平成 30 年度共同利用研究・研究成果報告書

研究課題名	和文:CTA 北サイト・ラパルマでのオンサイトデータ解析システムの開発				
	英文 : Set-up and Commissioning of the onsite data center for CTA North				
in La Palma, Spain					
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研究成果概要

The next generation observatory for very high energy γ rays will be the Cherenkov Telescope Array covering energies from 20 GeV to 300 TeV with unprecedented sensitivity. This new observatory is now in the pre-production phase. It will be built on two sites: one array will be constructed in the Northern hemisphere (La Palma, Canary Islands, Spain), the other one in the Southern hemisphere (Paranal, Chile). Four Large Size Telescopes (LSTs) of 23 m diameter and 28 m focal length will be arranged at the center of both arrays to lower the energy threshold and to improve the sensitivity of CTA below 200 GeV. The first LST was inaugurated on La Palma in October 2018. The data center onsite of CTA North is being setup by Fujitsu through a contract with the University of Tokyo. The system consists of 2000 cores with 3PB

disk space. A sketch of the IT system is shown on the right. I am responsible for this data center, i.e. the correct set-up, the coordination and management of

. A	Camera Servers Dell R730 x4	Camera Servers Dell R730 x5 2x5	ne Trigger	End Users			
ne IT	Pulsau Internal Network (10GbE) CISCO Nexus 9508 x1						
hown	Computing Servers	2x7 Telescope Control Servers		1x2 Forticate 1500D1 1x2 Ziriks from WAN 2 links from WAN - 100G SFPP L long range			
I am	FUJITSU Server	FUJITSU Server PRIMERGY CX2550 M2 x7	Control Servers (Disk Admin. Server & Service Servers)	Login Servers			
1 am	PRIMERGY CX2550 M2 x57 Total Theoretical Perf: 61TFLOPS	Total Theoretical Perf: 7.53TFLOPS	FUIITSU Server	FUJITSU Server			
for	(2.1GHz/32C/node) Total Cores: 1824 cores Total Memory: 14TB(256GB/node)	(2.1GHz/32C/node) Total Cores: 224cores Total Memory: 1.7TB(256GB/node)	PRIMERGY RX2530 M2 x2	PRIMERGY RX2530 M2 x2			
	D1x57 D 1x57		2x2 Q1x2	1x2 1x2			
enter,		Management Network (1G Ethernet) Brocade ICX 7450-48 x2					
			1x2				
orrect	Control Network (1G Ethernet) Brocade ICX 7450-48 x3						
_	1x4(PG) 1x2(PG) 1x2(PG) 1x2(PG) 2x5(ET) 1x2(PG) 1x2(PG) 1x2(PG)						
the	Large-Capacity Disk Servers	Job Managemen		(IB spine switch SB7800 x2 cooling x3 x1			
and	ETERNUS DX200 S4 / FEFS Total Usable Storage: 3PiB (RAID6-F MDS x2	R) FUJITSU Server PRIMERGY RX2350 M ETERNUS DX100 S4 x		Schneider Other device x5			
of	MDT x1 OS5 x2 OST x4 3PiB 1 File System			10GbE(10GBASE-T) 1GbE(Management LAN) 10GbE(10GBASE-SR) 10bE(Control LAN)			

the users and the commissioning of the IT center. During the last year we set up the IT center successfully. In particular the following points were achieved:

- I spent 2 months on La Palma to setup the IT Center to the telescope sub-systems. The network had to be prepared accordingly and interfaces had to be established.

- The Lightweight Directory Access Protocol (LDAP) was installed to guaranty an easy and safe login. A two-step login procedure is implemented in order to avoid unwanted access from the outside world.

- The computing servers are set-up and already used for Monte Carlo simulations and studies that are crucial for precise simulations of the CTA array. I organized the file structure for different sub-working groups and a corresponding quota system.

- The telescope control servers are used for the different sub-systems of the telescope (figure below). I am managing the different accounts. Currently I am working on an automatic back-up and restore system for the machines in case of hardware failures. - The setup of analysis chains for the fast real time analysis and the precise offline analysis of the data is ongoing. Internal tests were already successful. As a next step the connection to the outside world has to be established in order to receive and send alerts of flaring sources like Gamma-Ray Bursts or Gravitational Waves.

- In collaboration with FUJITSU we established a procedure of safely shutdown the IT container in case of a power cut. This procedure successfully worked already once when an unplanned power cut occurred.

- Purchase of a back-up server with the capacity of 100TB and extendable in future to store sensitive data in the sea level "office" CALP on La Palma. Next step in FY2019



is to install the server as well as to setup and the test back-up system in collaboration with the users wish who to their have software being backed-up and restored automatically.

整理番号