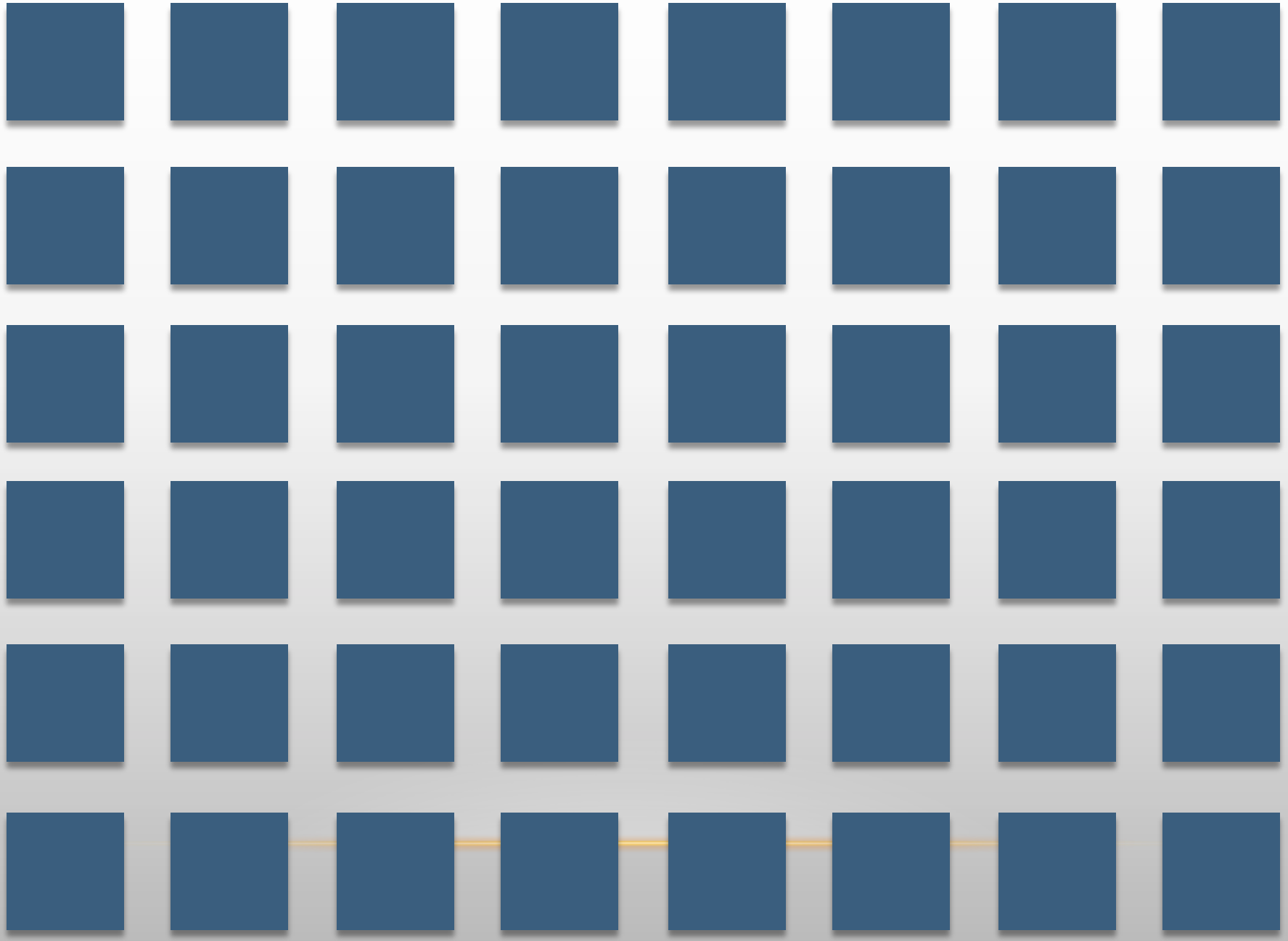
Why should you care about visualization?

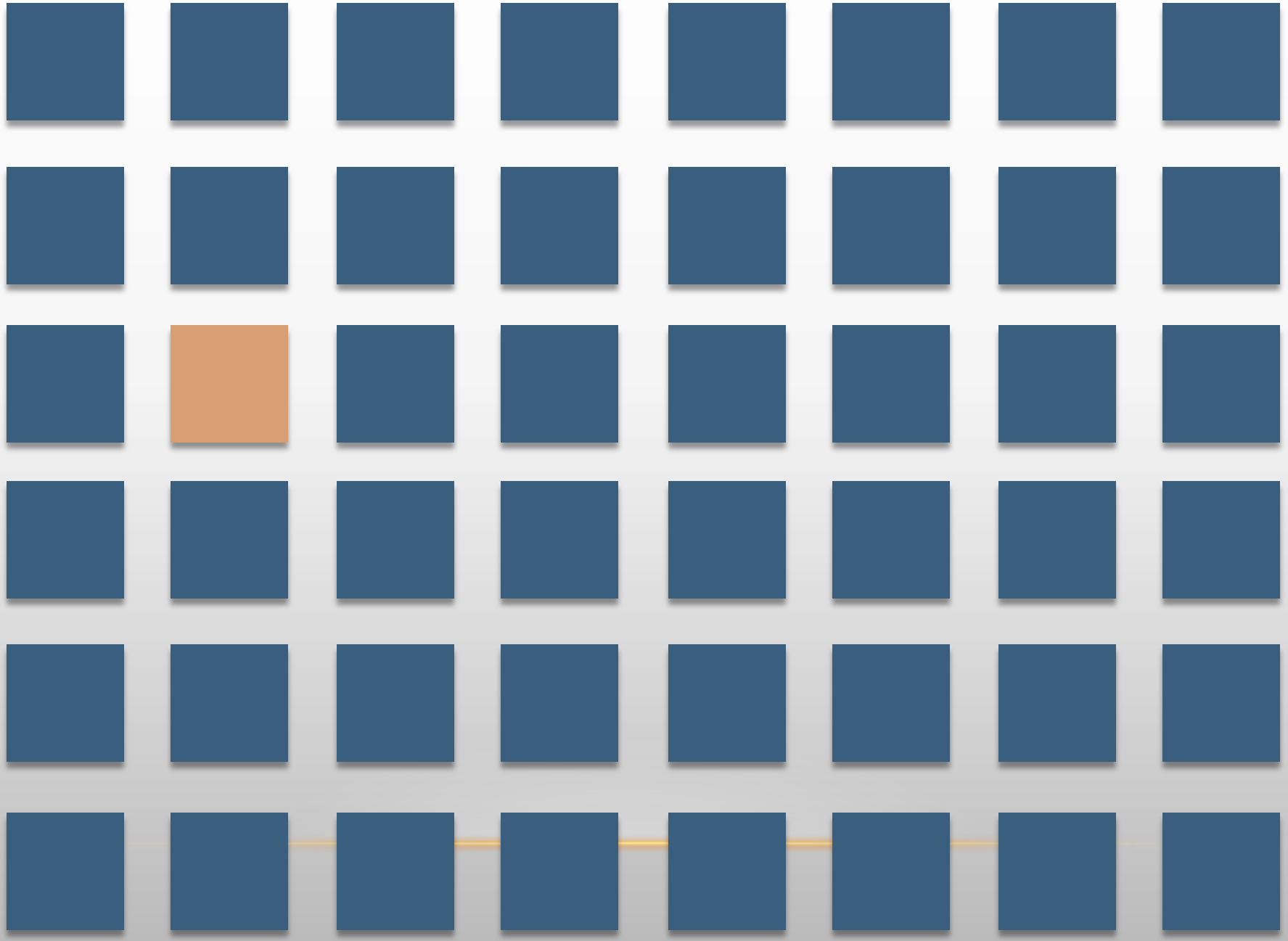
HOW MANY 3'S IN FIRST 350 NUMBERS OF PI?

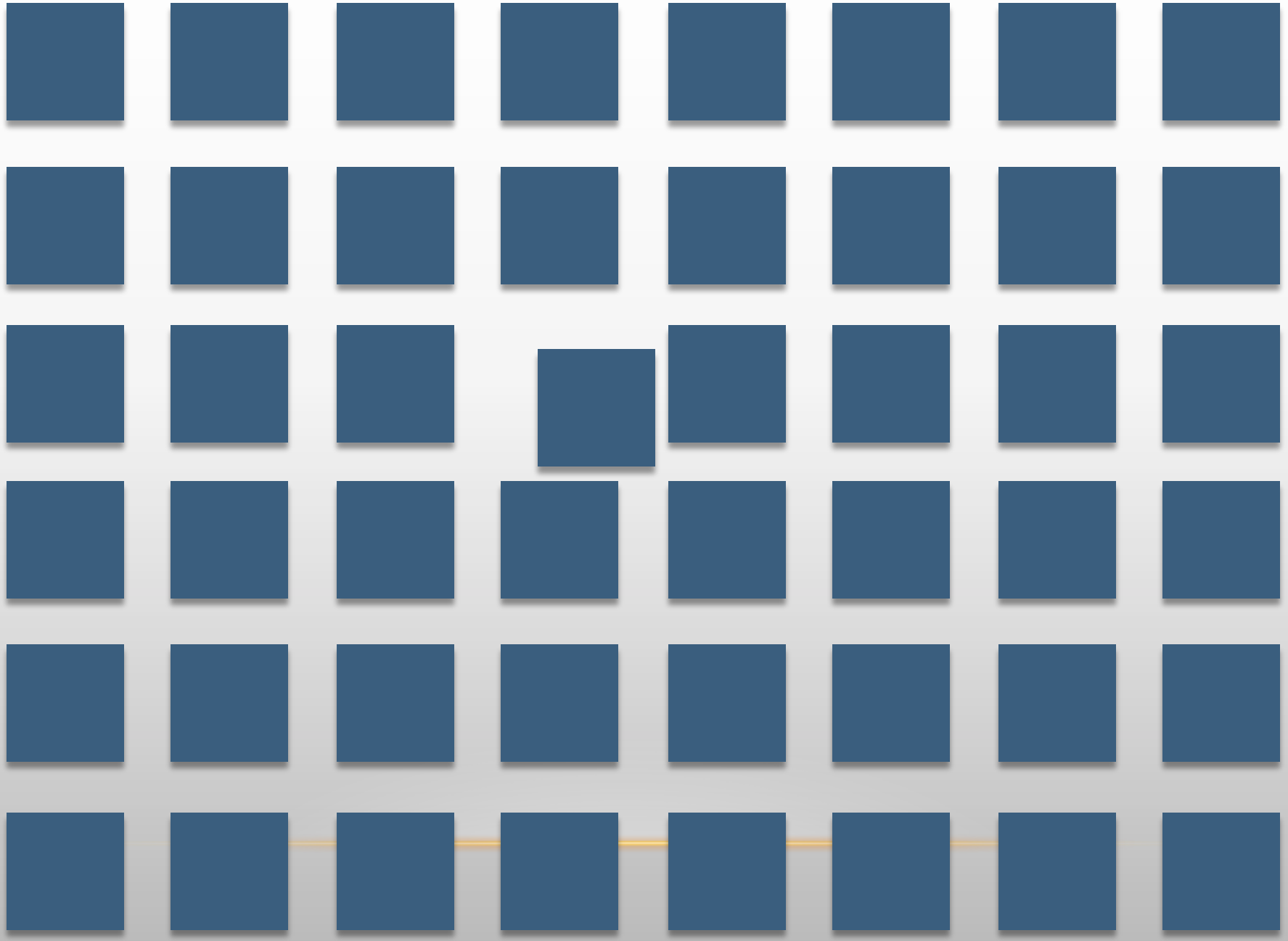
3.14159265358979323846264338327950288419716939937510582097494459230781640628620
89986280348253421170679821480865132823066470938446095505822317253594081284811174
50284102701938521105559644622948954930381964428810975665933446128475648233786
78316527120190914564856692346034861045432664821339360726024914127372458700660631
5588174881520920962829254091715364 3

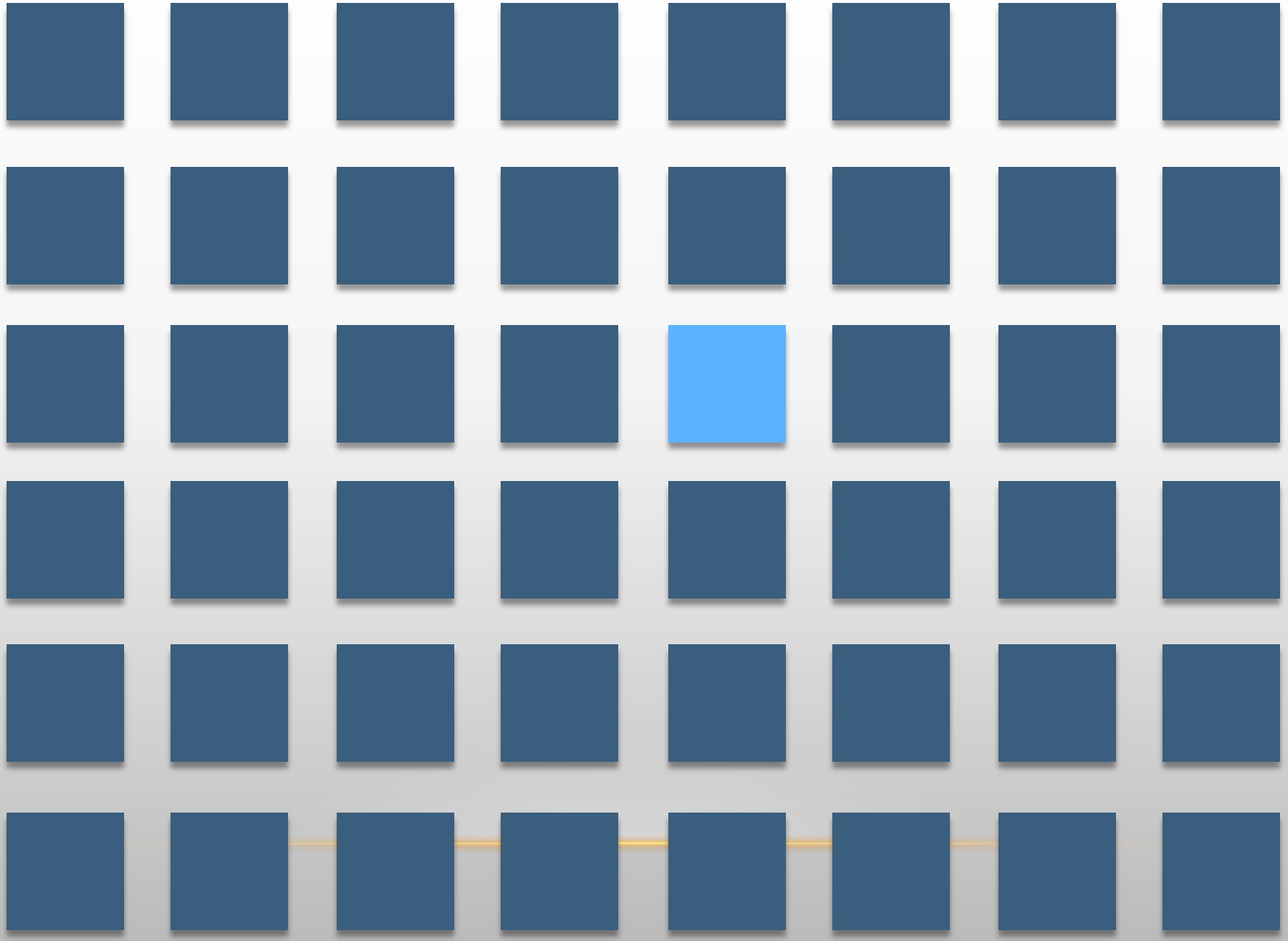
HOW MANY 3'S IN FIRST 350 NUMBERS OF PI?

