



Tender

AI CLUSTER EQUIPMENT

Version	Author	Description
25-09-2023	Dirk Van Merode	Draft
25-10-2023	Jan Guldentops	RFP technical infrastructure within technical and budgetary limits
25-10-2023	Engineer Bainomugisha Godfrey Luwemba Jan Guldentops Dirk Van Merode	Final editing of the tender, before publication
29-10-2023	Dirk Van Merode	Added technical meetings dates

Tender for the AI Cluster for the courses *Data Science, AI and Machine Learning*

INTRODUCTION

Project introduction from the AHUMAIN website <https://ahumain.africa/>.

Problem Statement

The technological revolution is proceeding fast, every day we see new interesting applications. The communication between humans, machines and their constant communication through the Internet is becoming increasingly interconnected. Two major tendencies which are changing the world around us are Internet of Things (IoT) and Artificial Intelligence (AI). While IoT produces sensor data, AI will help interpret this data, in a comprehensible way and to make semi-automated decisions for controlling certain physical processes. If we look at the world's investment and strategic plans on AI, governments are putting a lot of effort in the development of AI systems, to find relevant applications and to get their knowledge up to an excellent level, not to be left behind.

The increased competitiveness of countries worldwide is becoming apparent for those who do invest in creating linkages between government, business, and academia in this field. This is equally important for Africa. There are a number of initiatives in African countries, but the real challenge is to get the African biggest companies adopting AI for their business processes. This calls for the development of an AI ecosystem that will lower their development costs, help create AI applications tailored to local needs, and reduce their dependence on foreign companies. In addition, the African AI ecosystem could position itself as an attractive partner for global digital giants keen to enter the African market.

Goal of the project

The aim of the AHUMAIN project is to connect diverse specializations together in one consistent curriculum, tailored to the East-African situation and societal problems, to come to a hybrid engineer who has in-depth knowledge in all different aspects and can connect these parts together to a useful and commercially viable system. At the same time, we focus on real-life applications of AI, operational deployment, and business cases, to break away from the theory and give way to practical applications.

Methodology

To ensure a good-skills matching, the project includes research on both labor market demands, and competences included in current curricula. To that end, work package 1 includes the development, distribution and analysis of surveys for stakeholders (teachers / students / local labor market).

During the visits to all partners, several meetings with local stakeholders were conducted. In the course of the project, impact measurements of all training and teaching activities are performed.

Output

The results will be disseminated and exploited with train-the-trainer sessions, Master Classes and with training of a pilot group of internal and external stakeholders. Good practices and results will be made public through e-resources, radio and local media. The Entrepreneurship and

Innovation Bureau favors cooperation with local business, for trainings, employing students or as client for end-products. All is done according to a well-defined quality assurance scheme.

Impact

The impact on the short term is increased technological and pedagogic knowledge, increased operational capacity, increase in IT students, and a better cooperation with local labor market. On the long term, the project aims at an increase in international employability, in added value produced locally, sustained life-long-learning and long-term high-quality knowledge gain in Data Science and AI.

The project in short

First: Research the local situation: skills needed at the labor market – skills taught at the universities – local capacity in HR, IT and infrastructure

Second: Develop academic courses in applied Data Science and AI

Third: Provide a centralized AI cluster, provide local computing power, provide equipment for specific applications and local use cases

Fourth: Training in the EU and Africa

All supported by digital tools for project management, course development & quality assurance

Key ideas are openness, collaboration, synergy and respect

Dirk Van Merode – Project coordinator

CONTACT DETAILS

I. PROJECT TEAM

Coordinating organization	AP University of Applied Sciences and Arts - Antwerp Department Media, Design & IT Campus Spoor Noord, Ellermanstraat 33 BE-2060 Antwerp, Belgium T +32 3 220 55 63 www.ap.be
Project Coordinator	Dirk Van Merode, dirk.vanmerode@ap.be
Responsible for AI Cluster	Jan Guldentops, jan.guldentops@ap.be

II. DELIVERY ADDRESSES – BENEFICIARIES – LIST OF RECEIVING INSTITUTES

Beneficiary	Makerere University - Department of Computer Science
Address	7062 University Rd, Kampala, Uganda
Contact person	Dr. Joyce Nabende joyce.nabende@mak.ac.ug Dr. Engineer Bainomugisha baino@mak.ac.ug
Hosting entity	Research and Education Network for Uganda (RENU)
Address	House No. 31 - The Edge, Makerere University, 7062 University Rd, Kampala, Uganda
Contact person	Daniel Kawuma dkawuma@renu.ac.ug

TENDER

GENERAL SPECIFICATIONS

I. GENERAL INFORMATION

- Article I.** Tenderers should direct their offer to leading organization, as described above.
- Article II.** The tender period **starts on October 27, 2023 and closes November 30th, 2023**. Offers received after this date are not considered.
- Article III.** Only e-mailed versions are considered.
- Article IV.** All tenderers should provide their full legal status in their offer.
- Article V.** All contracts will be awarded on a 80% prepayment and 20% downpayment after delivery basis.
- Article VI.** All parties who can supply the specified equipment, is allowed to participate to the tender without any prejudice.
- Article VII.** The tender is intended to purchase **AI Cluster Equipment** to be used in the courses on *Data Science, AI and Machine Learning*
- Article VIII.** The selection committee consists of the team responsible for implementing the courses of *Data Science, AI and Machine Learning*, including the project coordinator.
- Article IX.** The estimated amount of the AI Cluster equipment is €35.000. For shipping and import we estimate €10.000. The final amount is subject to variations, depending on external factors. No purchase obligation can be derived from this document.

