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CHPC

# **HPC Ecosystems Project**

Embracing Online Education for HPC System Administrator Training

SIGHPC Education Global Seminar Series March 2023

> Bryan Johnston Senior Technologist ACE Lab CHPC, South Africa

## bjohnston@ace-lab:[~]\$ whoami



### **HPC Recipient**

Principal Technician, UKZN
 Research & Advanced Computing
 May 2013 - May 2016



- 192 core Sun HPC (Ranger chassis)
  - SysAdmin Training
  - Student Cluster Competition
  - TACC & SC'15



## **HPC Project Lead**

- Senior HPC Technologist, CHPC
  - Project Lead: HPC Ecosystems
  - ACE Lab
  - June 2016 present
- MS Computer Science (Computing Systems)
   Georgia Tech, USA
   OMSCS Programme





## South Africa - most descriptive country name!



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ISC 2021



## **CENTRE FOR HIGH PERFORMANCE COMPUTING**



## NATIONAL SUPERCOMPUTING FACILITY

- 1PF system
- (just recently) formerly Top500
- Largest HPC System in Africa (YMMV)









Cambridge





CYBERINFRASTRUCTURE SYST



HPC Ecosystems Project Overview

## HPC Ecosystems Team @ CHPC (18+1)



## Advanced Computer Engineering (ACE) Lab

- David Macleod (Principal Engineer)
- Eugene de Beste (Senior Technologist)
- Lara Timm (Engineer)
- O Mmabatho Hashatsi (Engineer)
- O Nyameko Lisa (Senior K/A)
- Sean February (Senior Technologist)

acelab@chpc.ac.za

### **CHPC Technical Team**

- O Themba Hlatshwayo
- Zama Mtshali
- Zintle Sanda

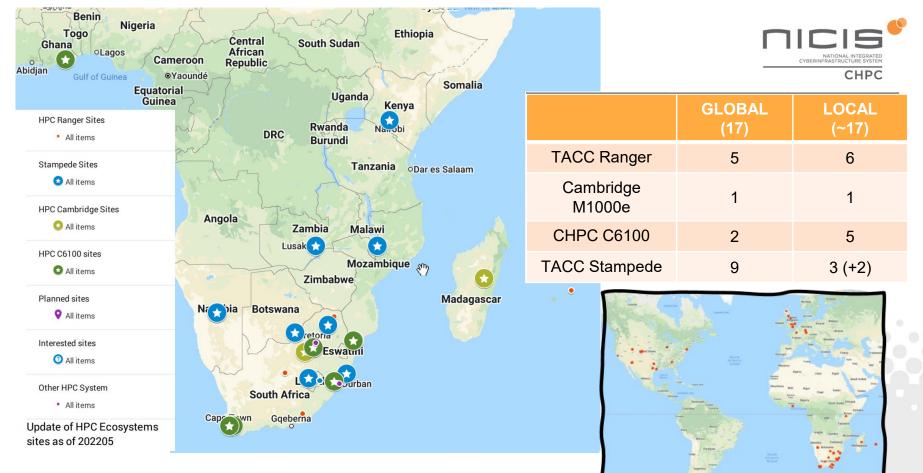
## **Research / Academic**

### Support

- O Dr. Charles Crosby
- O Mr. Inus Scheepers
- O Dr. Mthetho Sovara
- O Mr. Samuel Mathekga
- Dr. Werner Janse van Rensburg

## **CHPC Operations Support**

- O Funeka Mafani
- Lesley Fredericks
- Nox Moyake
- O Dr. Ricardo Harry



#### HPC Ecosystems Project Overview





# How it happens

HPC Ecosystems Project Overview

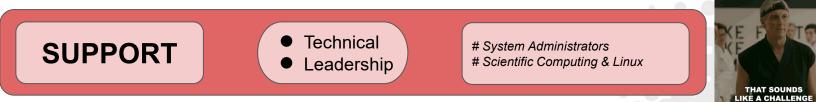
# **HPC Ecosystems Project - READINESS**



To implement a **successful deployment** of HPC Ecosystems Resource/s, a site requires:

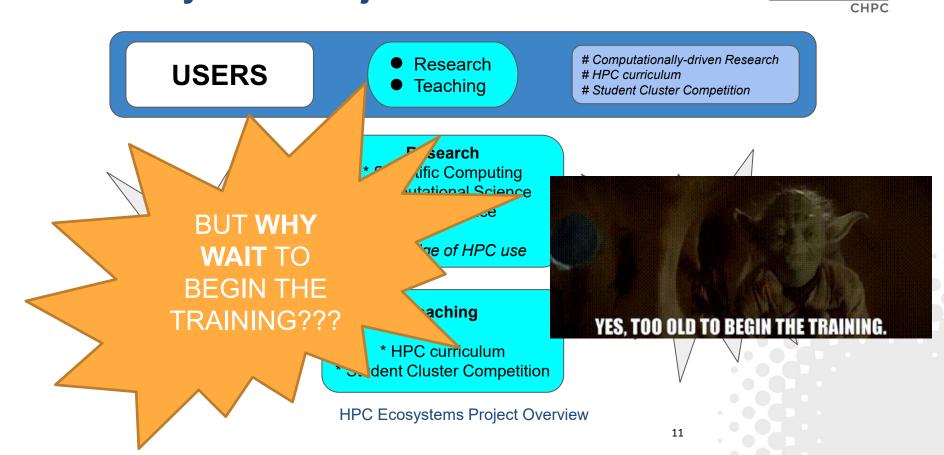






## **HPC Ecosystems Project – WHY WAIT?**





## The Traditional HPC Ecosystems Model













# **On-site Training (pre-COVID19)**





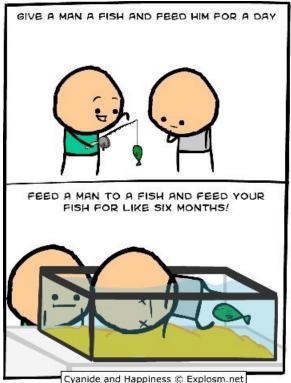


HPC Ecosystems Project Overview

larch 2019

## **REPEAT train.site() UNTIL 1==2**







Give a man a fish and you feed him for a day. Don't teach a man to fish and you feed yourself. He's a grown man, fishing's not that hard.