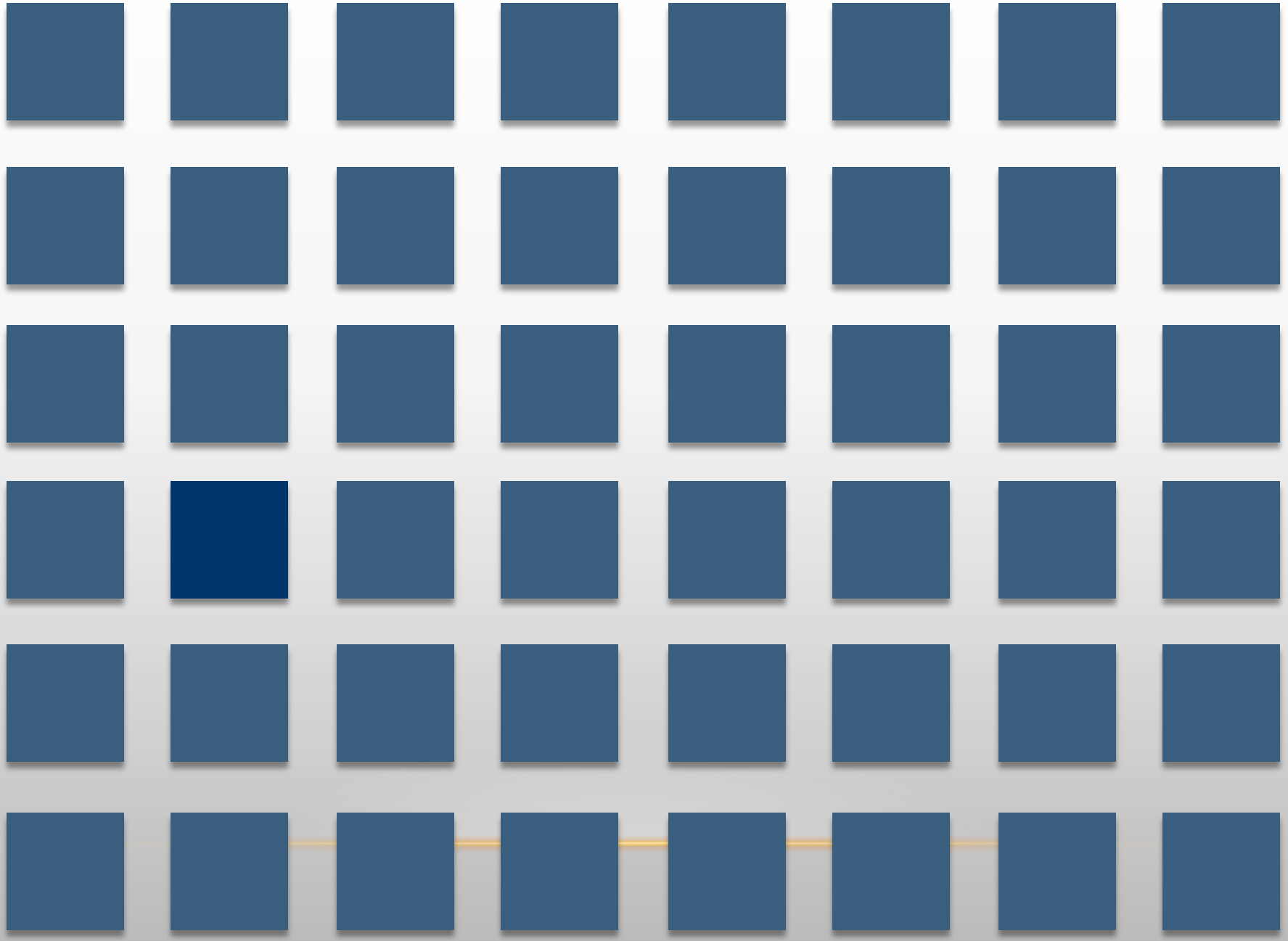
Total 33

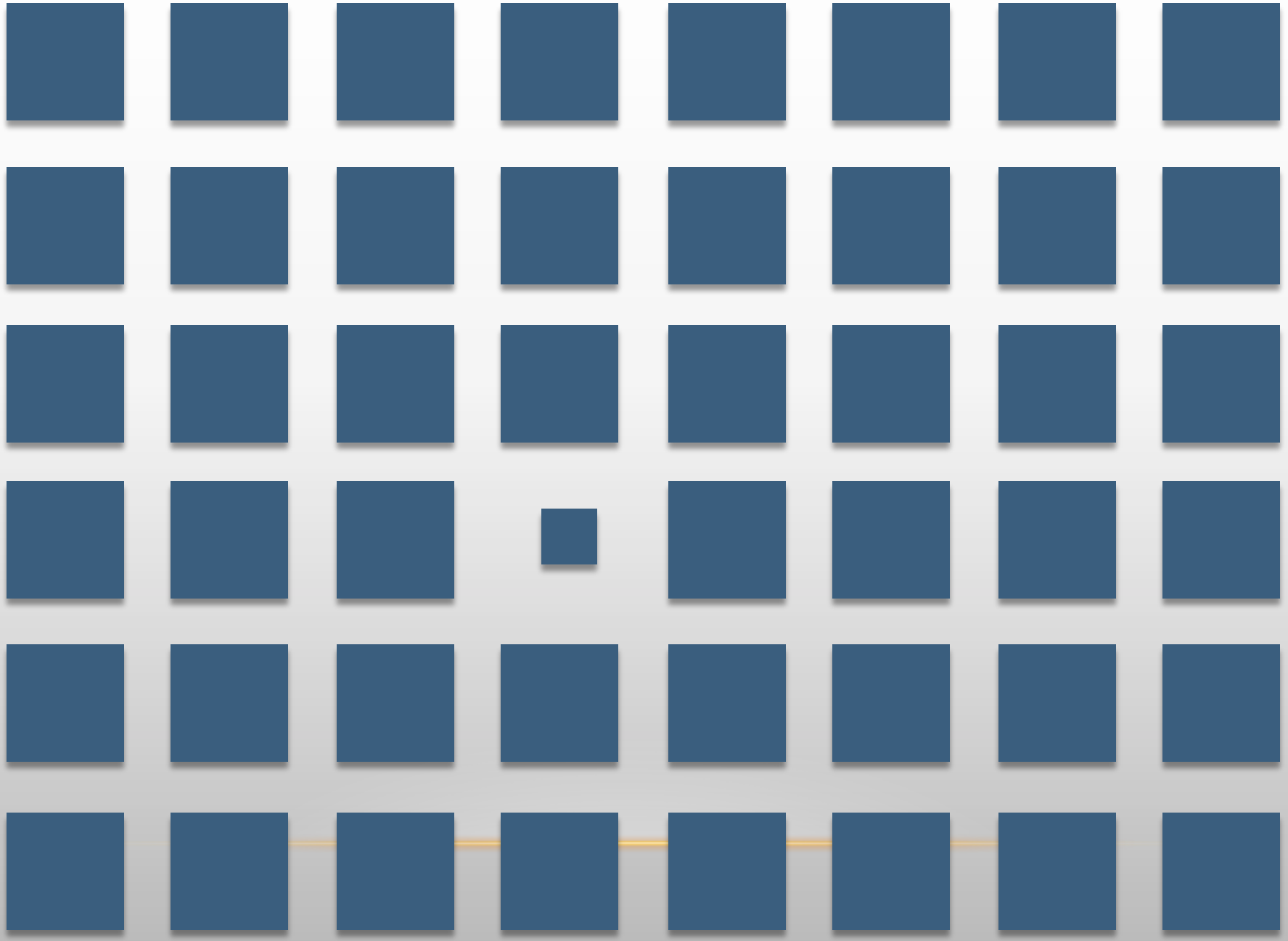


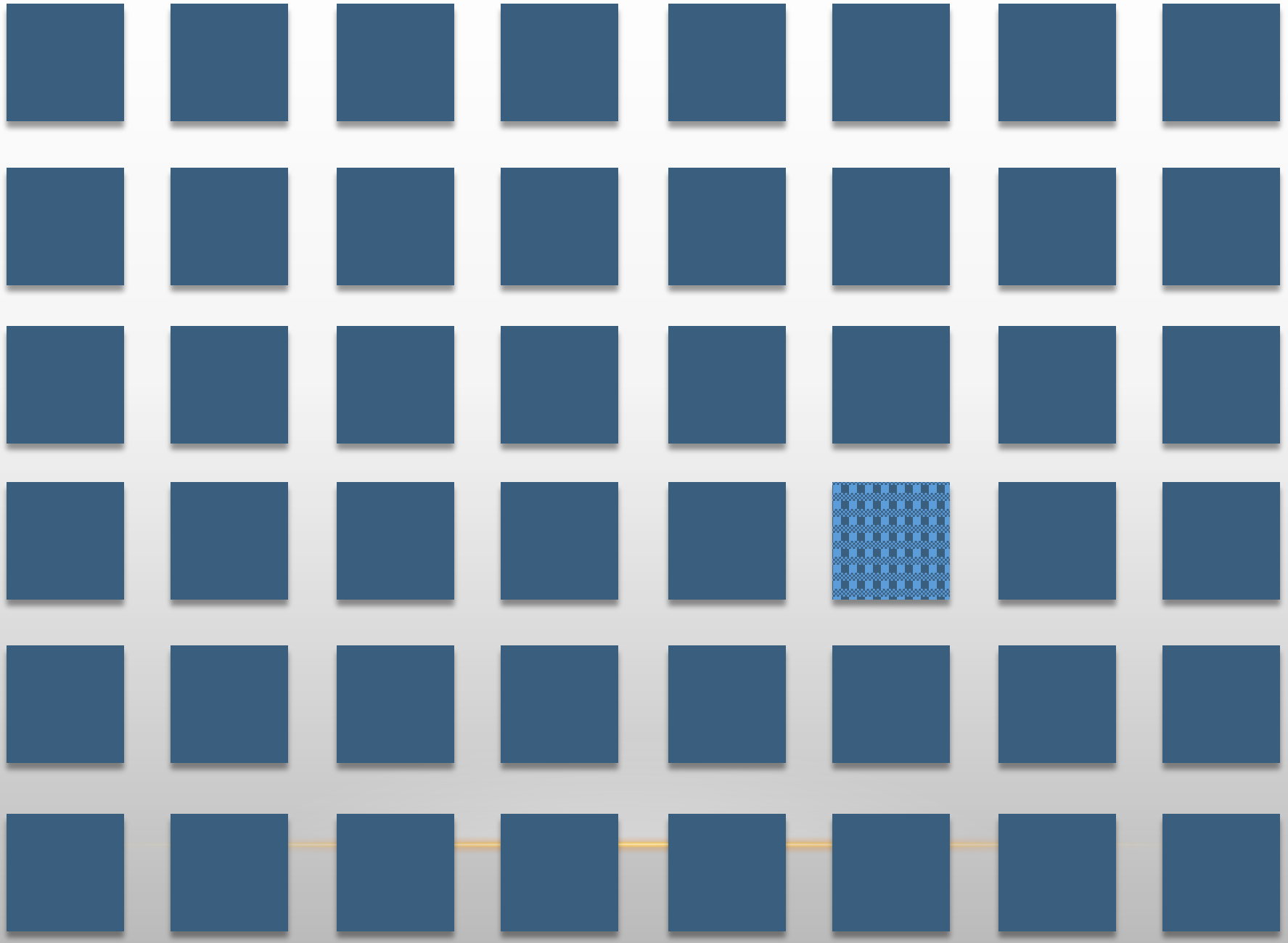


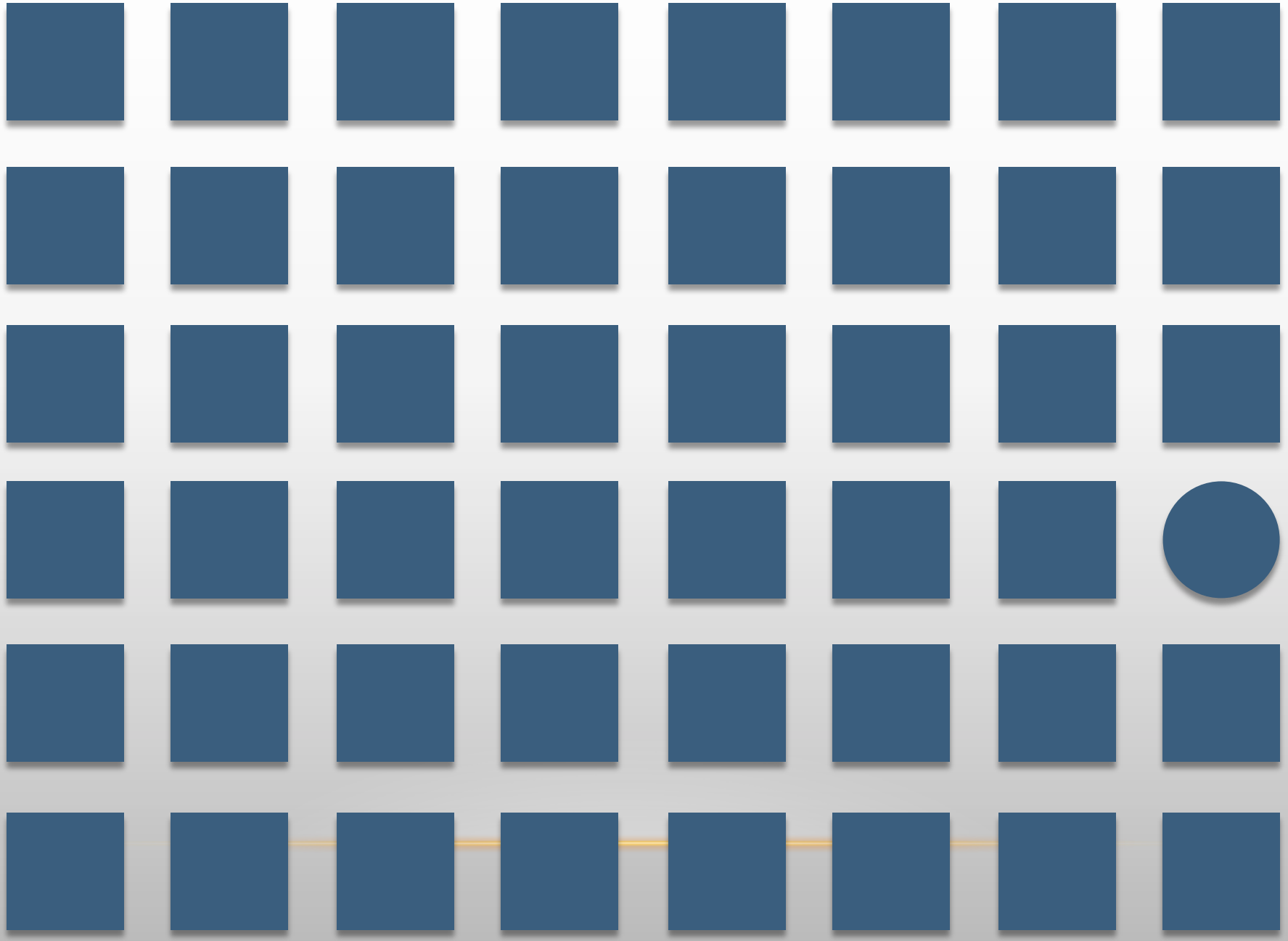












What did you observe?

PREATTENTIVE PROCESSING

Unconsciously gathering information from the environment

Preattentive Attributes(partial list):

position, orientation, scale

color, brightness, saturation

shape, texture

WHAT IS SCIENTIFIC VISUALIZATION?

Working Definition

Visually gaining/extracting insight from a scientific **data** using computational methods

Or

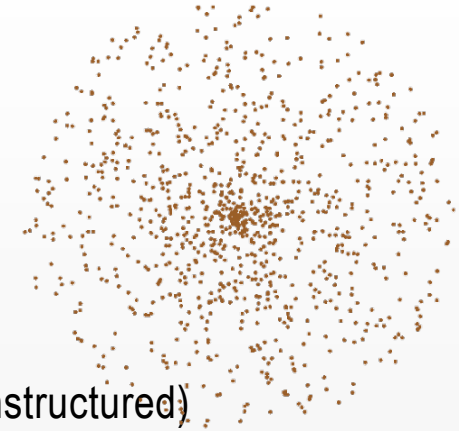
Creating a visual representation of **data** using algorithms

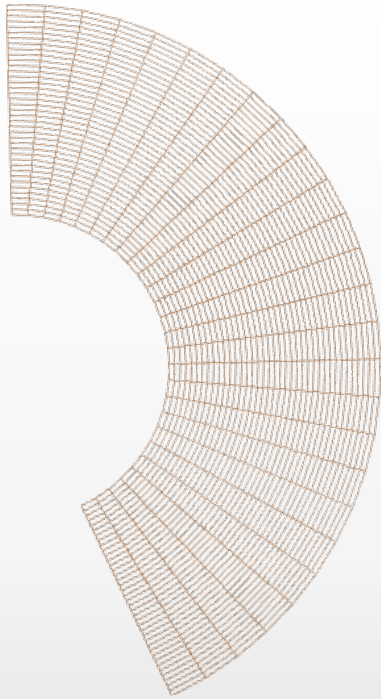
Trivia

Are charts visualizations?

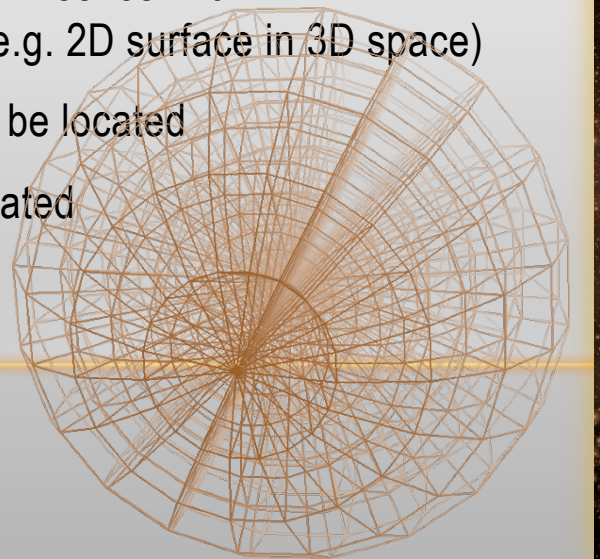
Are illustrations visualizations?

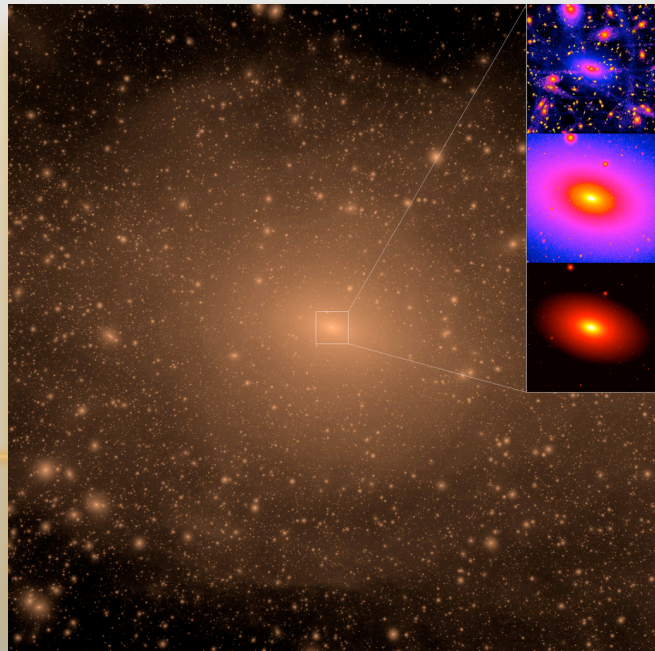
DATA





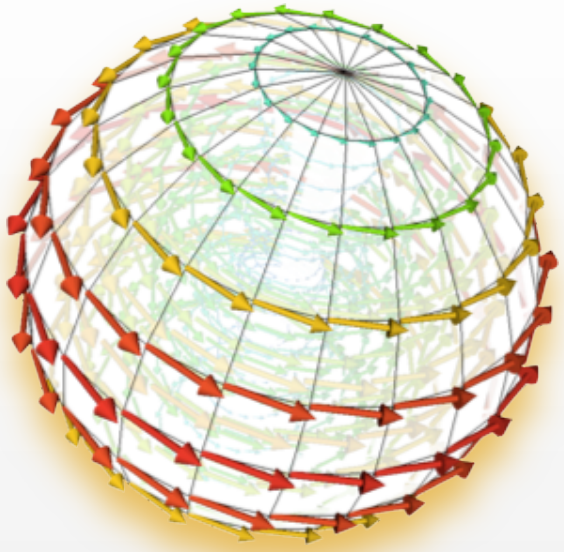
- Data
  - High Dimensional (structured and Unstructured)
  - Mesh
- Meshes Discretizes space into points and cells
  - 1D, 2D, 3D
  - All of these over time (up to 4D)
  - Can have lower-dimensional meshes in a higher-dimensional space (e.g. 2D surface in 3D space)
  - Provides a place for data to be located
  - Defines how data is interpolated



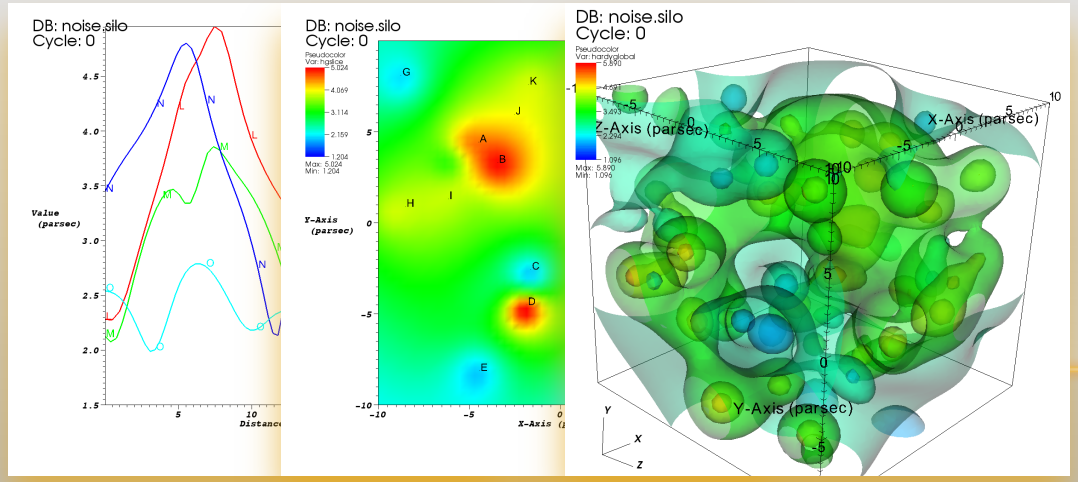


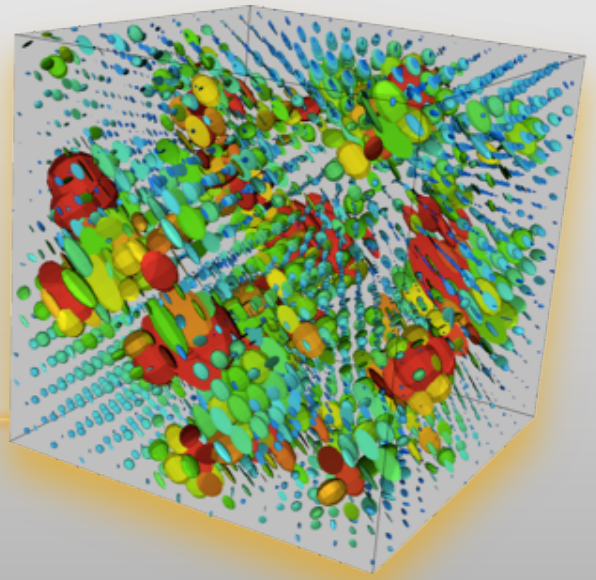
Slide: Courtesy of Sean Ahern, NICS

VARIABLES



- Scalars, Vectors, Tensors
- Sits on points or cells of a mesh
  - Points: linear interpolation
  - Cells: piecewise constant
- Could have different dimensionality than the mesh (e.g. 3D vector data on a 2D mesh)





