

ASGC Resource & Collaboration

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ASGC Introduction

- ASGC joined WLCG development and deployment for the Large Hadron Collider grand challenges since 2001
 - ASGC T1 and WLCG Asian Regional Operation Centre has been operational from 2005
 - Migrating to T2s for ATLAS and CMS (effective from Oct. 2023)
- ASGC has been supporting multi-disciplinary e-Science applications of Academia Sinica from 2006, based on WLCG core technologies
 - The research infrastructure, platform and services are improved progressively along with growing scientific applications of various disciplines
- System efficiency optimization (including power, thermal, system and applications, etc.) is also a strategic goal of ASGC aided by machine learning technologies
- ASGC becomes the Core Facility for big data and scientific computing of AS from 2023 (大數據與科 學計算核心設施)





Scientific Collaborations and Resource Status

- Supporting e-Science and big data analysis based on WLCG core technologies in Taiwan and Asia
- Research collaborations since 2006: Workflow customization and Efficiency optimization
 - Domains: particle physics (ATLAS, CMS, AMS, KAGRA/LIGO, TEXONO, ICECUBE), physics, Bio-imaging (CryoEM), bioinformatics, next-generation sequencing, earth science, environmental changes, biodiversity and ecology, astronomy & astro-physics, molecular dynamics, remote sensing, information science, humanities and social sciences, etc.
 - 50 research groups, 150+ users
 - Flexible collaboration model
- Asia regional collaborations on e-Science, especially for hazard risk analysis have been conducted as part of a series of EUfunded/EGI-lead project from 2008
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- Resource Usage
 - Availability: 99%
 - Growth of CPU utilization (2012 2021): 15%
 - Growth of GPU utilization (2017 2021): 320%
 CAGR
- Data centre operation in 24x7 since 2001
 - 2MW, 400 tons AHUs, 112 racks in 800 m²
 - 10,976 CPU Cores, 204 GPU (36x A100), 30PB disk storage (Oct. 2022)



SRU is normalized computing resource unit based on CPU or GPU performance in Linpack.

Flexible Collaboration Model

 Primary Goal - Building supporting infrastructure to facilitate the ecosystem of BDA and SC, together with user communities

Collaboration Model	ASGC Services	Advanced Services	Instances of Institute	Cost Sharing model
Collaboration - Priority Resource (HW and HR) Investment & Sharing	 System Operation Application Integration Computing & Data ASGC Infrastructure 	 Ceph & data pipeline optimization Performance & Efficiency Tuning; 	ASCEM, IOP, WLCG, AMS, KAGRA, IBC, IES, Biodiversity	Resource Usage Fee with discount
Resource Usage	 Computing & Data Application Integration 	3. Portal/Web UI Development	Statistics	Pay as you go
Collocation - Dedicated HW (without Sharing)	ASGC Infrastructure - Electricity, Rack Space, Network	Energy saving	IAA, IOC	Electricity (HW + AHU) + Operation (DC Infrastructure & HR)
Service Hosing	Providing research services developed by user communities/ Institutes/Research Groups		Depositar (Prof. TR Chuang, IIS) would be the 1st case	
Remark		 Extra HR cost/ investment is needed In general, extra cost of services development has to be paid by man-hr (160 man-hr = NTD\$100K) on monthly basis 	Some user communities also invest HRs for long- term advanced services	

Science Cloud by Federating Cloud and HPC Resources

• Type of resource

- Core resource: used for providing services
- Shared resource: shared by all users
- Priority resource: invested by user communities. Will be shared to other users whenever facility is free



Supporting Big Data & Al in Innovations



Collaboration With CryoEM Community

ASGC provides

- Development of web applications, portals and JupyterLab interfaces according to research workflows
- Software package as container services
- Data flow and application performance optimization
- Reduced latency between CryoEM facility and big data analysis facility
- CryoEM user community uses 43% computing resources (GPU > 90%) and 1PB storage
- ML-enabled functions: particle picking; ab initio 3D classification; unexpected structure discovery with minimum bias; structure determination
- Tools and database from AlphaFold2 and RosettaFold are also supported



45 Web Applications Provided



Pricing Model of ASGC Resource

- Current pricing mode was defined in early 2022.
- Will be revised later according to the funding support level of ASGC from AS, advised by the Advisory Committee by end 2022

研究服務	計費模式(院內使用者)	國內其他單位使用者	非本院之國外使用者		ASGC
計算服務	以各系統效能正規化後之 SRU,為計費單位	加計 20%	加計 50%	Unit Price (TWD\$)	Unit Cost NTD\$ per CPUCore-Day or GPUBoard-Day
				GPU-1080	2
儲存與擷 取服務	1,000NTD/TB-Year	加計 20%	加計 50%	GPU-3090	158
				GPU-P100	94
				GPU-V100	140
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貞科得期 		日刖木袇八計貿	Storage (TB/yr)	1,000	

Welcome To ISGC 2023 & HEPiX Spring 2023 in Taipei

ISGC 2023

Accelerating Time-To-Science Through Computing



- 20th anniversary of ISGC
- International Symposium on Grids and Clouds (ISGC) 2023
 - 19~24 March 2023, Academia Sinica, Taipei, Taiwan
- Call for Abstract
 - On-line Submission: https://indico4.twgrid.org/event/25/abstracts/
- HEPiX Spring 2023 (27-31 March 2023) will be hosted by ASGC in Academia Sinica, Taipei, Taiwan



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