Nick Offerman

AZQUOTES

# ONLINE TRAINING

Moved Training Online in 2020 (influenced by ...) **Georgia Tech** 



# HPC Ecosystems Project (for SysAdmins)

- OpenHPC Virtual Labs
- HPC SysAdminWorkshops

**HPC Ecosystems** 

## **TAKING EDUCATION & TRAINING ONLINE**



#### LOWER OVERHEAD

- **Cost**: not funding participants
- Logistics: not hosting a F2F
   workshop
- Workload: long-term, can re-run online course relatively easily.

### SCALABILITY

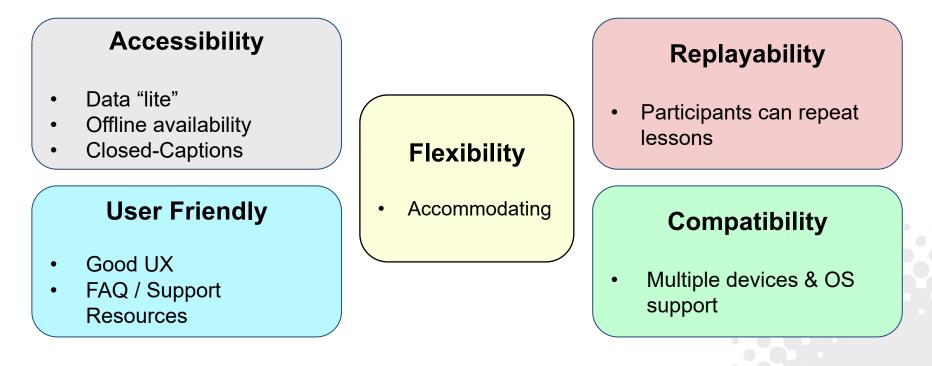
- Size: can accommodate larger
   groups
- Frequency: can run programs in parallel / quick succession / ondemand etc.
- Repeatable!

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# **PRINCIPLES LEARNED FROM OMSCS**





## **ONLINE EDUCATION STRATEGIES**



### Drop-out / Disengagement

- Regular Office Hours
- Encourage Collaboration
- Incentivise Participation

## Confusion / Overwhelming

- Community chat
- Advice & Tips for online learning

### Life Happens

- Be understanding!
- Make it manageable!
- BE HUMAN!!

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# Implementation

HPC Ecosystems Project Overview

### HPC Ecosystems Project Overview

## Videos

### Accessible

Downloadable 

- Zero-rated
- Captions

### Replayable

Compatible

**User Friendly** 

### Flexible

On Demand 

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Show more	24 videos • 164 views • Last updated on Apr 27, 2020	4:15
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## **Virtual Labs**



### Accessible

### • Off-line

- Opensource (GitLab)
- Low Resource Requirement

### Replayable

### Compatible

VirtualBox

### **User Friendly**

• YMMV :-)

### Flexible

- On Demand
- Transferable to Production

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## **Formal Workshops**



### Accessible

### • FREE

#### Replayable

• Quarterly :)

### Compatible

Web-clients

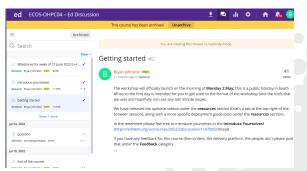
### **User Friendly**

• YMMV :-)

### Flexible

- LMS and Slack
- 1-2 weeks for 15 hours of work

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# FEEDBACK: YOU ARE NOT YOUR USER!

HPC Ecosystems Project Overview

## **HPC Ecosystems Project – DO IT!**

OpenHPC 101 (hpc-ecosystems.gitlab.io)

YouTube: 'hpc ecosystems 101 openhpc'

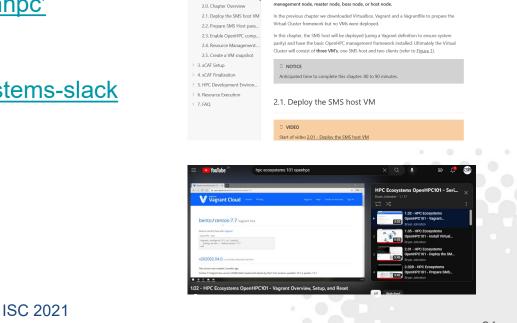
HPC Ecosystems Slack: <a href="https://tinyurl.com/sighpc-join-ecosystems-slack">https://tinyurl.com/sighpc-join-ecosystems-slack</a>

HPC Ecosystems Google Group: http://tinyurl.com/SADC-HPC-Apply

NICIS CHPC Events: events.chpc.ac.za

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2. SMS Host Setup

This section will guide you through the setup of your System Management Server (SMS) host

the node that is responsible for managing the Virtual Cluster. This is often also called the

2.0. Chapter Overview

Home
 Quick Links

> 0. Introduction
 > 1. Getting Ready

2. SMS Host Setup



## HPC Ecosystems Project -Acknowledgements



HPC Ecosystems Project Team

- HPC Ecosystems Project Community Partners
- Texas Advanced Computing Center (TACC)
- University of Cambridge
- STEM-Trek
- EPCC & PRACE
- OpenHPC





# THANK YOU! (and stay safe)



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