Slide: Courtesy of Sean Ahern, NICS

MOTIVATION FOR VISUALIZATION

Create visual representations based on underlying data that are

- Concise (Yes)
- Unambiguous (Preferably)
- Intuitive (Trainable)
- Interactive (Desirable)
- Scalable (We wish)

VISUALIZATION BUILDING BLOCKS

Viz Elements

- Glyphs (e.g. Alphabets, Arrows)
- Lines
- Triangles
- Voxels* (volume element)

*Cannot be directly represented on displays

Viz Attributes

- Transforms (Position, Rotation, Scale)
- Color
- Opacity

View Attributes

- Viewpoint
- Projection (Orthographic, Perspective)
- Canvas

Viz Reinforcement

- Texture
- Light
- Distortion (e.g. displacement)
- Motion (e.g. Camera, time steps)
- Filter (e.g. threshold, resample, subset, slice, clip)
- Add Context (e.g. Connectivity, Map Overlay)

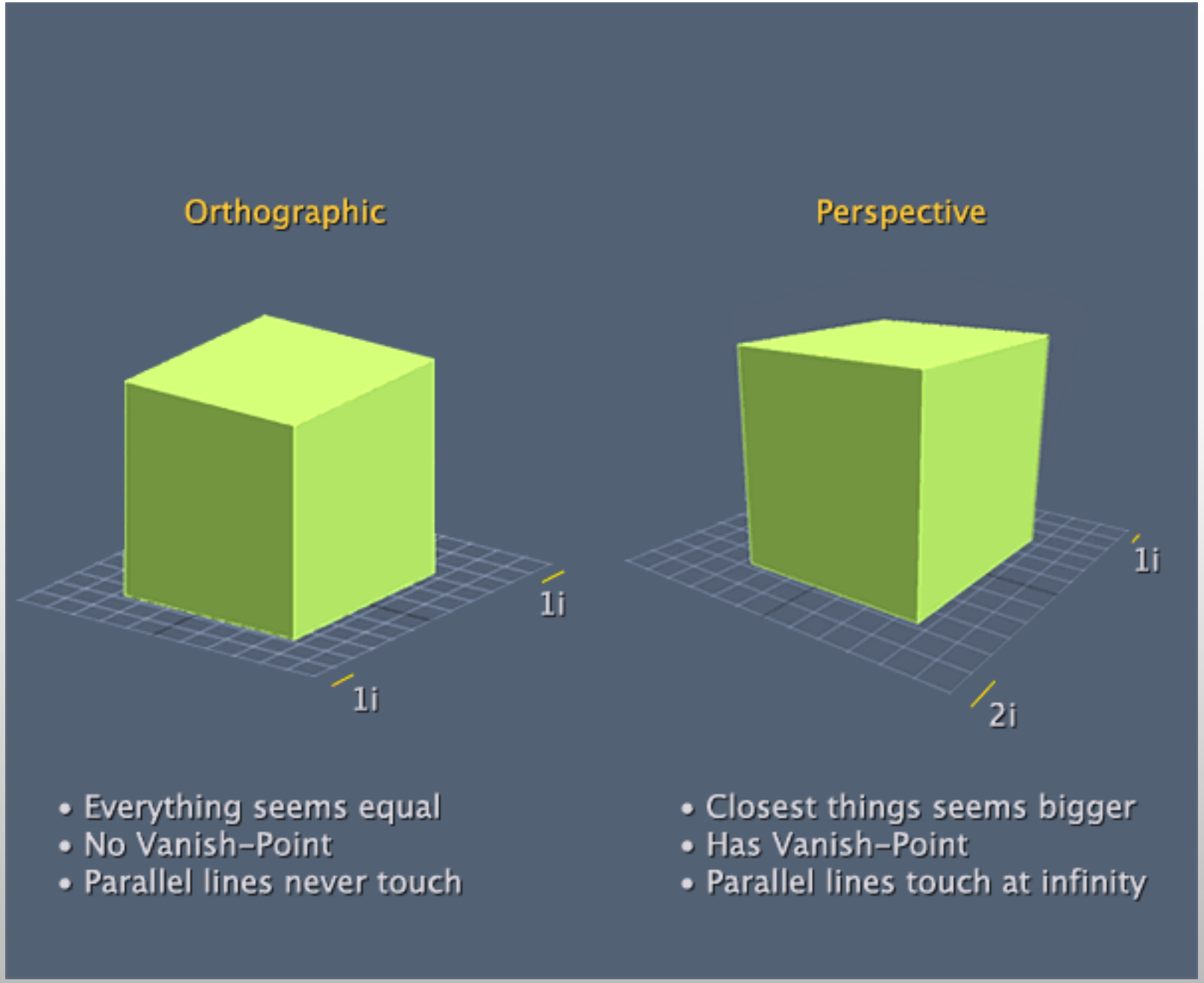


Image Credit: Diney Bomfim - http://blog.db-in.com/cameras-on-opengl-es-2-x/

VISUALIZATION TECHNIQUES

VISUALIZATION TECHNIQUES

- **COLOR MAP (Pseudocolor)***
- **CONTOURS***, **ISOSURFACE*** AND EXPLICIT GEOMETRY
- **VOLUMETRIC***
- STREAMLINES
- LINE INTEGRAL CONVOLUATION
- GLYPHS
- TOPOLOGICAL (advanced)
- **PARALLEL COORDINATES***, NETWORKS, ETC

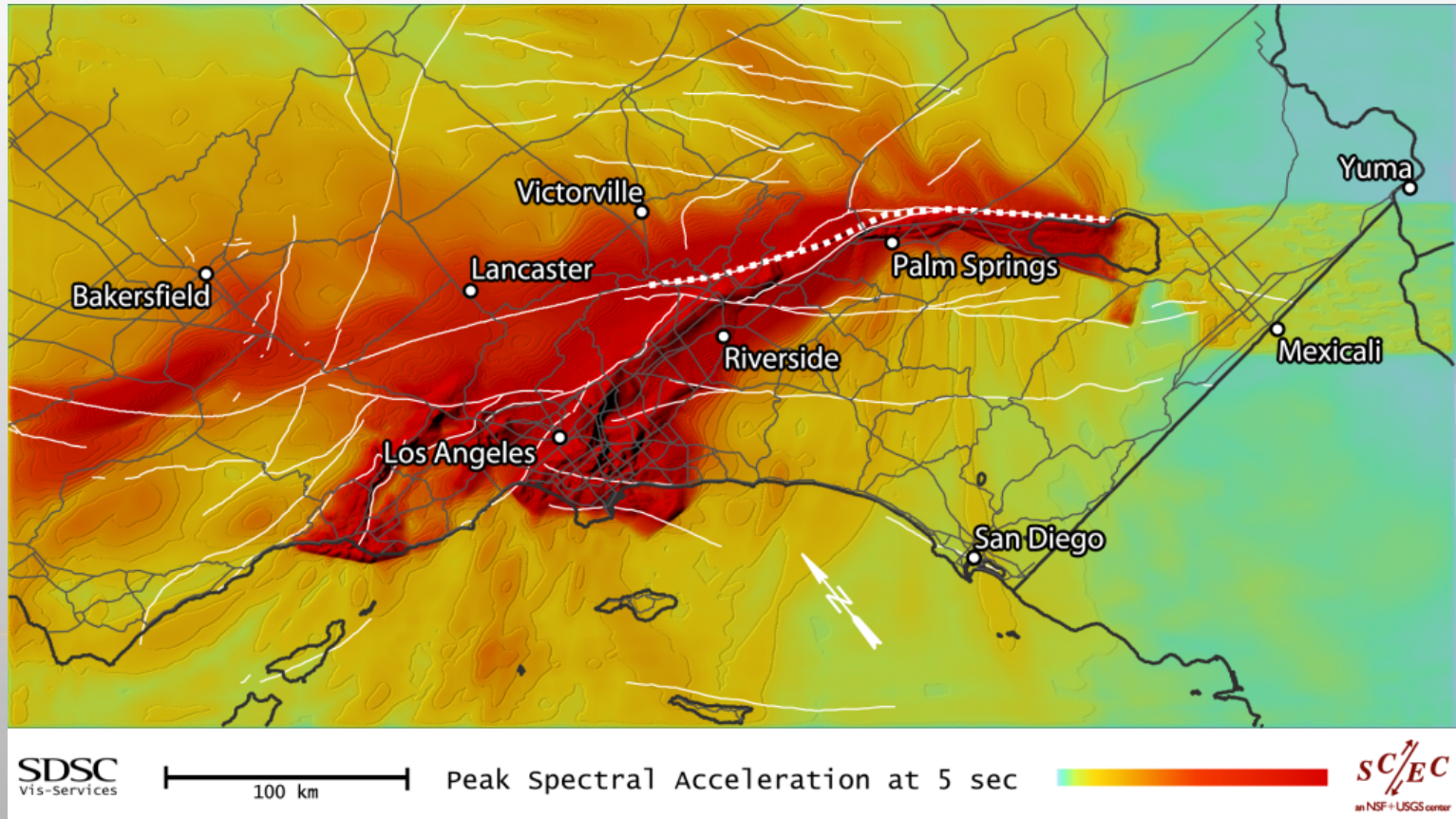
* We will create these plots using Parview and VisIt in hands on session.

VIZ TECHNIQUES: COLOR MAP (PSUEDOCOLOR PLOT)

Process: Map scalar data to a color table

Utility: To investigate range of data

Fast and great for Error Diagnostic and Visual Validation



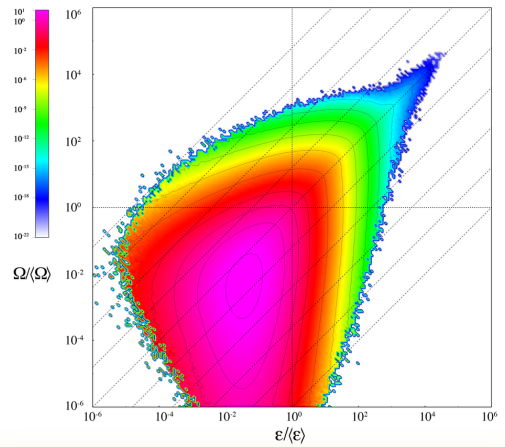
VIZ TECHNIQUES: GEOMETRIC

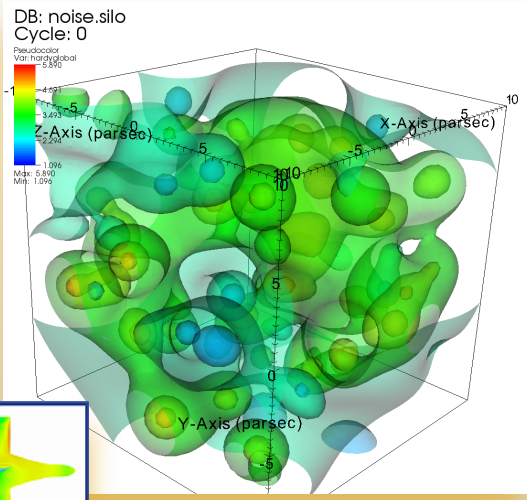
Process & Utility: Identify regions of same scalar value

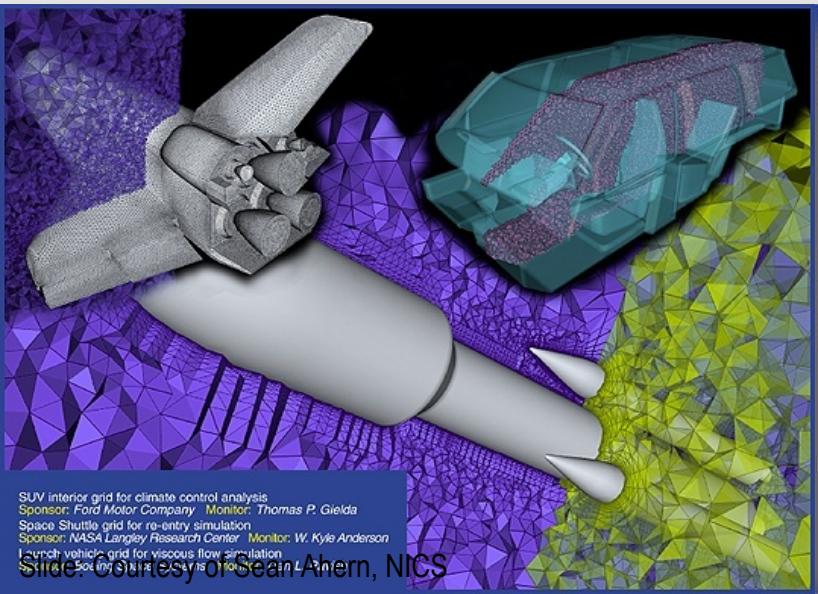
2D: Contours

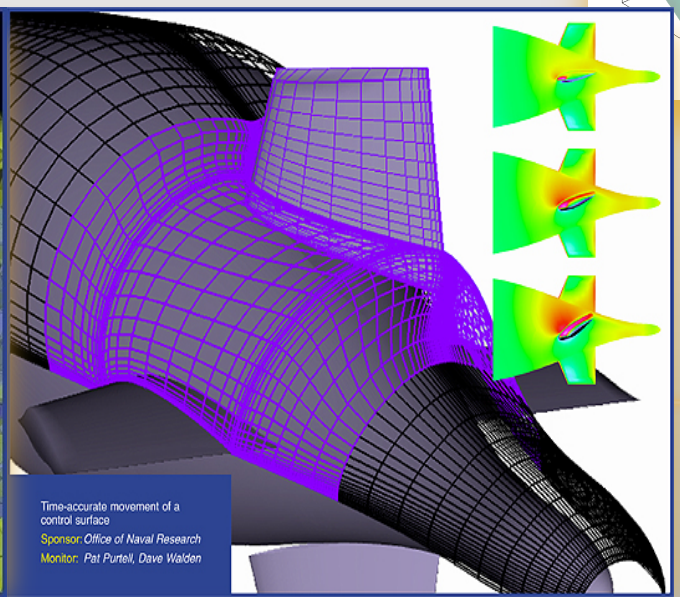
3D: Isosurface (Marching cubes, Marching tetra)

Process: Draw Explicit Geometry (Tri Mesh, Tet Mesh)









Slide: courtesy of Sean Ahern, NICS

VIZ TECHNIQUES: VOLUMETRIC

Process: Volumetrically map scalar data to a transfer function (Color + Opacity)

Utility: To investigate interior/density of scalar volumetric data

Results are very sensitive to

- Transfer Function
- Sampling Interval
- Output Resolution

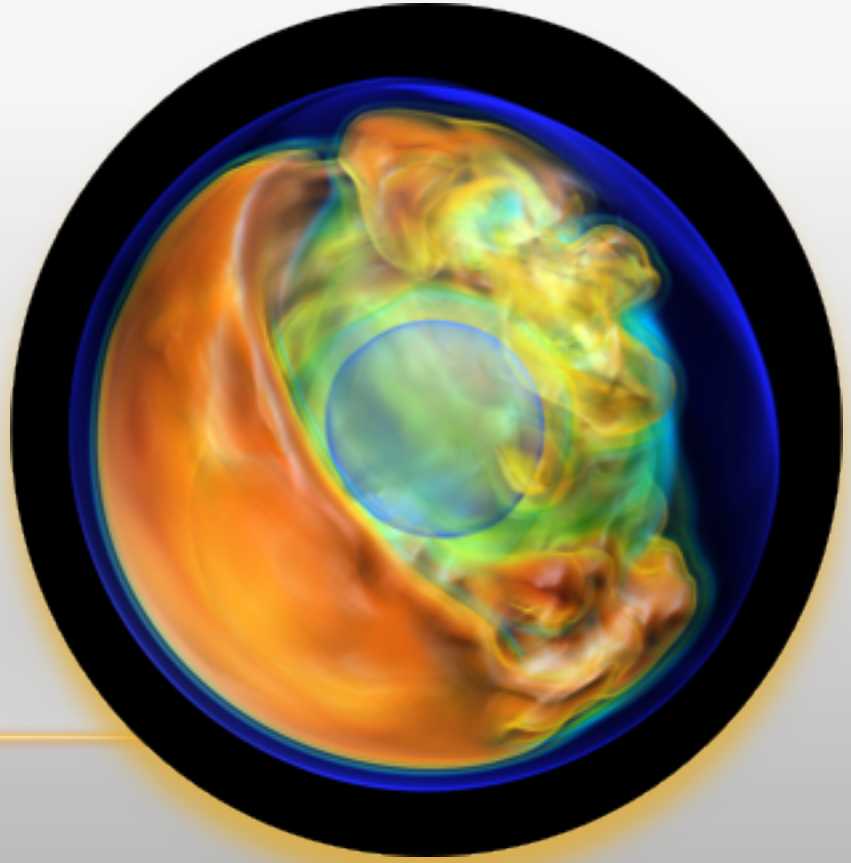


Image: Courtesy of Sean Ahern, NICS

VIZ TECHNIQUES: STREAMLINES

Process: Find curves that are instantaneously tangent to the velocity vector of the flow