II. PACKAGING, TRANSPORT AND DELIVERY SPECIFICATIONS

- Article I.** The equipment must be constructed and/or packed in a way that it can withstand transport by airplane and car/truck within Europe and East-Africa.
- Article II.** Defects on delivery will be communicated within two weeks after delivery by the receiving institution. The supplier is responsible for describing a workable solution for this case in his offer.
- Article III.** Delivery must be done to the premises of the beneficiary Higher Educational Institute. The supplier should specify a transport & delivery plan and specify the related costs for transport & delivery, including all import taxes.
- Article IV.** The delivery of the equipment should be done before January 31st, 2024.

III. SUPPORT & SERVICES

Article I. The supplier of the AI Cluster Equipment must be able to deliver support to the partners in East-Africa in case of malfunction and/or defect(s) of the technical equipment.

Article II. Suppliers with a local agent at the countries involved will take preference above others. If a local agent is available, the supplier should provide contact data of this agent. If no local agent is available, the supplier should elaborate on how services & support will be provided.

Article III. The supplier should elaborate on after-sales services and additional services with the related costs in their offer.

IV. SELECTION & EXCLUSION CRITERIA – AWARDING CRITERIA

The following cases will lead to exclusion:

Article I. Offers received after the tender period.

Article II. Suppliers unable to meet the delivery deadline of January 31st, 2024. This is a contractual obligation put in the offer.

Article III. Offers without a delivery plan – suppliers who cannot deliver to Uganda.

Article IV. Offers without a detailed description of the equipment - suppliers unable to deliver equipment of the specified quality.

Article V. Offers without a detailed pricing, broken down into the technical equipment and delivery costs.

The following offers will be considered:

Article VI. Offers with a detailed technical description of the equipment.

Article VII. Offers with a detailed delivery plan both in timing (before January 31st 2024 and in operational implementation (transport, import, administration)).

Article VIII. Offers with detailed after-sales services and additional support .

Article IX. Offers with a detailed price list broken down into the technical equipment and delivery costs, including import taxes.

Awarding criteria:

A selection committee consisting of the team responsible for implementing the courses of *Data Science*, *AI and Machine Learning*, including the project coordinator will assess the criteria.

Article X. The proposed equipment should be of high quality, professional-grade. (30%)

Article XI. The delivery plan should be feasible (30%)

Article XII. The quality of support & services, including services for transport & delivery to the premisses of the beneficiary. (20%)

Article XIII. Best value for money. (20%)

TECHNICAL SPECIFICATIONS

V. HARDWARE SPECIFICATIONS

Article I. The tender is intended to purchase a **physical server node** to be used in hosting the platform that will be used for the courses of *Data Science, AI and Machine Learning*.

Article II. The server to be acquired MUST meet or exceed the specified hardware specifications in *Articles VI, VII, VIII and IX*

Article III. Suppliers are allowed to send in offers for the full bit, or to send in an individual offer for *Articles VI, VII, VIII and IX*

Article IV. Use case of this infrastructure

The goal of buying this hardware is to provide the different participating universities with all the necessary compute-infrastructure to enable them to run AI and cloud projects.

This means :

- **AI deep learning and machine learning hardware** based on NVIDIA GPU's in combination with high performance server infrastructure.
- **Private cloud infrastructure** to host the necessary virtual machines and docker environment to enable to run the essential infrastructure in a container and/or virtual machines.
- **Storage infrastructure** in the form of a ZFS based NAS/SAN to provide high available, performant storage for the AI and private cloud projects.
- **Backup / Business continuity hardware** so we can guarantee the availability of all the research and production data by Copy-on-write snapshots and replication to a secondary site.

Article V. Environment this hardware will operate in

This infrastructure will be hosted in the datacenters of RENU (Research and Education Network for Uganda). RENU will provide network-connectivity, rackspace, power and handson maintenance.

Therefor all the hardware should support or integrate with :

- Rack-based (all rack rails should be included)
- gigabit UTP based ethernet
- 10Gbit multimode SPF+ connectivity
- Network based Integrated Lights out boards (ILO, IDRAC, IPMI, etc.)
- C13 to C14 power cables
- As much redundancy as possible (power supply, network interface cards, etc.)

Article VI. AI infrastructure

The concept is to order a server with enough memory, onboard storage and 4 x GPU's within our budget.

