GRID Based Rainfall-Runoff model on Flexible Cloud platforms

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(a) Purpose of study or research hypothesis
We can build a rainfall-runoff web system with recent Open ICT platforms, like Open Source GeoSpatial software, open data and public Cloud. We can change or adjust the computing power for the GRID-based rainfall-runoff model

(b) Key issue(s) or problem(s) addressed
- Which ICT platforms, can we use together?
- Can we change the computing power for the GRID-Based rainfall-runoff model
- Which part of computing we can change, the number of processor cores, the amount of RAM, the type of storage, etc.
- Is the changing process easy and affordable?
- Is the benefit(ROI) of change clear?

(c) Methodology or approach used
- Experiment on a public Cloud platform
- Testbed: Nakdong River Basin(about 24000sqm area)
- We applied the same test case to each comparison

(d) Results or conclusions derived from the project
We tested the performance by changing the computing machine size between 2 cores ~ 72 cores and more.
We stored the Input(criteria for water levels and dam flow, etc.) and output data(rainfall-runoff result) in RDBMS.
Data tables relate each other and build the structure of the ERD
Geometry data (basin zone or administration zone) was treated in OGC polygon and stored in spatial DBMS
Some big data were treated in the Cloud DBMS.
This is because longtime query processing used an extensive spatial index and spatial join.
We did not use the constant configuration of DBMS specifications.
We adapted the size of the DBMS(2~80 cores)
Flood alarm data was aggregated by the administrative zone and displayed on the webpage.
Regarding the spatial data Web service, we used the OGC(The Open Geospatial Consortium) WMS(Web Map Service) and the WFS(Web Feature Service).
So we mainly used two formats(OGC KML and ISO GML) for transport information over the internet.
We used the OpenStreetMap for overlay as our website base map.

(e) Implications of the project relevant to congress themes
In the aspect of information sharing, we used HTML5 standard technology. This means that we do not request the additional installation on the client web browser. We only need a standard web browser like Google Chrome. This kind of server-based computing(SBC) also will be useful for developing countries

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