Utility: To investigate nature of flow

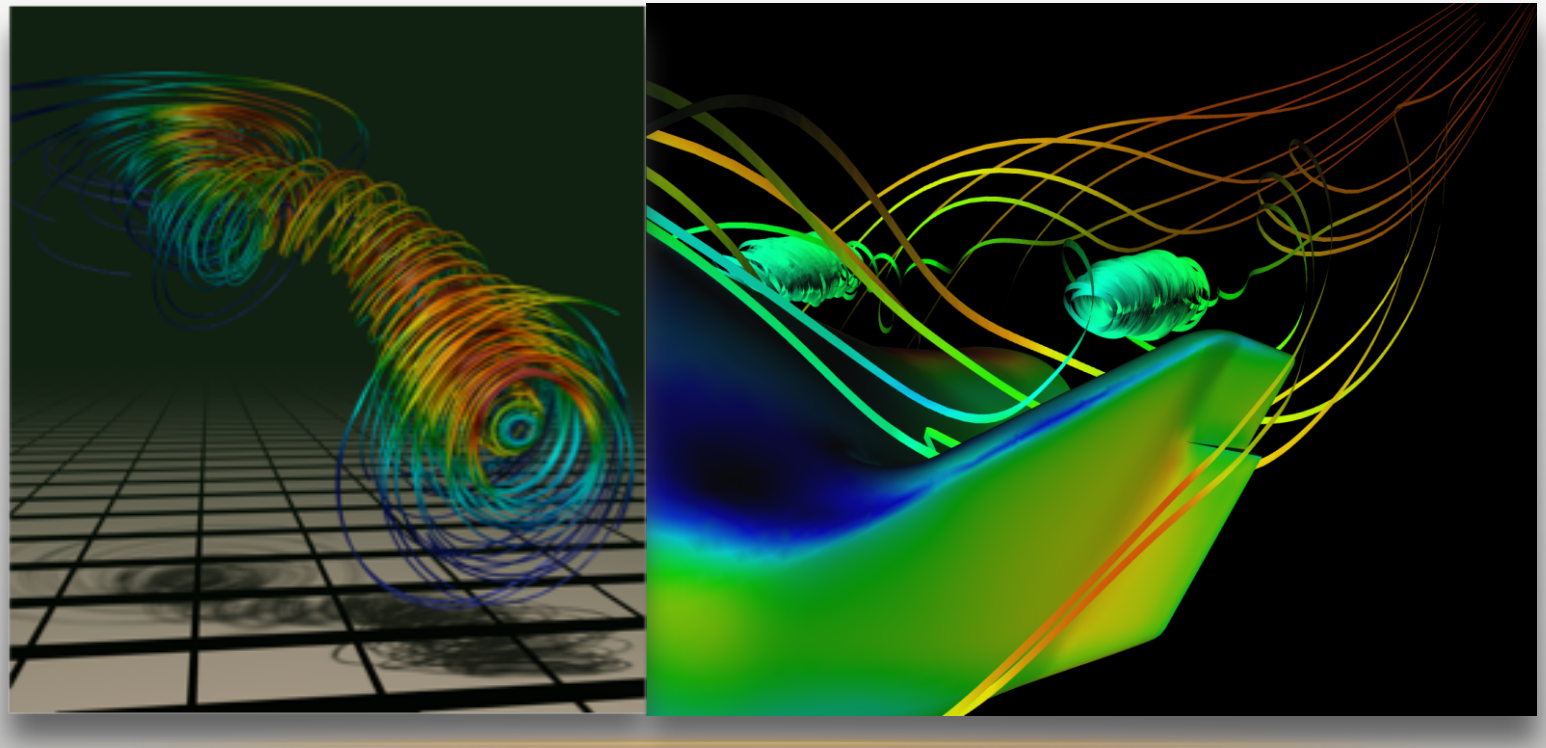
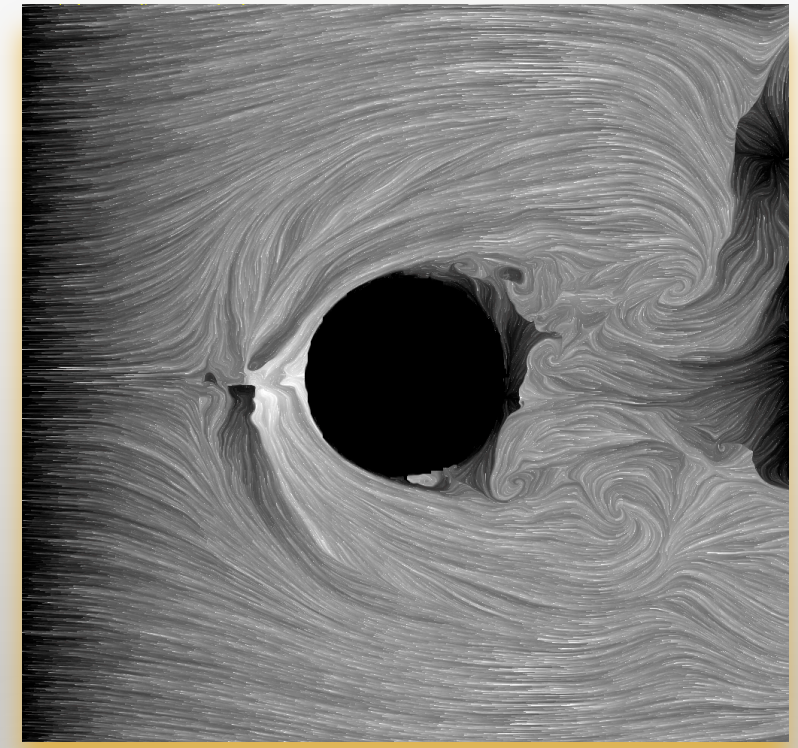


Image: Courtesy of Sean Ahern, NICS

VIZ TECHNIQUES: LIC

Line Integral Convolution

Utility: To investigate nature of flow

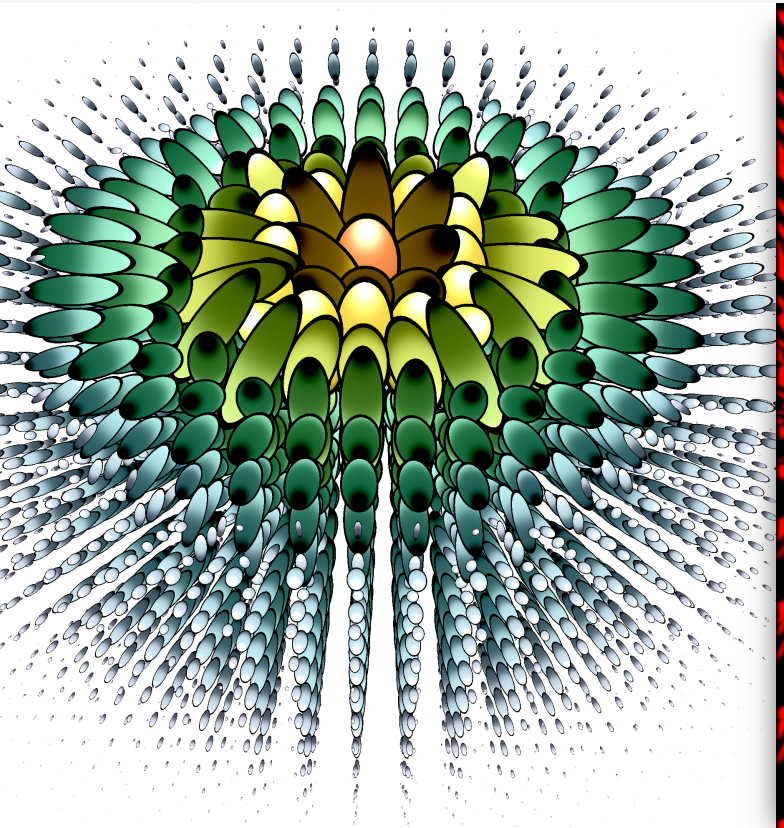


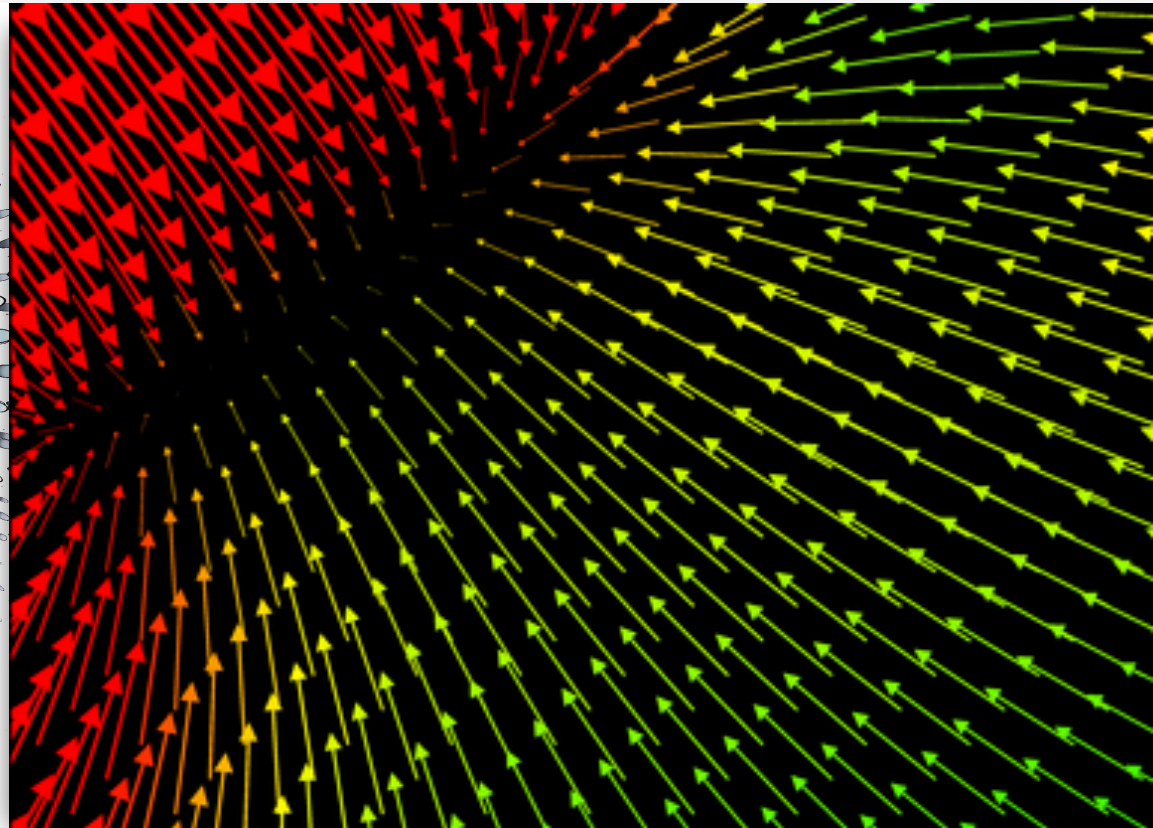
Image/movie: Courtesy of Sean Ahern, NICS

VIZ TECHNIQUES:
GLYPHS

Map the scalar or vector data to a shape

Utility: To investigate flow of vector data or distribution of scalar/vector data

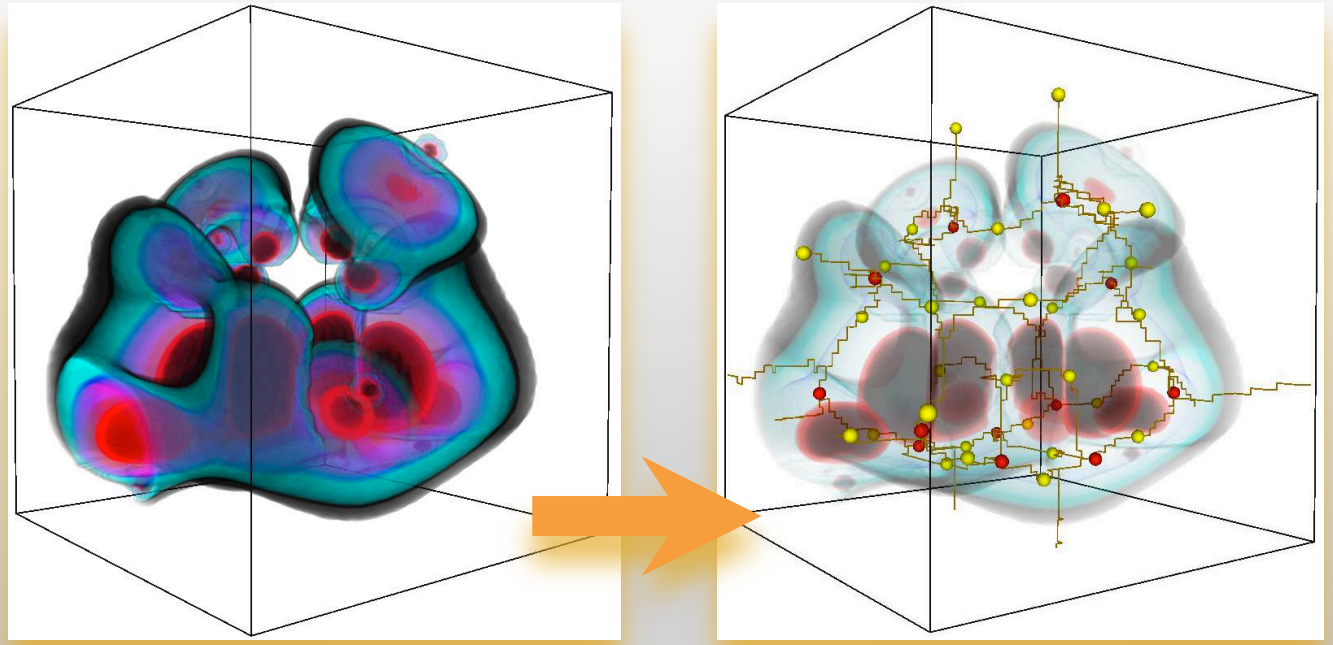




VIZ TECHNIQUES: TOPOLOGICAL

Process: Compute topology of underlying data

Utility: To investigate local maxima, minima saddle points, etc



Images: Courtesy of Sean Ahern, NICS

VIZ TECHNIQUES: TENSOR ANALYSIS

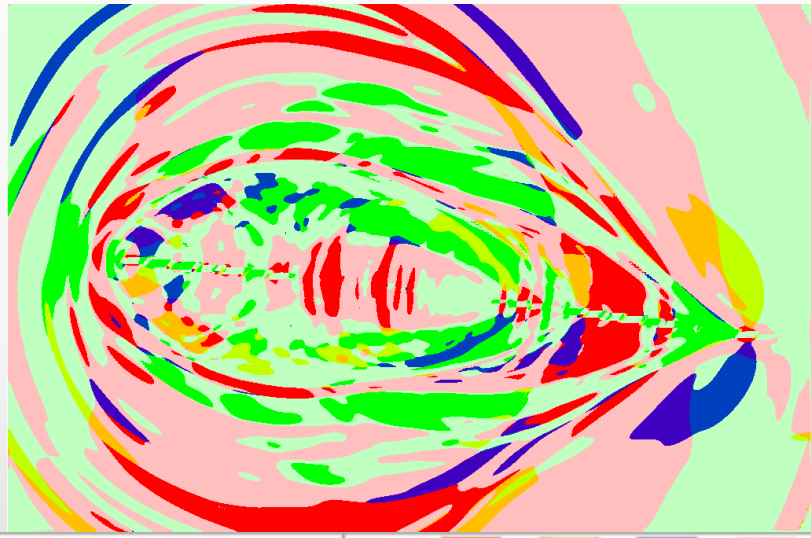
References

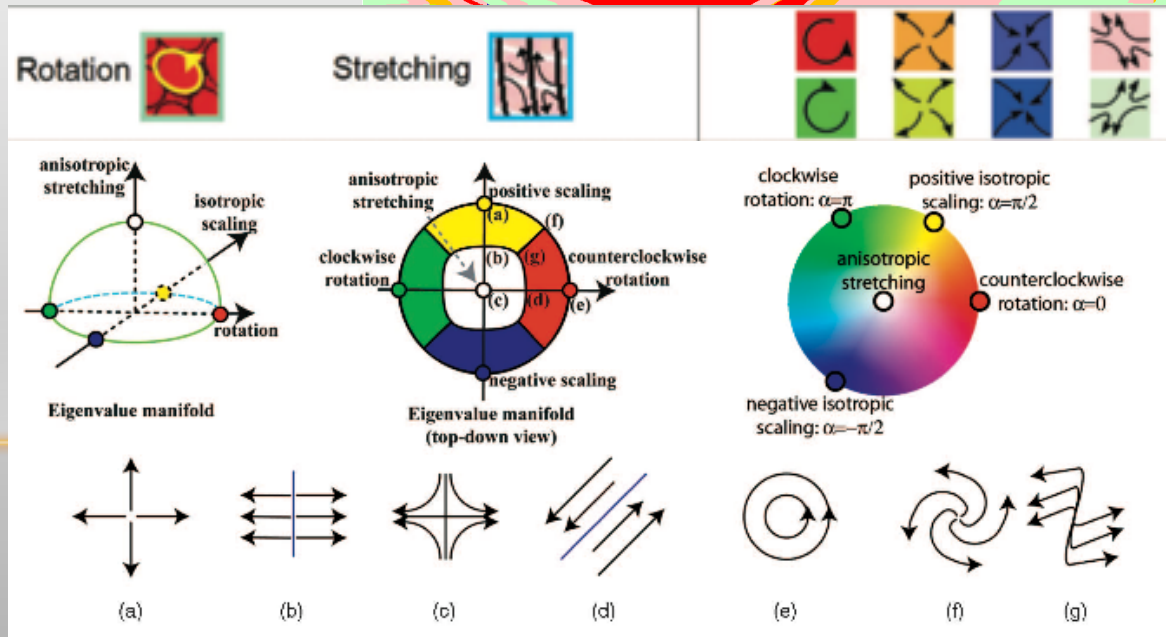
Asymmetric Tensor Analysis for Flow Visualization

Eugene Zhang, Harry Yeh, Zhongzang Lin, and Robert S. Laramee

Asymmetric Tensor Field Visualization for Surfaces

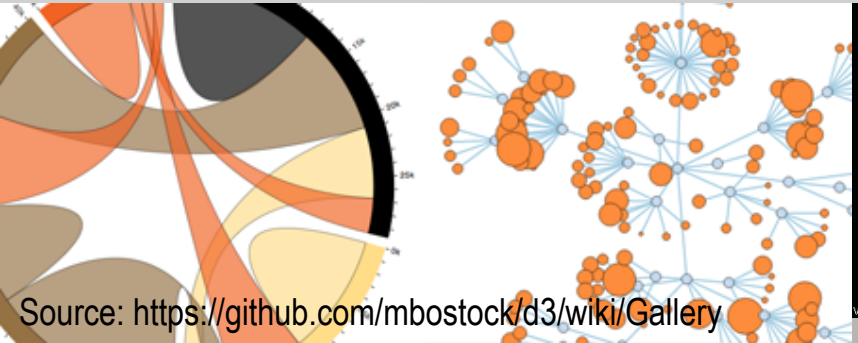
Guoning Chen, Darrel Palke, Zhongzang Lin, Harry Yeh, Paul Vincent, Robert S. Laramee and Eugene Zhang

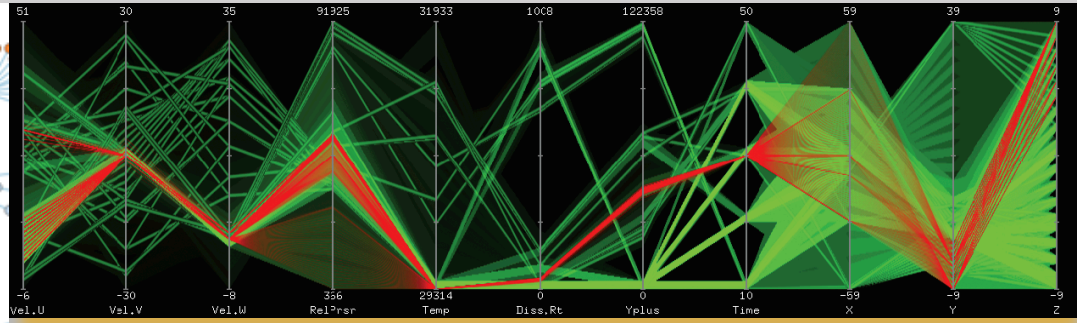




OTHER VIZ TECHNIQUES

- **Parallel Coordinates**
- Chord
- Tree (e.g. Dendograms, Sunbursts, Treemaps, etc)
- Many others