- 1 x Rack-based server with all rails and other components to be built into a standard server rack ;
- All hardware has full support for the latest Linux distributions, FreeBSD and Microsoft Windows operating systems ;
- Minimum 2 x x86 64bit CPU with at least 8 cores/16 threads per CPU;
- 256GB memory ;
- Room for up to 4 double width NVIDIA PCIe based GPU's ;
- Redundant 2TB netto redundant (RAID-1) SSD storage ;
- 2 x 10Gbit SFP+ interfaces ;
- 2 x 1Gbit baseT ;
- Remote control access card (ILO, IDRAC, IPMI, etc.) ;
- Redundant Power Supply ;
- Proven sufficient cooling to have all this hardware run at optimal performance ;
- 3 year replacement contract
- List of available GPU's with :
 - o Price
 - o Delivery time (< 1 month from order)
 - o Performance (cuda cores, tensor flow cores, memory, etc.)

Article VII. Private cloud infrastructure

- 4 x Rack-based server with all rails and other components to be built into a standard server rack ;
- All hardware has full support for the latest VM Vsphere version, Linux distributions, FreeBSD and Microsoft Windows operating systems ;
- 2 x 256GB SSD in RAID-1
- 2 x 10Gbit SFP+ interfaces ;
- Remote control access card (ILO, IDRAC, IPMI, etc.) ;
- At least 2X 10core, 20threads 64bit processor (Xeon / AMD)
- 256GB memory
- 3 year replacement contract
- Hardware can be refurbished, media (SSD, disk) should be new
- Spare material : one piece of memory, SSD, disk, power supply
- An optional extra price for :
 - o More performant CPU's
 - o Double the memory

Article VIII. Storage infrastructure

- 1 x Rack-based server with all rails and other components to be built into a standard server rack ;
- All hardware has full support for the latest Linux distributions, FreeBSD and Microsoft Windows operating systems ;
- Minimum 1 x x86 64bit CPU with at least 12 cores/24 threads;
- 64GB memory ;
- JBOD storage controller
- Room for at least 24 x SSD's
- 2 x 256GB SSD (OS)
- 20 x 1TB SSD (DATA)
- 2 x 10Gbit SFP+ interfaces ;
- 2 x 1Gbit baseT ;
- Remote control access card (ILO, iDRAC, IPMI, etc.) ;
- Redundant Power Supply ;
- 3 year replacement contract
- Hardware can be refurbished, media (SSD, disk) should be new
- Spare material : one piece of memory, SSD, disk, power supply
- An optional extra price for :
 - o Bigger SSD drives

Article IX. Backup / Business continuity hardware

- 1 x Rack-based server with all rails and other components to be built into a standard server rack ;
- All hardware has full support for the latest Linux distributions, FreeBSD and Microsoft Windows operating systems ;
- Minimum 1 x x86 64bit CPU with at least 12 cores/24 threads;
- Room for at least 12 x 3,5inch disk
- 2 x 250GB SSD (OS)
- 8 x 10TB SAS/SATA disk (DATA)
- 64GB memory ;
- JBOD storage controller
- 2 x 10Gbit SFP+ interfaces ;
- 2 x 1Gbit baseT ;
- Remote control access card (ILO, iDRAC, IPMI, etc.) ;
- Redundant Power Supply ;
- 3 year replacement contract
- Hardware can be refurbished, media (SSD, disk) should be new
- Spare material : one piece of memory, SSD, disk, power supply
- An optional extra price for :
 - o Bigger SATA drives

VI. ADDITIONAL TECHNICAL SPECIFICATIONS

Article I. The tender is intended to purchase a physical server node to be used in hosting the platform that will be used for the courses of Data Science, AI and Machine Learning.

Article II. The server should meet or exceed the specified hardware specifications.

Article III. The server should have at least 2 heavy-duty PDU/PSU power cords (c13 to c14). See Figure 1.



Figure 1: PDU/PSU c13 to c14 power cord

Article IV. The server should be compatible with deep learning frameworks and software.

Article V. The NVIDIA GPUs should support CUDA and cuDNN and other libraries like TensorFlow, PyTorch, Caffe or MXNET for optimal deep learning performance.

Article VI. The server should have a GPU Factory Installed cable kit. This ensures the connection of the GPU to the power supply and other components in a computer system without the need for separate purchases or additional cables.

VII. SERVICES DESCRIPTION

Article I. All hardware needs to have at least a 24-hour burn-in test;

Article II. Delivery at AP for basic software installation or software installation on the supplier's site before shipment

Article III. Shipment of all hardware to Uganda

VIII. TECHNICAL MEETINGS

Two meetings are planned for possible suppliers to get input on technical details of the equipment.

Friday 10th of November – 9h00

[Link to meeting 1](#)

Meeting-id: 364 159 211 526

Password code: Lp8i4U

Friday 24th of November – 9h00

[Link to meeting 2](#)

Meeting-id: 319 946 190 469

Password code: ZRXfWL