Cloud Computing 101 – Innovations in Floodplain modeling and mapping
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Presenter
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19 years of H&H experience in modeling, project management mainly supporting Federal/State projects
Leads and focuses on Atkins Innovation team
Worked in TX, LA, OK, AR, NM in FEMA R6 and 20 other states

What is Cloud Computing?
Microsoft Azure Workflow

Types of Cloud Computing and Cost

- Infrastructure as a Service (IaaS)
- Platform as a Service (PaaS)
- Software as a Service (SaaS)

Cost Calculator

1. Important – Cost varies based on Windows or Linux based application

Benefits of Cloud Computing

Disclaimer: I’m not a salesperson for any cloud computing services!

- Cost
- Global Scale
- Performance
- Security
- Speed
- Productivity
- Reliability
Is Cloud Computing for everyone?

- Are We Going to Save Money?
  - It depends
- What Application or Environments Should We Start With?
  - Not all applications are compatible
- How Do We Keep Track of Our Resources?
  - Public cloud is dynamic
- How Do We Secure the Environment?
  - Shared responsibility

When to use Cloud Computing for Flood Studies?

- When time is critical, and you have lots of simulations to undertake
- You don’t have enough software licenses and/or hardware resources
- To undertake more detailed analysis
- Run many more simulations to help with model calibration, understand climate change impacts or improve designs
- Process or tasks that you must repeat - to avoid manual repetition

Important - You can use typical H&H softwares - USACE’s HEC-RAS software, BMFT’s TUFLOW, and US EPA’s SWMM

Typical Atkins Workflow

Identify Output Format  
Models and Flood-affected Identifiers (Streams)  
Backwater processing needed  
QAQC Checks required

Combine all Vector data  
Run QAQC Checks  
RAS Processing batch processing  
Multiple RAS model to supported event  
Zipped deliverables
Case Study – Neches River Basin BLE - 13,000 miles

National Pluvial Analysis – Google Cloud

Everywhere in USA (+ territories) where high-resolution DTMs available

As of 2020:
- Over 80% of USA population covered
- Approximately 1.7 million square miles

Four rain events
- 2-year
- 10-year
- 100-year
- 1000-year

Resulting 3-meter depth rasters composed of about 8 terabytes, compressed

National Probabilistic Modeling for Risk Rating 2.0 – AWS and Azure
Future Explorations

1D / 2D model integration and 2D Floodway
  - Automated 2D floodway creation and surcharge reporting
  - Investigate new outputs from evaluation such as energy
    map/changes to velocities, etc.

Archiving tool from RAS
  - Archive and compress data so it can be put back
    together

Robust QAQC Checks

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Key Takeaways

- Take advantage of well-established cloud computing providers –
  public or onsite
- Provider selection - Google, Microsoft Azure or Amazon AWS –
  Evaluate advantages / disadvantages
- You can use typical H&H softwares - USACE’s HEC-RAS
  software and others

Finally, identify a champion in your organization

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Questions

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