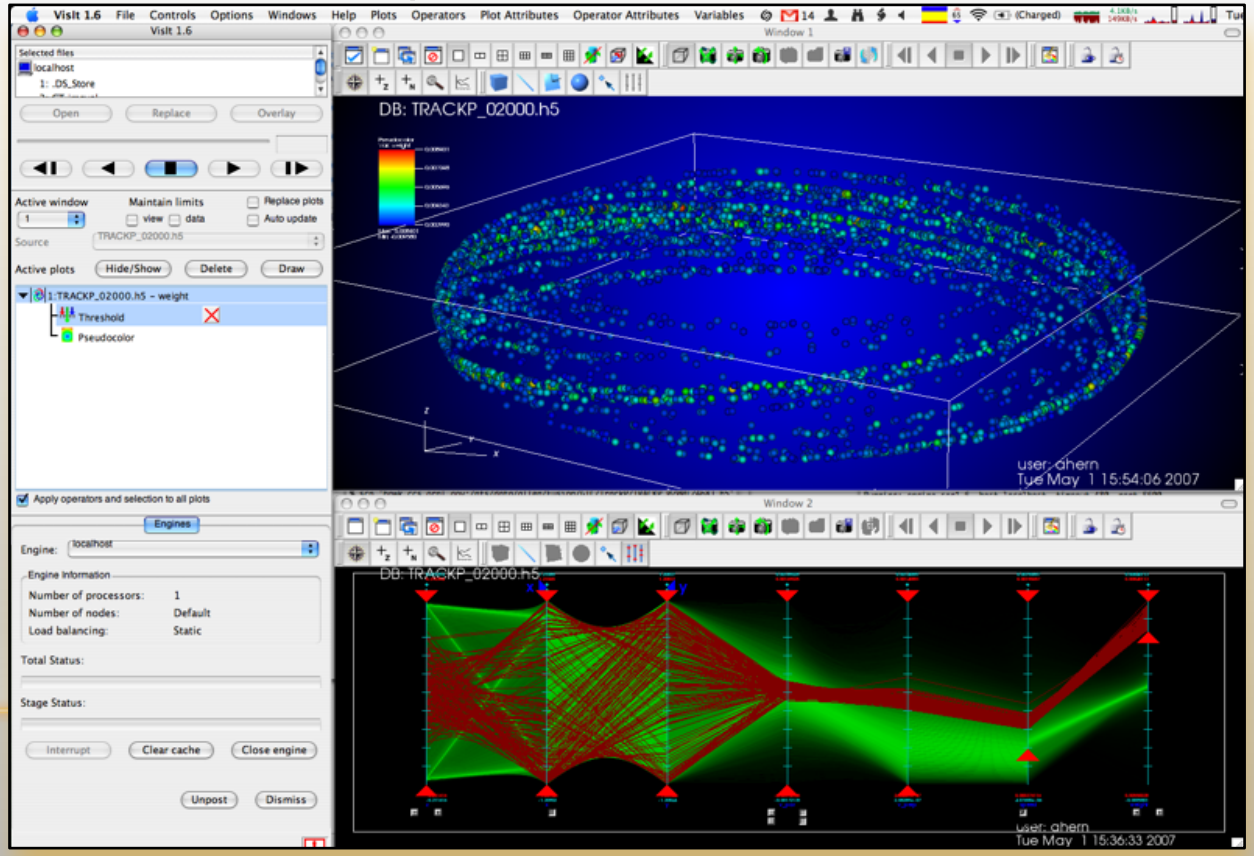


Source: https://github.com/mbostock/d3/wiki/Gallery

HIGH-DIMENSIONAL VISUALIZATION

Parallel coordinates summarize high-dimensional information

Utility: To find trends and relationships



VISUALIZATION APPLICATIONS

- Communication
- Confirmation
- Inspection and Exploration

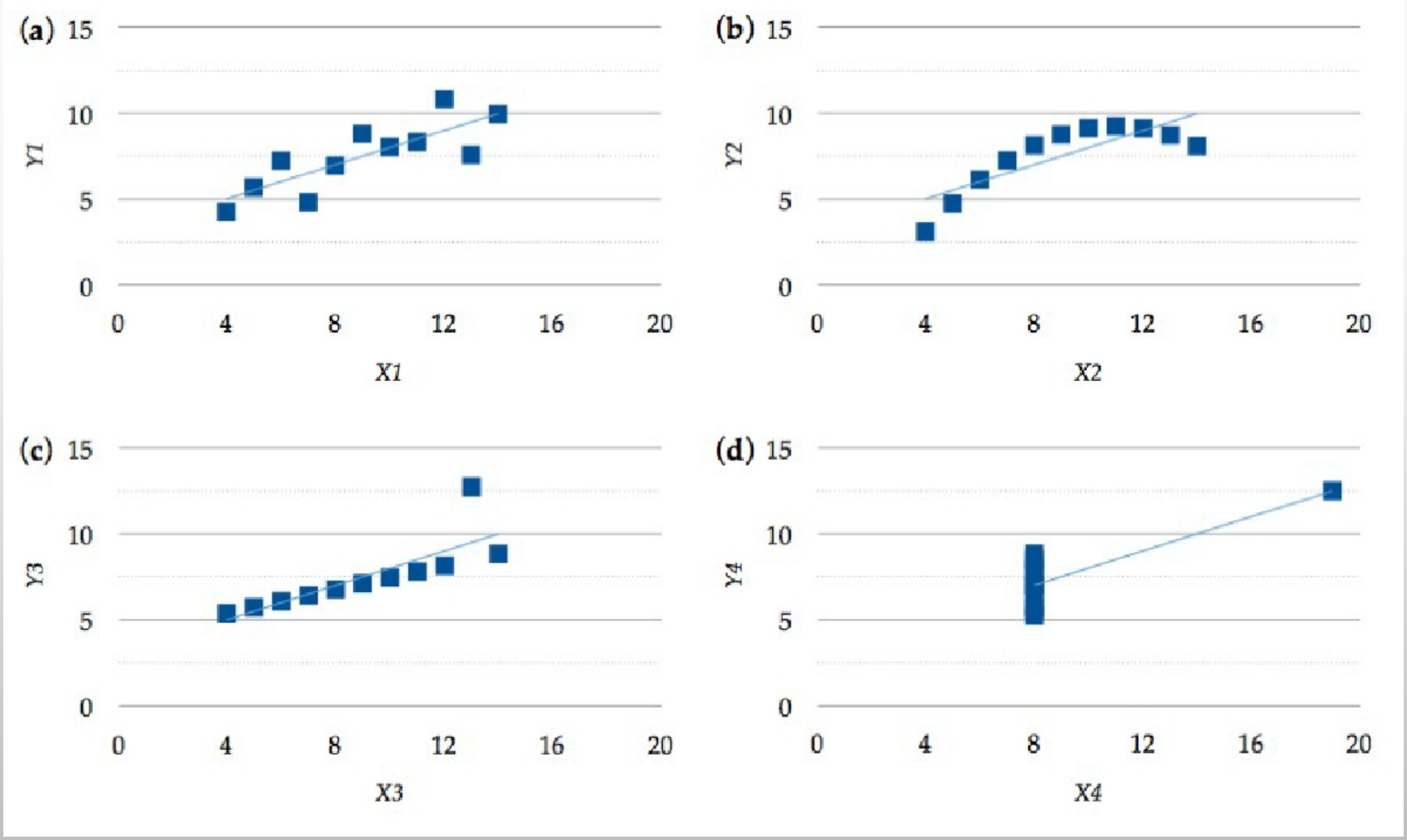
APPLICATION OF VIZ -CONFIRMATION

X_1	Y_1	X_2	Y_2	X_3	Y_3	X_4	Y_4
10.0	8.04	10.0	9.14	10.0	7.46	8.0	6.58
8.0	6.95	8.0	8.14	8.0	6.77	8.0	5.76
13.0	7.58	13.0	8.74	13.0	12.74	8.0	7.71
9.0	8.81	9.0	8.77	9.0	7.11	8.0	8.84
11.0	8.33	11.0	9.26	11.0	7.81	8.0	8.47
14.0	9.96	14.0	8.10	14.0	8.84	8.0	7.04
6.0	7.24	6.0	6.13	6.0	6.08	8.0	5.25
4.0	4.26	4.0	3.10	4.0	5.39	19.0	12.50
12.0	10.84	12.0	9.13	12.0	8.15	8.0	5.56
7.0	4.82	7.0	7.26	7.0	6.42	8.0	7.91
5.0	5.68	5.0	4.74	5.0	5.73	8.0	6.89

mean(X) = 9, var(X) = 11, mean(Y) = 7.5, var(Y) = 4.12,
cor(X,Y) = 0.816, linear regression lineY = 3 + 0.5*X

Anscombe 1973, The American Statistician

Anscombe's Quartet

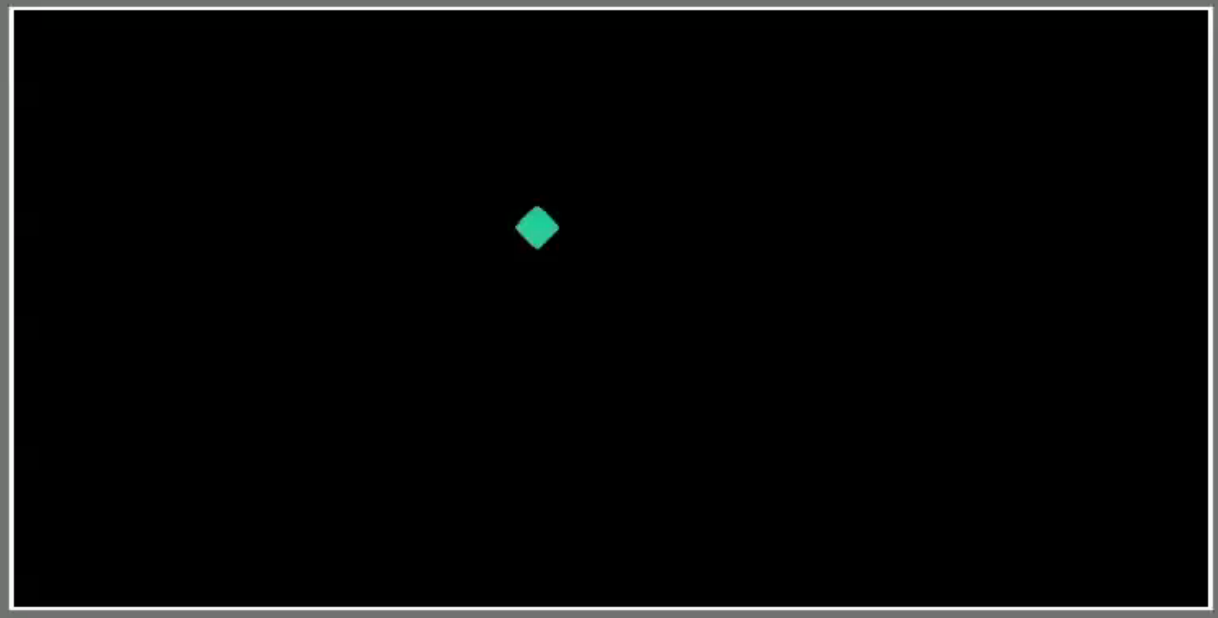


Slide: Courtesy of N Gehlenborg & M Meyer / Bio-IT World 2011

APPLICATION OF VIZ
- INSPECTION AND EXPLORATION

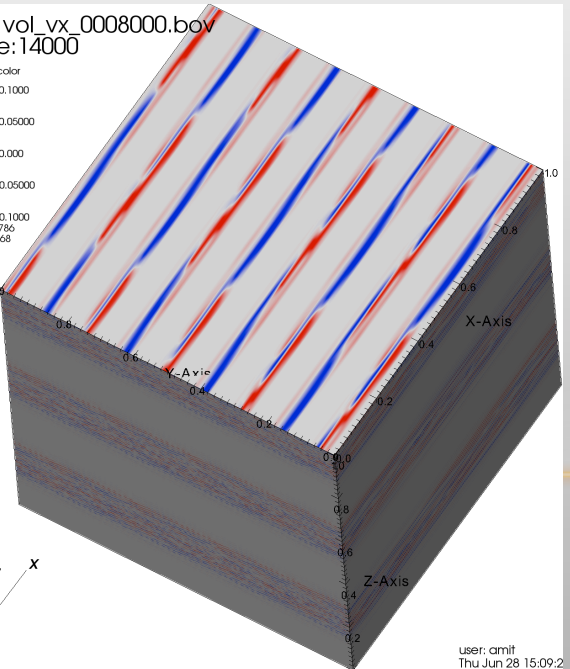
SALIENT APPLICATIONS OF VISUALIZATION

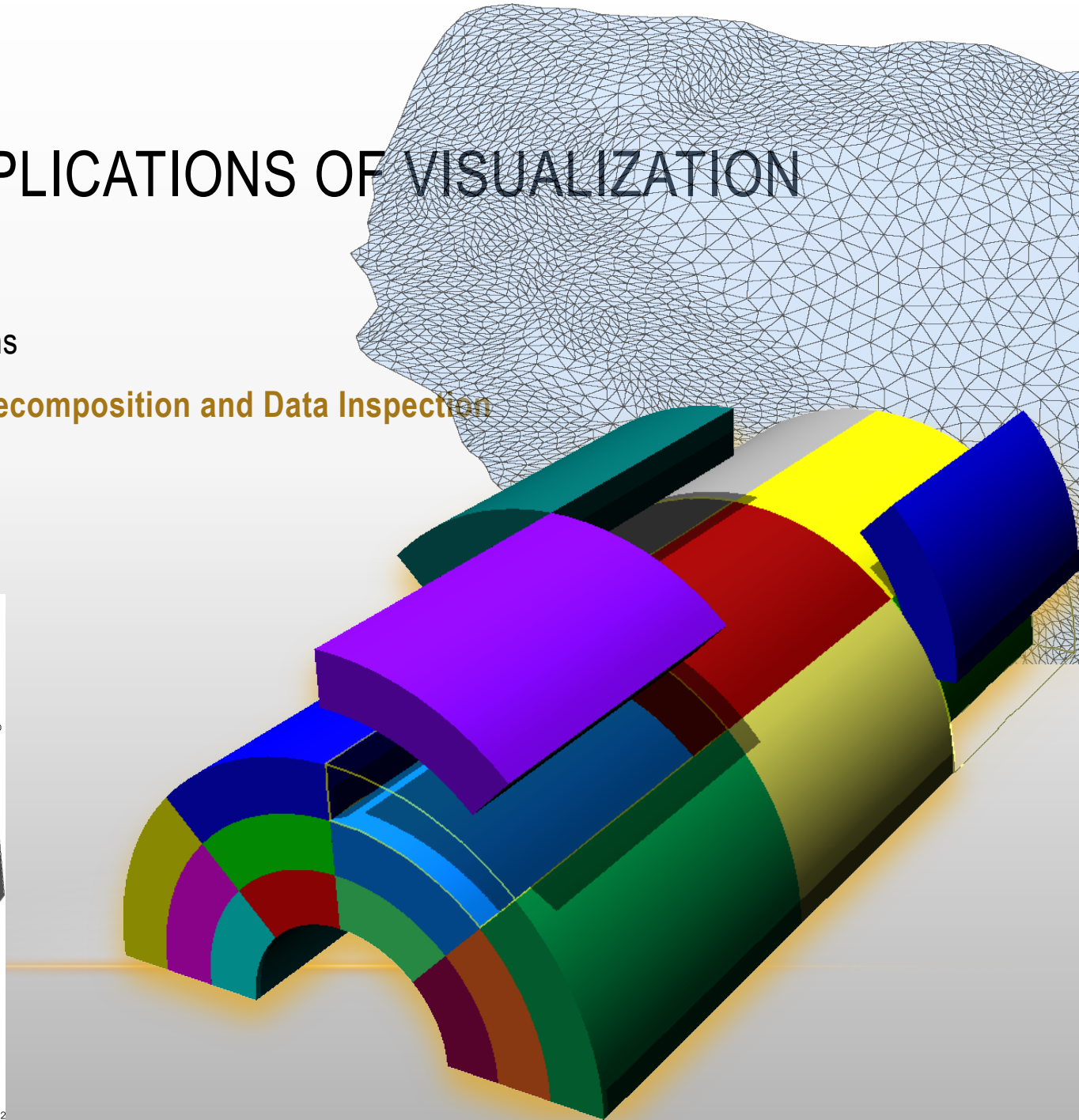
- **“nan” Inspection**
- **Boundary Conditions**



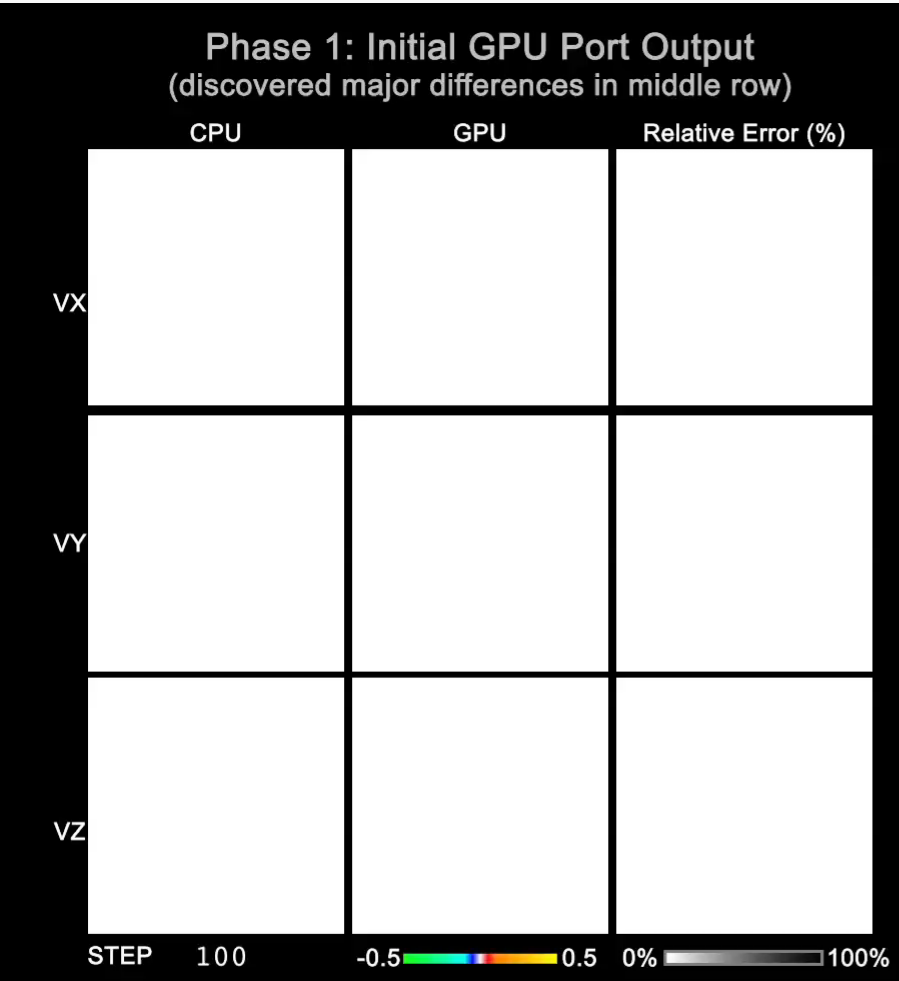
SALIENT APPLICATIONS OF VISUALIZATION

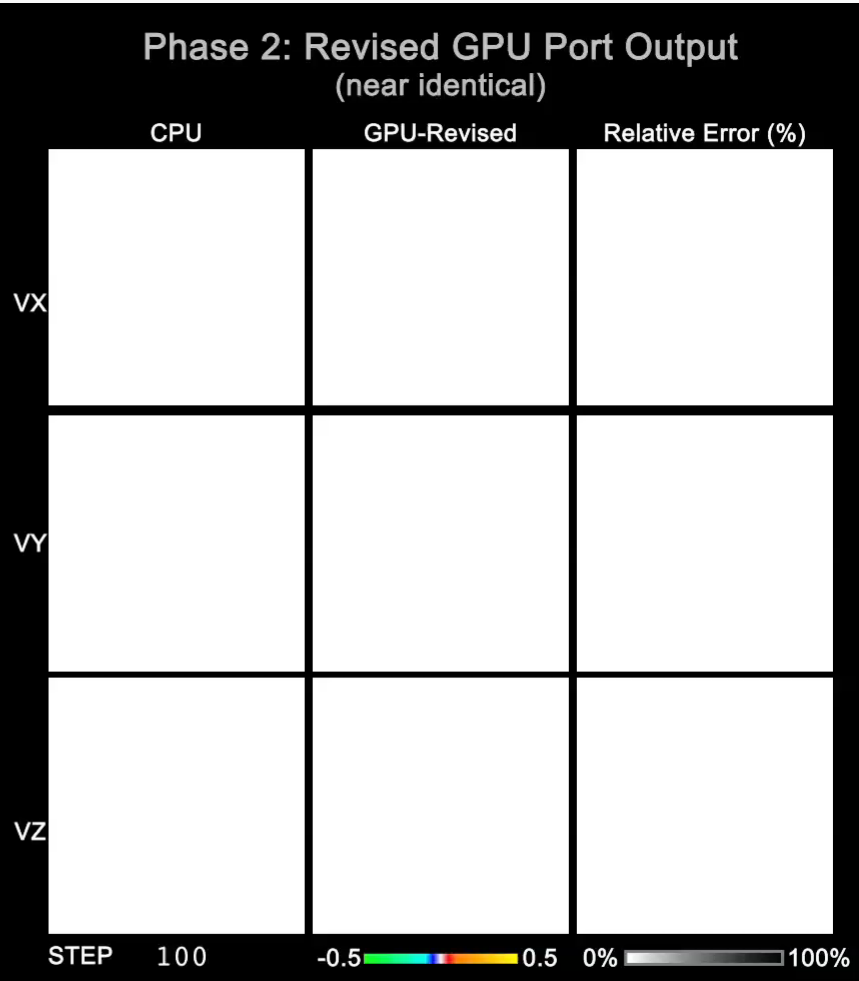
- “nan” Inspection
- Boundary Conditions
- **Mesh Topology, Decomposition and Data Inspection**





SALIENT APPLICATIONS OF VISUALIZATION

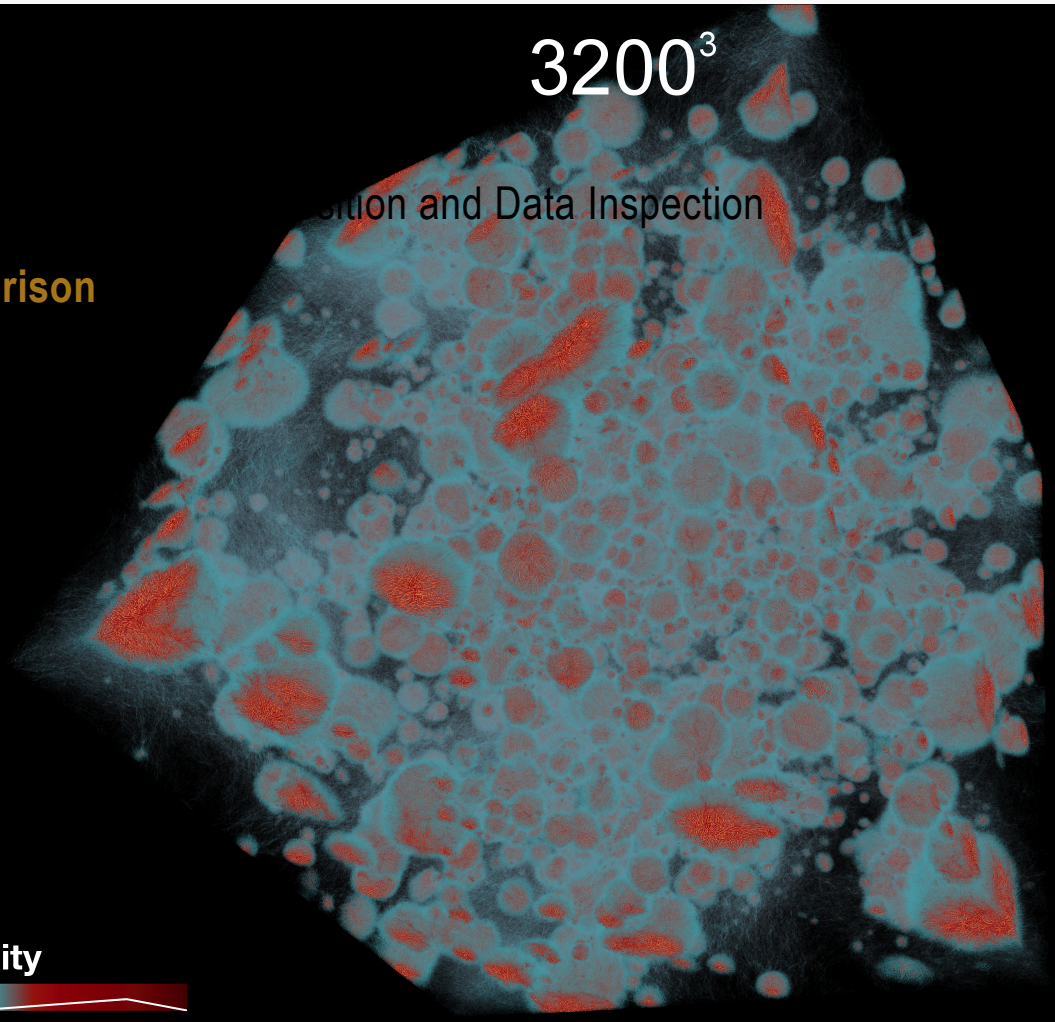




SDSC

SALIENT APPLICATIONS OF VISUALIZATION

- 3200^3
- ...tion and Data Inspection
- **Comparison**



Density

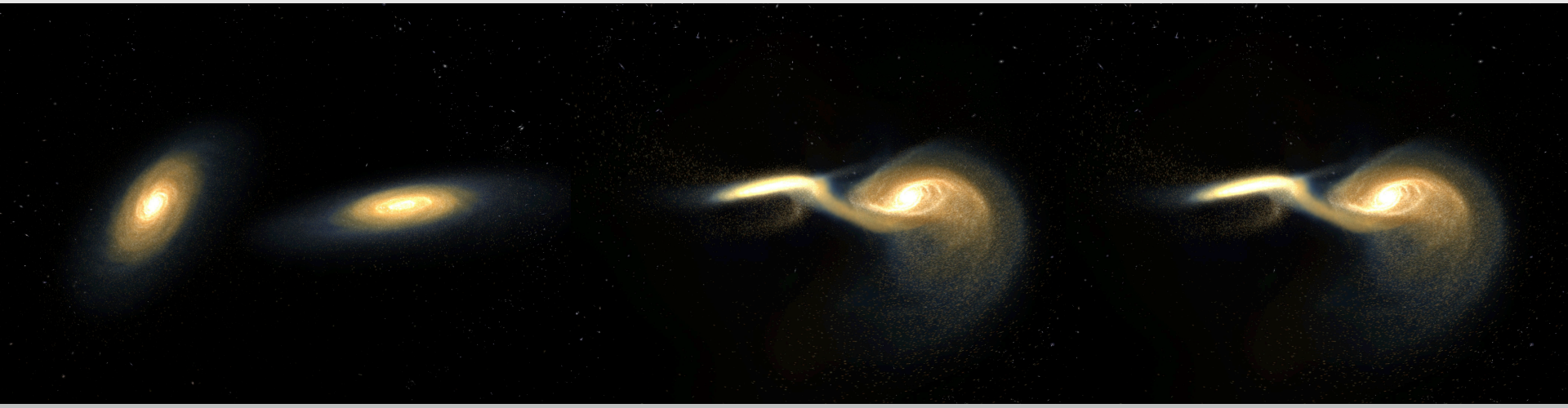
Non-Radiative No Difference Radiative

SDSC
SAN DIEGO SUPERCOMPUTER CENTER

Argonne
NATIONAL LABORATORY

SALIENT APPLICATIONS OF VISUALIZATION

- “nan” Inspection
- Boundary Conditions
- Mesh Topology, Decomposition and Data Inspection
- Comparison
- **Collisions and Mergers**



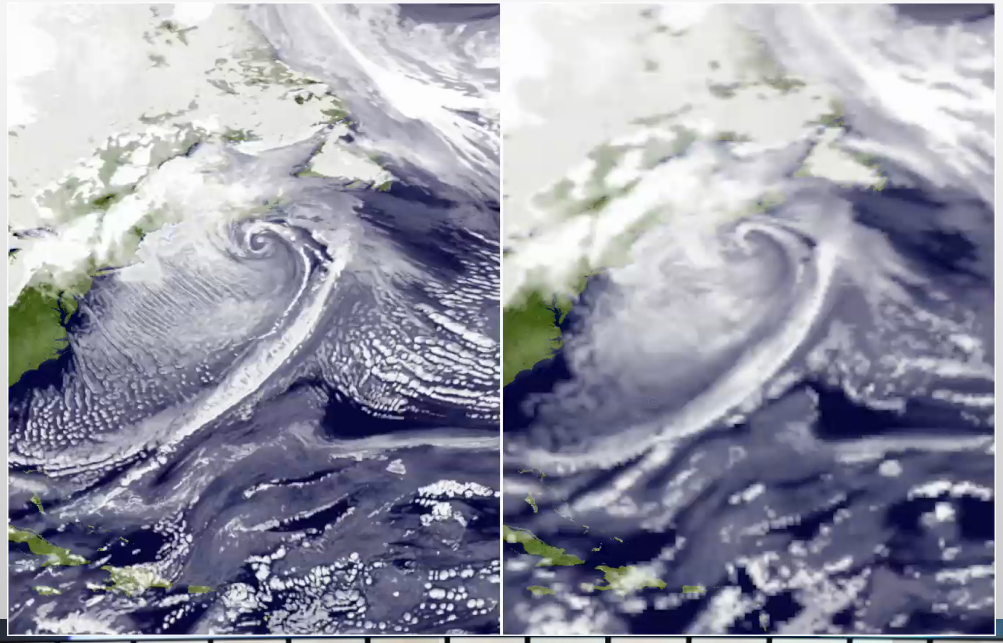
“Deep Sea Adventure” CalTech, NCSA, ADLER PLANETARIUM

SALIENT APPLICATIONS OF VISUALIZATION

SCEC
an NSF+USGS center
SDSC

DISPLAYING DATA

- High resolution devices (latest tablets and laptops)
- High resolution monitors (30” flat panels, 4 megapixel, 2500x1600)
- Tile Displays (array of monitors)

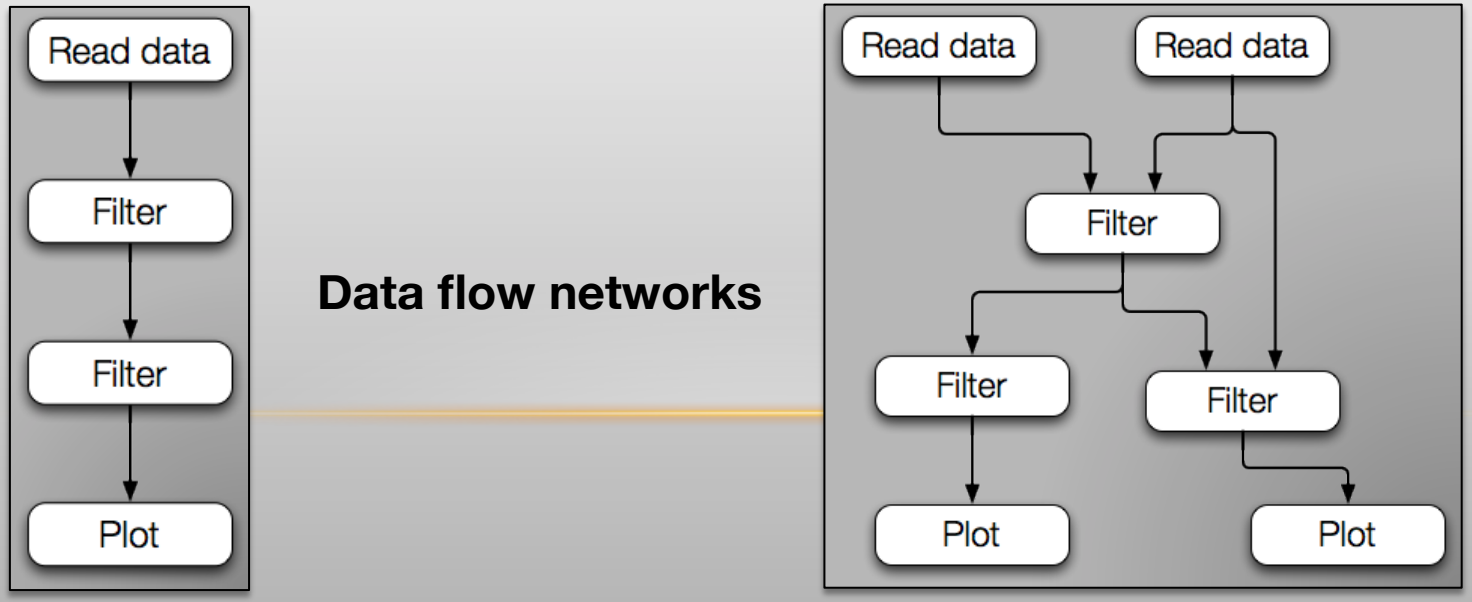


Slide: Courtesy of Sean Ahern, NICS

MISCELLANEOUS

FLOW NETWORKS (PIPELINES)

- Data reading: NetCDF, HDF, text, CSV, PDB
- Data operations: Slicing, resampling, mesh transforms
- Data plotting: Pseudocolor, isosurface, volume rendering



BEST PRACTICES

- Colors
  - Parsimony of color, Grey scale can be excellent at many things
  - Don’t use rainbow color map: http://blog.visual.ly/rainbow-color-scales/
  - Good Color map design:
    - colorbrewer2.org (excellent)
    - kuler.adobe.com
    - Use HSV color scale for color map design and interpolation
- Always include a legend
- Visualizations have their own unpredictable life cycle. Writing non technical captions will help you extremely in long run.
- Carefully set sampling, interpolation and seeds
- Write data in parallel read friendly format
- Reduce/Minimize Data Movement: Visualize as close to the data as possible

VIZ MODES

- Post Visualization (after the simulation)

  Pros:

  - Maximum flexibility
  - Operational simplicity

  Cons:

  - Data reload
  - Time consuming
  - Delayed access to results
- Co-located Visualization (during simulation but on different nodes)
- In-Situ Visualization (during simulation on same nodes)

  Pros:

  - Enables swift visual validation of results
  - Least/moderate data movement/replication

  Cons:

  - Difficult implementation
  - Additional complexity an longer runtime
  - Fixed visualization outputs

VIZ LIMITATIONS

- Domain knowledge
- Interpolation
- Multivariate data
- Temporal coherence
- Precision loss (compression)
- Perceptual issues (color blindness)
- Personal bias (author & viewer)

VIZ MISCONCEPTIONS (BUSTED)

- I am not an artist thus can't do viz (Stick around. Try again and ask for help this time)
- Viz is an art not science (Viz is driven by algorithms, some very sophisticated)
- Viz is a one time task (Viz is a process like any other analysis)
- Viz is useful only for communication (Think about error and diagnostics)
- Viz SU's are insignificant (Welcome to Viz World)

REQUESTING HELP

- Submit tickets at XSEDE
- Request Extended Collaborative Support Service (ECSS) with your allocation

  ECSS Provides collaborative expertise on your research work in several areas

  - Performance Tuning
  - Scaling
  - Visualization
  - etc

Q & A

Make sure you have

1. Download VisIt (2.9.2) : https://wci.llnl.gov/codes/visit/executables.html
2. Download sample Data, (Unzip sample data to your Desktop) https://wci.llnl.gov/codes/visit/2.3.0/VisItClassData.zip
3. Comet host file: http://users.sdsc.edu/~amit/comet-profile.zip

SESSION 2: VISUALIZATION WITH VISIT (HANDS ON)

VISIT SOFTWARE

Originally developed at LLNL (2000 onwards), now a community effort

Strengths

- Cross Platform
- Open and freely available
- Versatile (supports many mesh types, reads over 100 data formats)
- Local, Remote, Client-Server
- Supports large data (scalable)
- Interactive, Command Line & Batch
- Extensible via C++, Java & Python

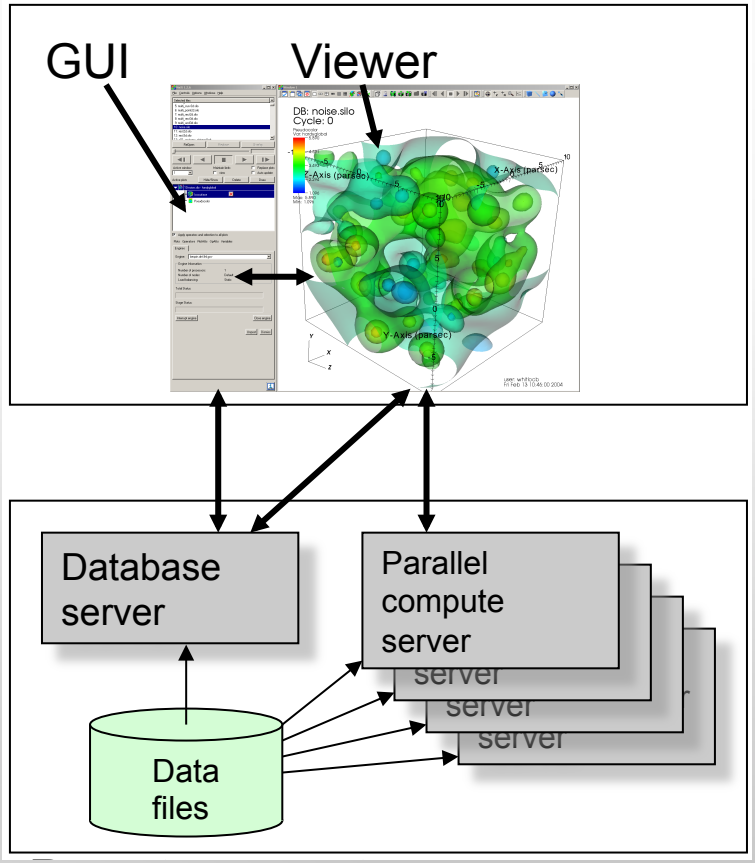
Source code, executable and documentation available at http://www.llnl.gov/visit

Trivia: VisIt name is play on words "**Vis**ualize **It**"

VISIT ARCHITECTURE

Four Main Components

- GUI (main window)
- Viewer (visualization or plot window)
- Database server
- Compute engine



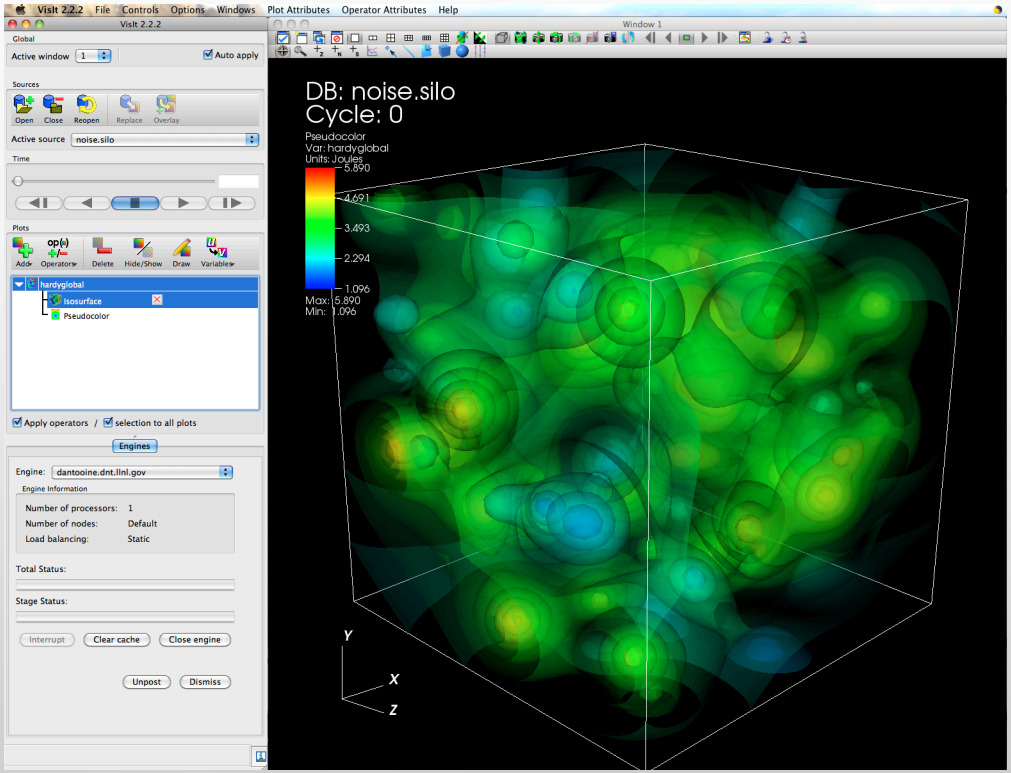
VISIT'S MAIN WINDOWS

GUI

- Select files to visualize
- Create and manage plots
- Set plot attributes
- Add operators
- Set look and feel for visualization

Viewer

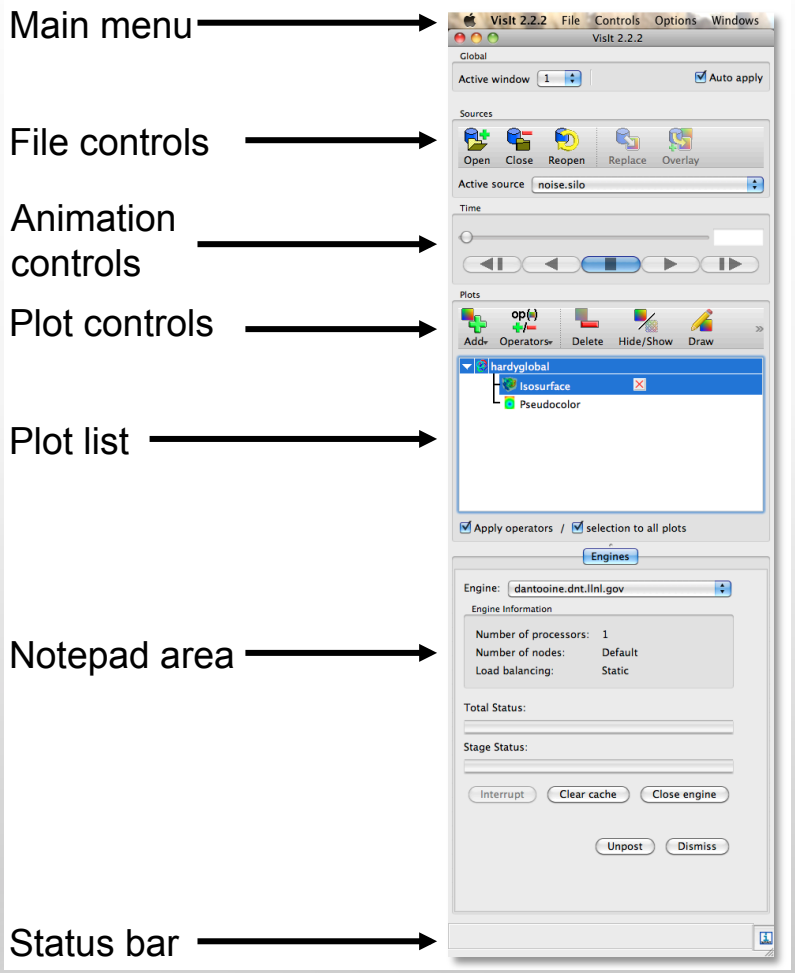
- Viewer windows, or vis windows, display all of the data being visualized
- Mouse navigation
- Up to 16 vis windows
- Popup menu
- Toolbars



MAIN WINDOW

GUI or Main window

- Open files
- Access other controls
- Set time state
- Create and manage plots
- Display plot progress



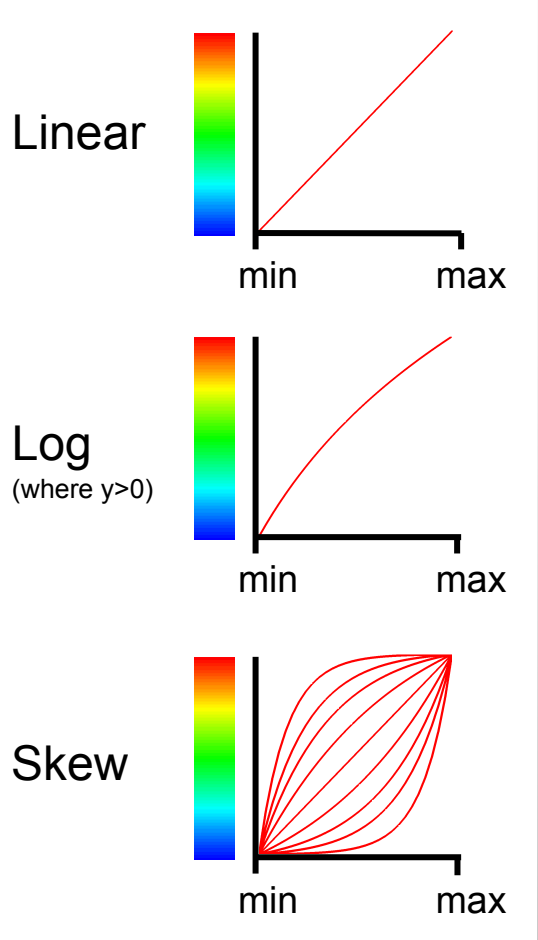
VISUALIZATION RECIPE FOR VISIT

1. Open database (file or set of files)
2. Create a plot
3. Set plot attributes
4. Apply operators to plot to modify data
5. Set operator attributes
6. Change refine view

SCALING OPTIONS IN VISIT

Scaling tells VisIt how to map values to color

- Linear scaling maps data range evenly to color range
- Log scaling assigns more low data values to color range (Values must be > 0)
- Skew scaling can assign either high or low values to color range using a skew factor



SESSION 3: REMOTE VISUALIZATION VISIT ON COMET (HANDS ON)

TEST ACCESS TO GORDON

SSH to Comet

% ssh USERNAME@comet.sdsc.edu

% module list

Note: VisIt does not use default modules on Comet

VISIT PATH ON COMET

/opt/visit

Find versions of visit installed on Comet Server -Client compatibility
2.9.x - 2.9.x
2.5.x - 2.5.x
2.3.x - 2.3.x

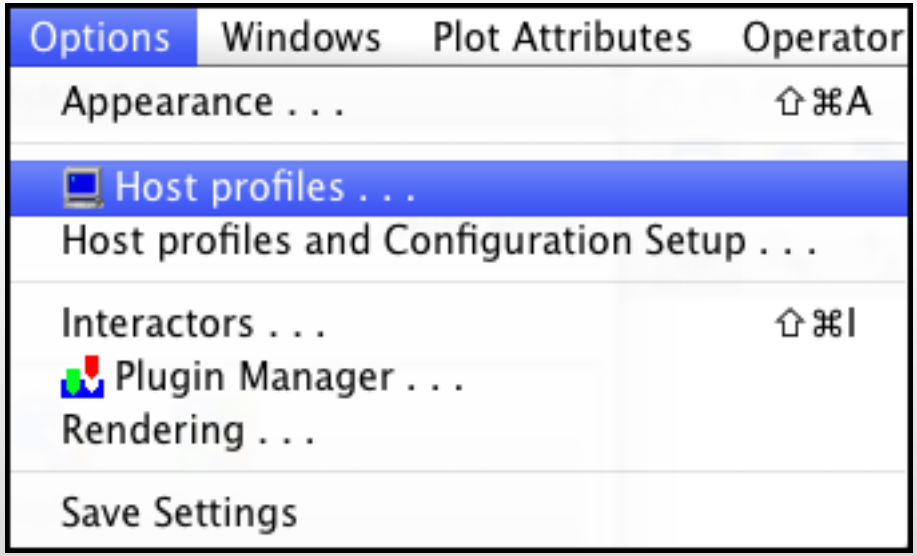
Bank/Account/Allocation: gue998

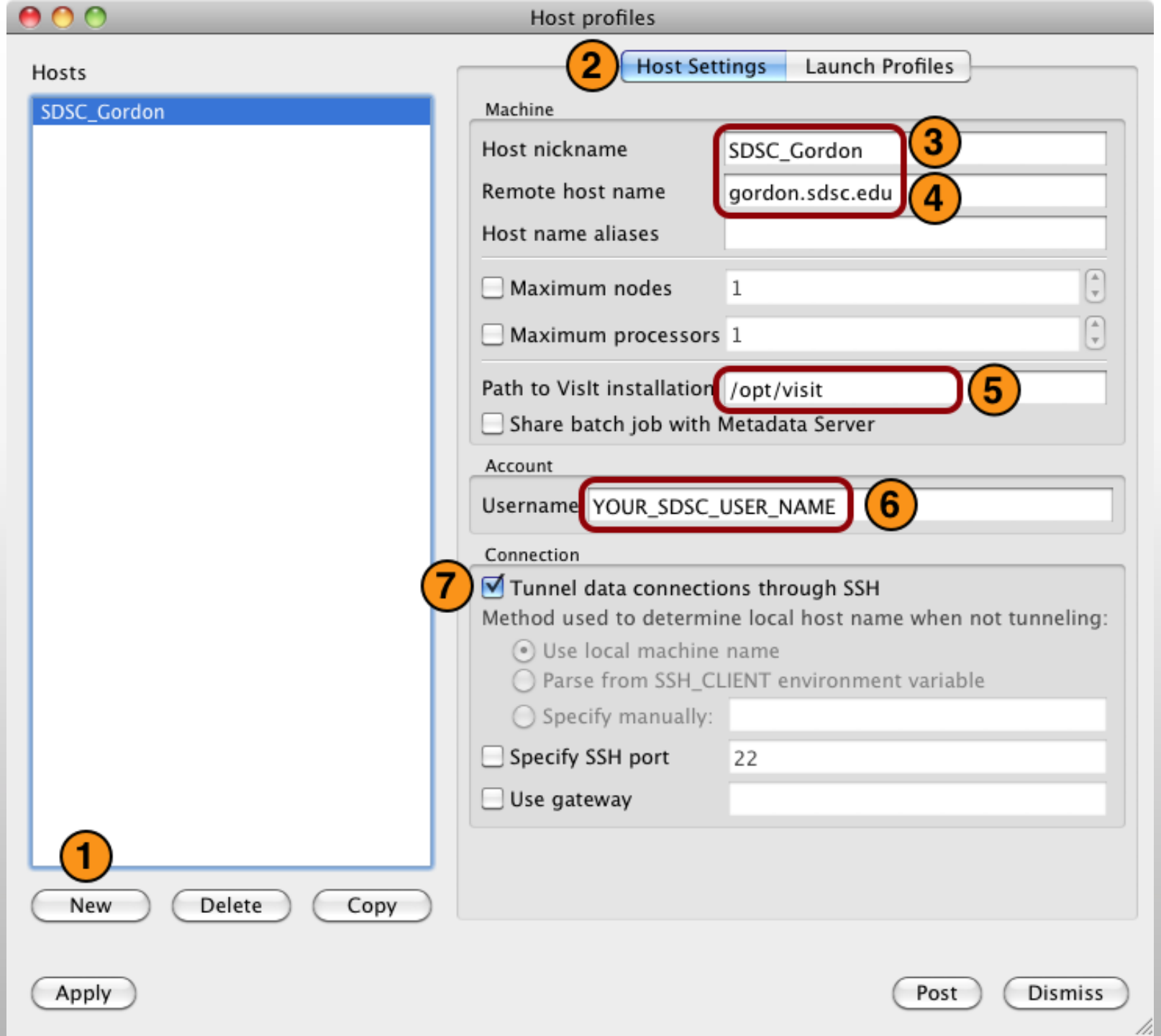
USING VISIT ON COMET

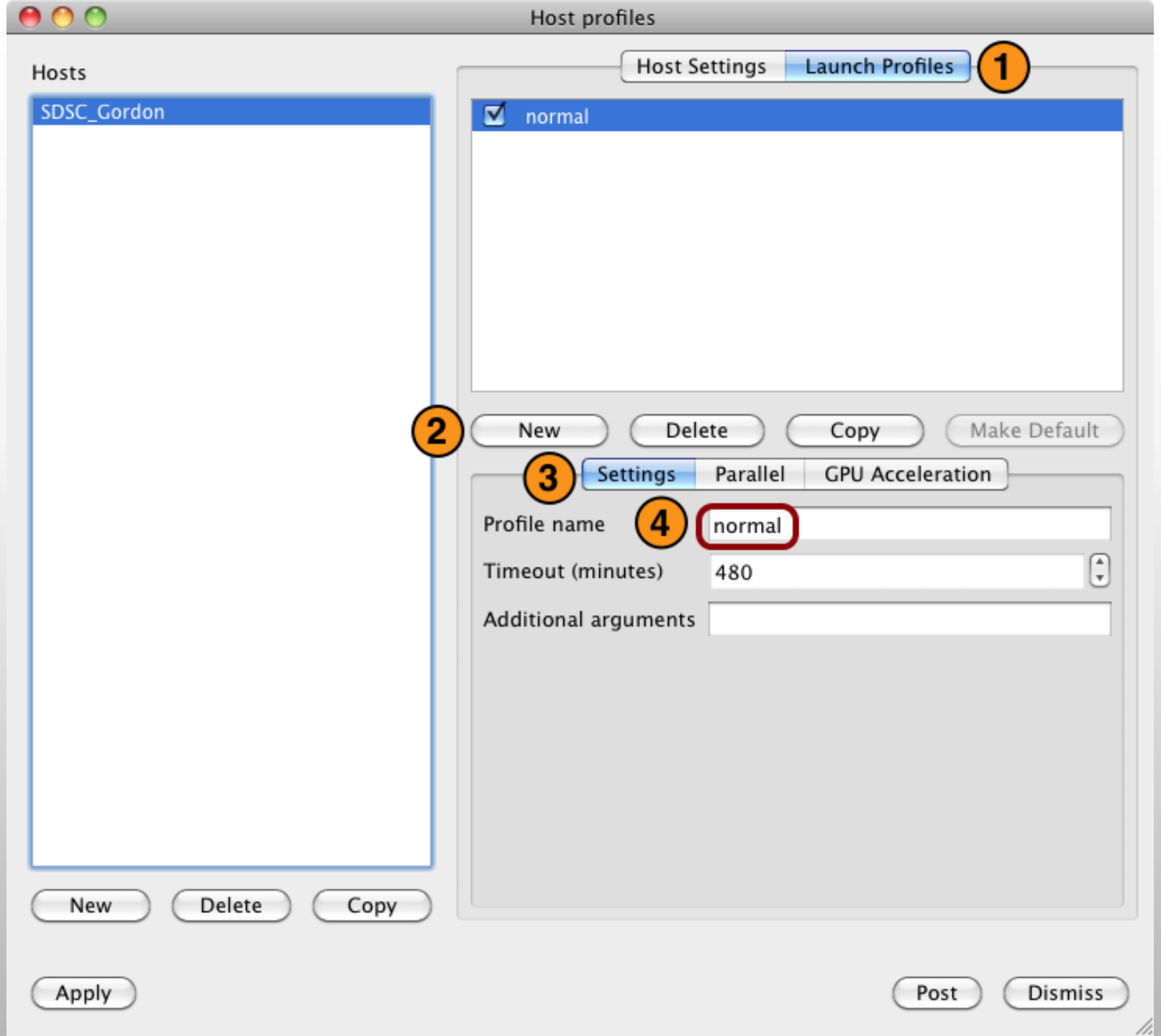
Create Host Profile for Comet in Visit
Connect and use Visit in server client mode

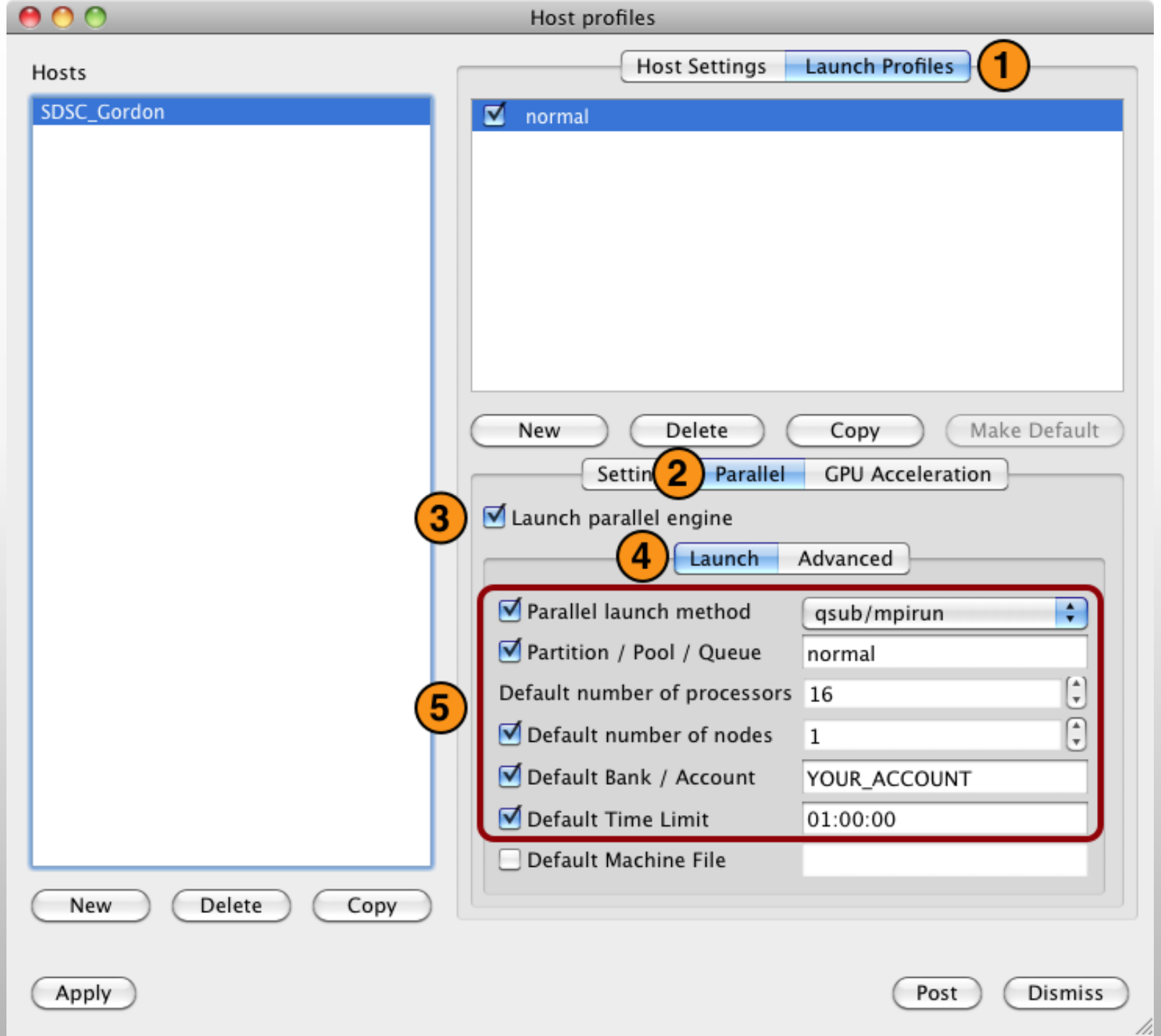
Documentation
http://www.sdsc.edu/us/resources/gordon/docs/gordon_visit.html

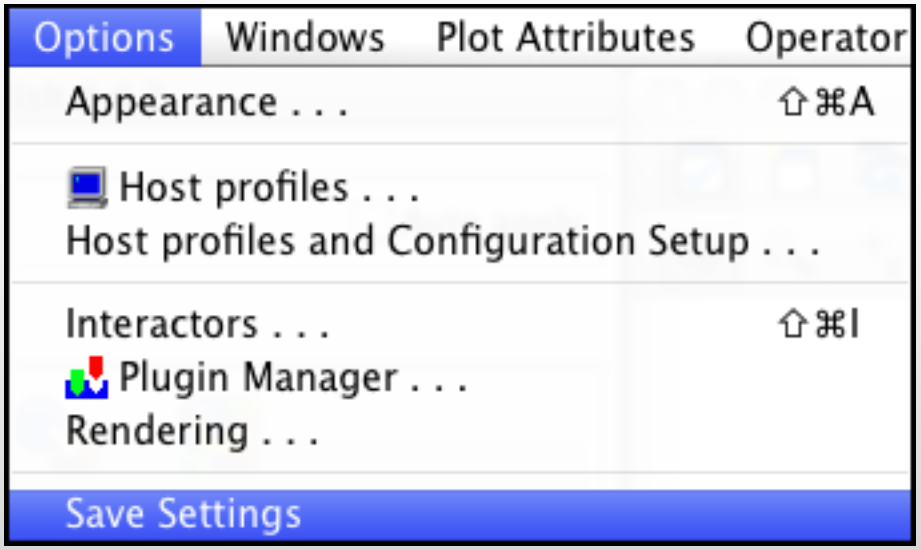
CREATE GORDON HOST PROFILE IN VISIT




Host profiles
Hosts
SDSC_Gordon
1
New
Delete
Copy
2
Host Settings
Launch Profiles
Machine
Host nickname
SDSC_Gordon
3
Remote host name
gordon.sdsc.edu
4
Host name aliases
Maximum nodes
1
Maximum processors
1
Path to VisIt installation
/opt/visit
5
Share batch job with Metadata Server
Account
Username
YOUR_SDSC_USER_NAME
6
Connection
7
Tunnel data connections through SSH
Method used to determine local host name when not tunneling:
Use local machine name
Parse from SSH_CLIENT environment variable
Specify manually:
Specify SSH port
22
Use gateway
Apply
Post
Dismiss


Host profiles
Hosts
SDSC_Gordon
New
Delete
Copy
Host Settings
Launch Profiles
1
normal
2
New
Delete
Copy
Make Default
3
Settings
Parallel
GPU Acceleration
Profile name
4
normal
Timeout (minutes)
480
Additional arguments
Apply
Post
Dismiss


Host profiles
Hosts
SDSC_Gordon
New
Delete
Copy
Apply
Host Settings
Launch Profiles
1
normal
New
Delete
Copy
Make Default
Settin
2
Parallel
GPU Acceleration
3
Launch parallel engine
4
Launch
Advanced
5
Parallel launch method
qsub/mpirun
Partition / Pool / Queue
normal
Default number of processors
16
Default number of nodes
1
Default Bank / Account
YOUR_ACCOUNT
Default Time Limit
01:00:00
Default Machine File
Post
Dismiss


Options
Windows
Plot Attributes
Operator
Appearance . . .
⇧⌘A
Host profiles . . .
Host profiles and Configuration Setup . . .
Interactors . . .
⇧⌘I
Plugin Manager . . .
Rendering . . .
Save Settings

USING VISIT IN COMMAND LINE OR BATCH MODE ON GORDON

Make sure that **intel compiler** and **openmpi** modules are loaded

source /etc/profile.d/modules.sh

module purge

module load intel

module load openmpi_ib

module list

Continued Self Study

Complete the VisIt class and exercises provided here

https://wci.llnl.gov/simulation/computer-codes/visit/manuals

More documentation

http://www.visitusers.org/index.php?title=User_Documentation

Sign up for VisIt users list. (Ask for help and help others)

https://elist.ornl.gov/mailman/listinfo/visit-users

SESSION 4: INTRO TO SEEDME.ORG

SeedMe: **S**tream **E**ncode **E**xplore and **D**isseminate **M**y **E**xperiments

SeedMe name inspired by Seed : proliferate and grow

Visit https://seedme.org

1. Sign-up / Sign-in
2. Download SeedMe client (downloads page)
3. Sample Data (downloads page)

Transfer

Storage

Access control

Collaboration

Gaps in HPC Infrastructure

- Collaborators need access to infrastructure
- Exact path
- Permissions
- Description of content

Sharing Consumable Products

(Many customers)

Email

Download + Send
Scattered results
Can't share larger content
Manual

Webpage

Download + Upload
Handle Privacy
Significant time commitment
Manual

Cloud Drive

Download + Upload
Cannot describe content
Manual

Gaps in Consumer/Home grown Infrastructure

SeedMe

Share easily

- Share data, images, & videos with selected colleagues.
- Access from any computer, phone, or tablet.

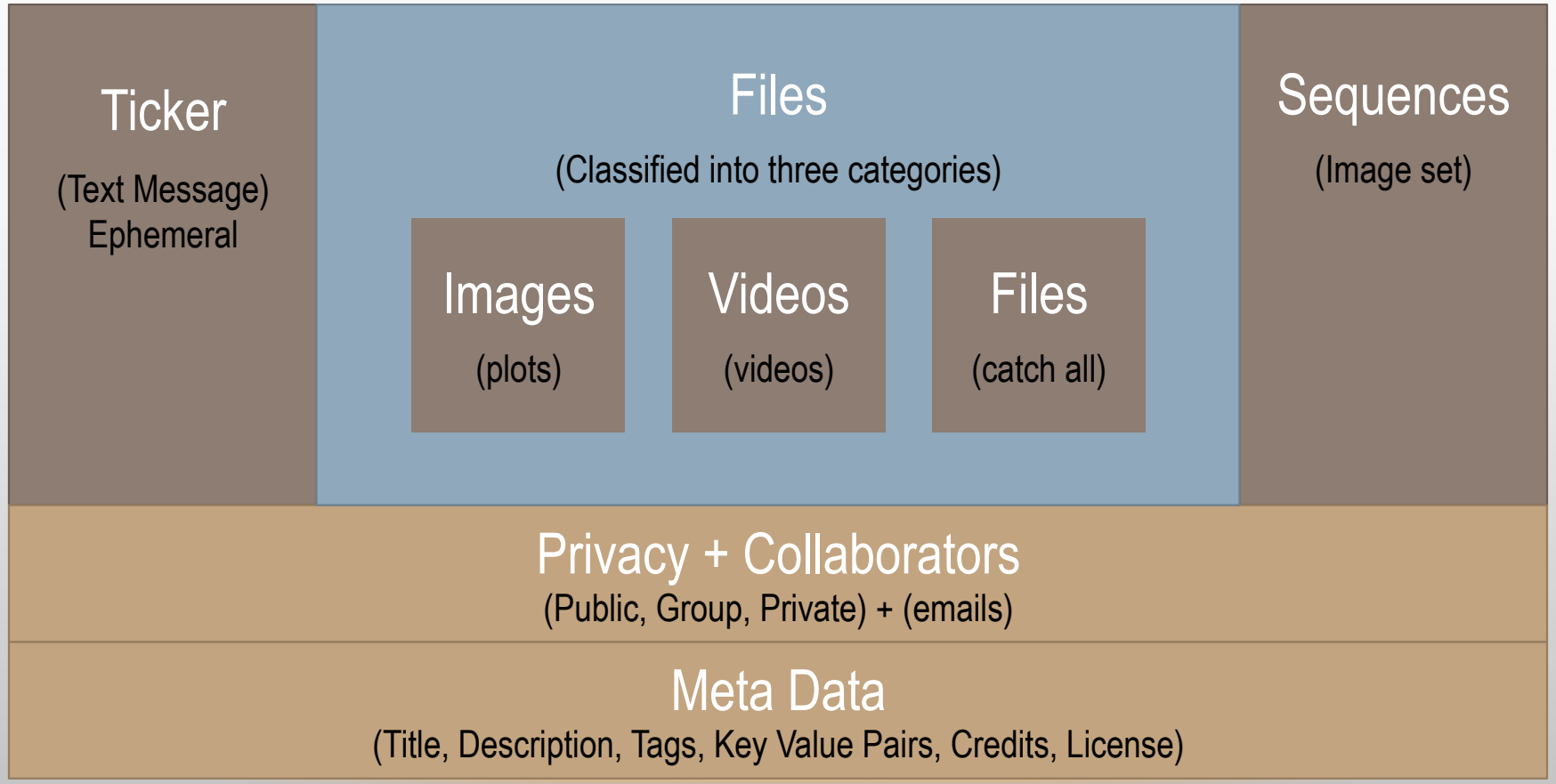
Collaborate securely

- Discuss preliminary & published results.
- Control who can view and comment on your content.

Automate quickly

- Post data from HPC jobs.
- Create videos from image sequences.

SEEDME COLLECTION



SeedMe | Collections | Downloads | News | Help | Account | Log out

High-performance image classification and search supporting large-scale seafloor biodiversity and habitat surveys

by David Nadeau | 2016-06-01 18:06 | ID: 71106 | private | 83,111,693 bytes | ♥ ☆ Subscribe

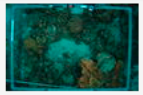
Overview: The project explores new domain-optimized high-performance computation methods for automatic image classification to enable seafloor population surveys at landscape scales. Recent advances in high-resolution imaging of seafloor communities have created a critical need for new optimized computation methods to process the resulting extremely large data collections. These new methods will enable scientists to create detailed biological and environmental maps of seafloor communities at unprecedented scales and do so repeatedly through time as these habitats change under the influence of human activity. Such maps provide a necessary long-term contextual framework and baseline data for subsequent sustainability data analysis and decision making.

Merit: Our approach uses domain knowledge to develop [illegible] algorithms to enable high performance processing of very large sets of survey images. Color, [illegible] metrics are derived from image tiles to build feature vectors that are used to guide search through a k-d-tree-based species and habitat classification library. This project's methods prototype and validate the performance and classification accuracy of new methods that cull the library based upon survey characteristics (geographic region, water temperature and salinity, sea bottom type from acoustic data), tune feature vectors based upon survey and library metrics (contextual color gamut and texture detail reduction, principal components analysis to combine and weight features), reduce the nearest-neighbor search set size using k-d tree metrics, restructure the k-d tree to improve common case search performance and cacheability, and parallelize the search for efficient classification across a cluster. Together these new methods are expected to substantially increase classification performance.

Describe the collection

Key/Value Pairs | Files | Images | Sequences | Tickers | Videos

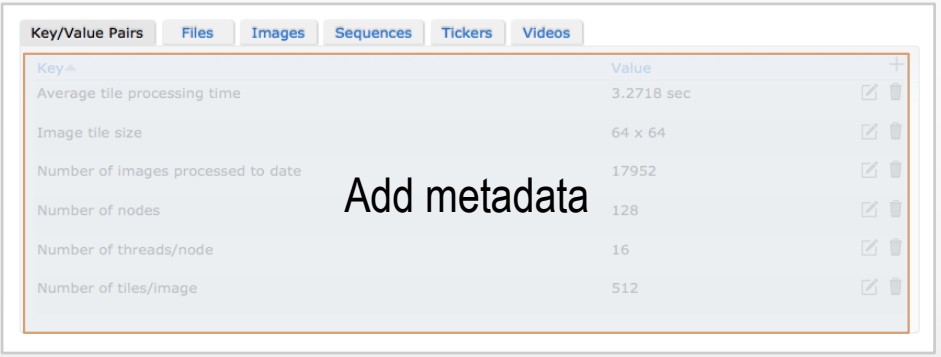
Content types

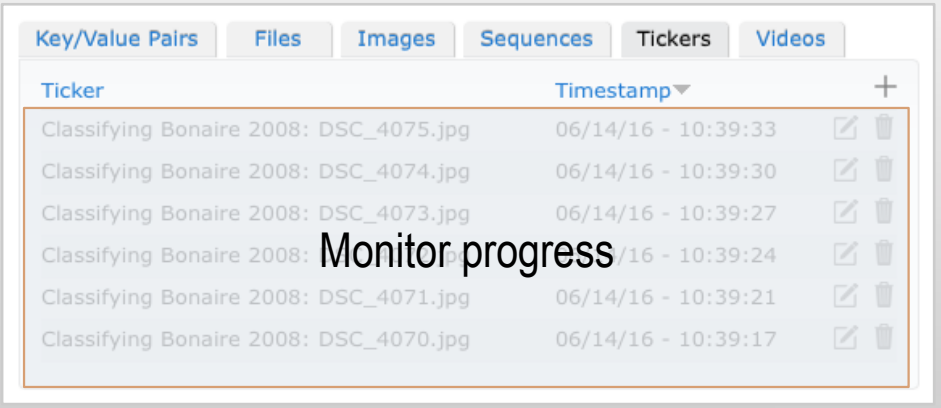
Title		Filename	Modified date
Bonaire 2008, Pink Beach diver and photo frame Documentation of photo frame using a PVC rectangle base, struts, and a mounted camera aimed down. The base includes tape to note the data collection location and date, along with white, black, and colored tapes used for a color reference.		IMG_3198.jpg	2016-06-01 18:04
Bonaire 2008, Pink Beach 20m transect, DSC 4076 Seafloor and photo frame partially obscured by soft coral. Color references visible. No color balance or contrast enhancement.		DSC_4076.JPG	2016-06-01 17:46
Bonaire 2008, Cliff 10m transect, DSC 2766 Variety of corals and other reef inhabitants. Photo frame is visible with color references. No color balancing or contrast enhancement.		DSC_2766.JPG	2016-06-01 17:39
Bonaire 2008, Cliff 5m transect, DSC 3045 Coral amidst highly silted sea floor indicative of the area. Photo frame is visible with color swatches. No color balancing or contrast enhancement.		DSC_3045.JPG	2016-06-01 17:38

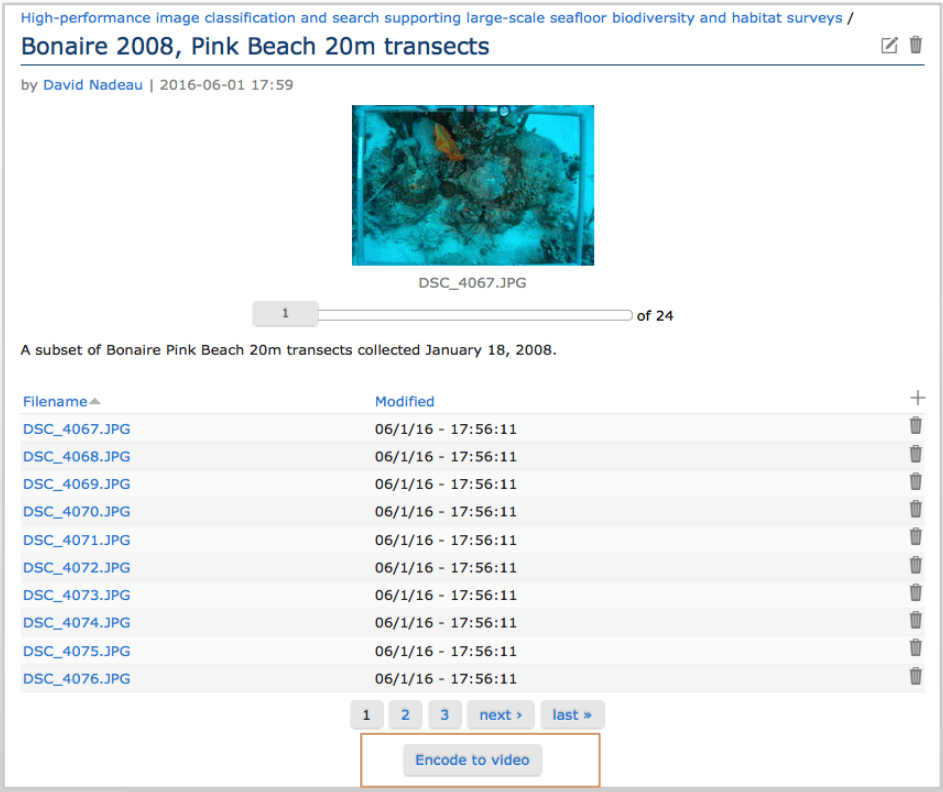
Describe files

Credits:
D. Stokes, J. Leichter (UCSD/Scripps Institute of Oceanography)
R. Sinkovitz, D. Nadeau (UCSD/San Diego Supercomputer Center)

SeedMe.org


Key/Value Pairs
Files
Images
Sequences
Tickers
Videos
Key
Value
Average tile processing time
3.2718 sec
Image tile size
64 x 64
Number of images processed to date
17952
Number of nodes
128
Number of threads/node
16
Number of tiles/image
512
Add metadata


Key/Value Pairs
Files
Images
Sequences
Tickers
Videos
Ticker
Timestamp
Classifying Bonaire 2008: DSC_4075.jpg
06/14/16 - 10:39:33
Classifying Bonaire 2008: DSC_4074.jpg
06/14/16 - 10:39:30
Classifying Bonaire 2008: DSC_4073.jpg
06/14/16 - 10:39:27
Classifying Bonaire 2008:
/16 - 10:39:24
Classifying Bonaire 2008: DSC_4071.jpg
06/14/16 - 10:39:21
Classifying Bonaire 2008: DSC_4070.jpg
06/14/16 - 10:39:17
Monitor progress


High-performance image classification and search supporting large-scale seafloor biodiversity and habitat surveys /
Bonaire 2008, Pink Beach 20m transects
by David Nadeau | 2016-06-01 17:59
DSC_4067.JPG
1
of 24
A subset of Bonaire Pink Beach 20m transects collected January 18, 2008.
Filename
Modified
DSC_4067.JPG
06/1/16 - 17:56:11
DSC_4068.JPG
06/1/16 - 17:56:11
DSC_4069.JPG
06/1/16 - 17:56:11
DSC_4070.JPG
06/1/16 - 17:56:11
DSC_4071.JPG
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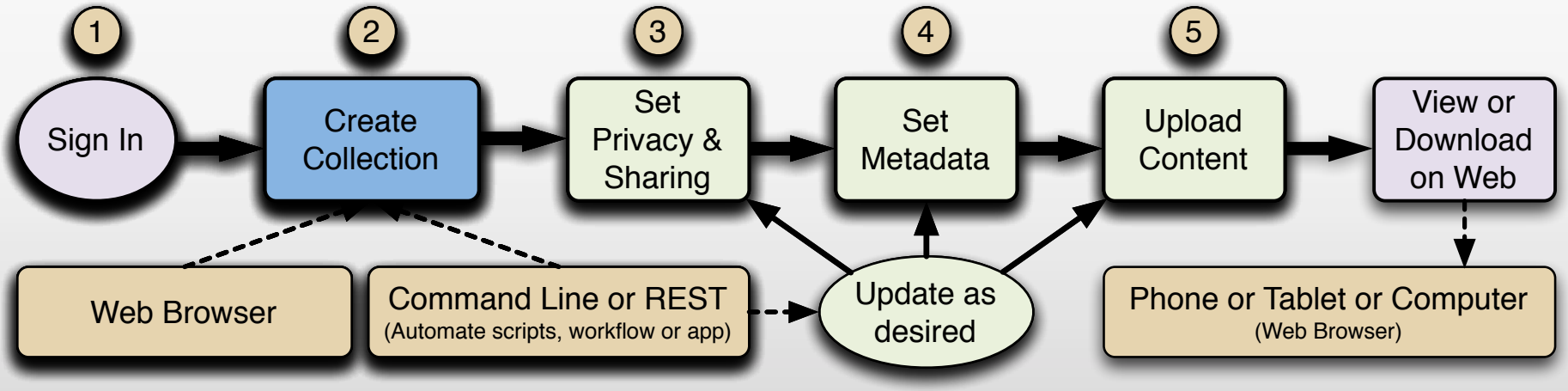
06/1/16 - 17:56:11
DSC_4073.JPG
06/1/16 - 17:56:11
DSC_4074.JPG
06/1/16 - 17:56:11
DSC_4075.JPG
06/1/16 - 17:56:11
DSC_4076.JPG
06/1/16 - 17:56:11
1
2
3
next ›
last »
Encode to video

SeedMe.org

SeedMe: How it Works



SAMPLE COMMAND LINE INTERACTION

Create a new collection

```
./seedme.py  -title "SeedMe Quick Start"
```

Add image seq. + create video from it

```
./seedme.py  -update 29643                        # Update
             -sp "sample/sequences/steam"         # Seq dir path
             -st "My cool vis"                    # Seq title
             -sr "5"                              # Seq frame rate
             -se                                  # Seq encode
```

Setup sharing

```
./seedme.py  -update 29643 \
             -privacy group \
             -email one@example.com \
             -email two@example.com
```

SeedMe Team

Amit Chourasia, Mona Wong, David Nadeau,

Andrew Ferbert, Michael Norman

Acknowledgements

All early users for their valuable feedback

Kristen Levy, Mahidhar Tatineni, Michael Dwyer, Tom Hutton, Doug Weimer, SDSC; Robert Morgan, Barefeats.com

Daniel Crawl, Andrea Zonca, Sebastian Amara, Brad Whitlock and Cyrus Harrison

Apple Inc. provided test hardware/software on loan during conceptualization phase

National Science Foundation

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"Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation."