Cirrus Cloud Server High-Performance Computing & Informatics Center

Presented by Cloud Computing Solutions Group, Inc.

Overview

Revision 3.0

In Healthcare,
“Time is Life”

The Current Problem

- The novel coronavirus presents an unprecedented challenge for scientists and researchers.

- The speed at which the virus spreads means we must use all the cutting -edge science and technology we must fight this.

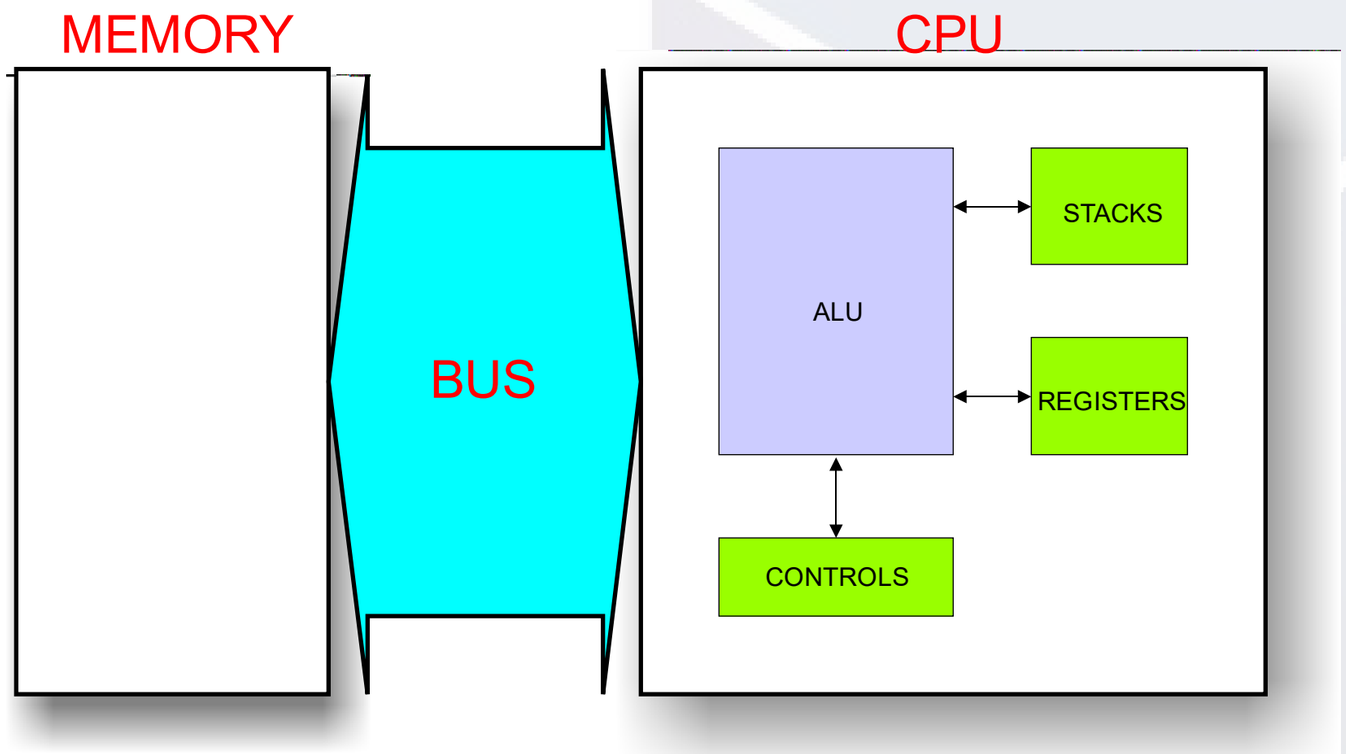
- Fortunately, with the help of supercomputers, we have created an era of accelerated discovery.

- Supercomputers are currently being used to research and develop cures and vaccines.

- A virus must be attacked from all fronts --from drug discovery and development with artificial intelligence led simulations to genomics, epidemiology, and health systems response.

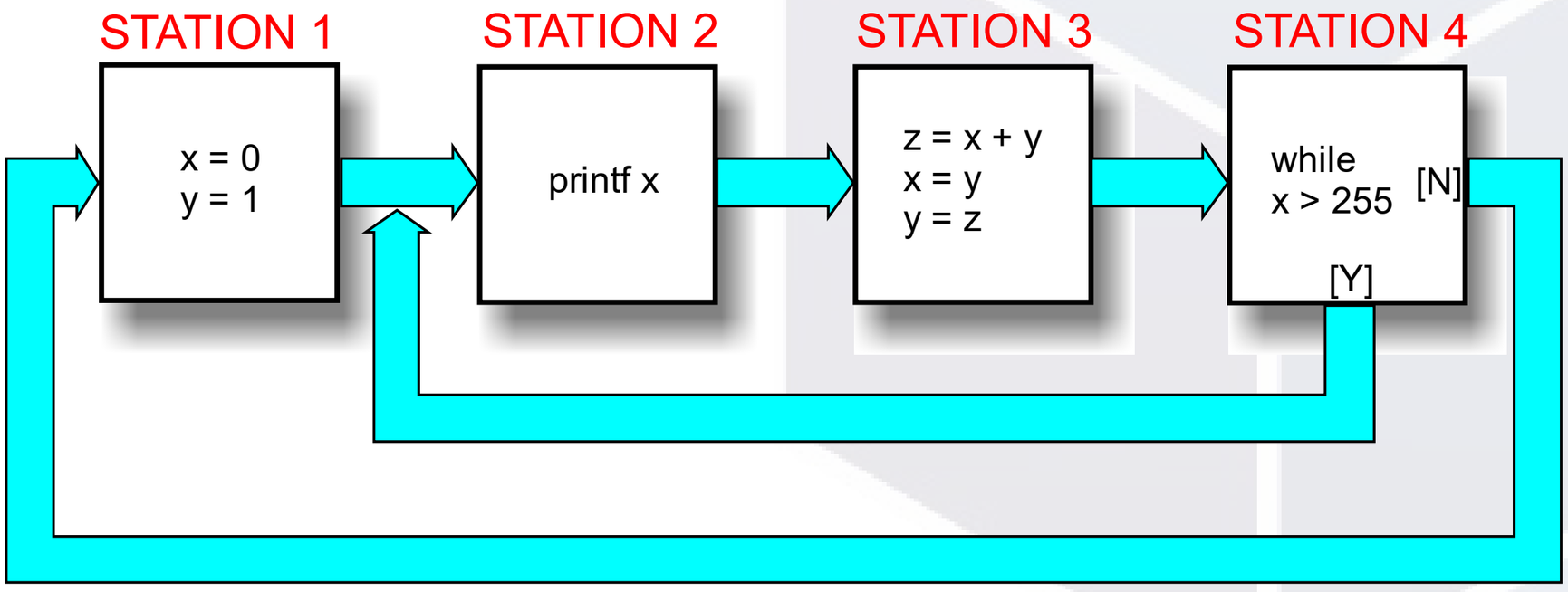
Existing Technology

- Von Neumann architecture is commonly referred to as the Universal Machine
- Can automate any process
- Program and Data are moved one byte/word at a time back and forth between memory and CPU across a common bus
- Slow and inefficient because data can only flow in one direction at a time
- The Bus is commonly referred to as the Von Neumann bottleneck
- Moving data “off chip” between two discrete devices (CPU and memory) causes power consumption to increase



Conveyor Belt Technology

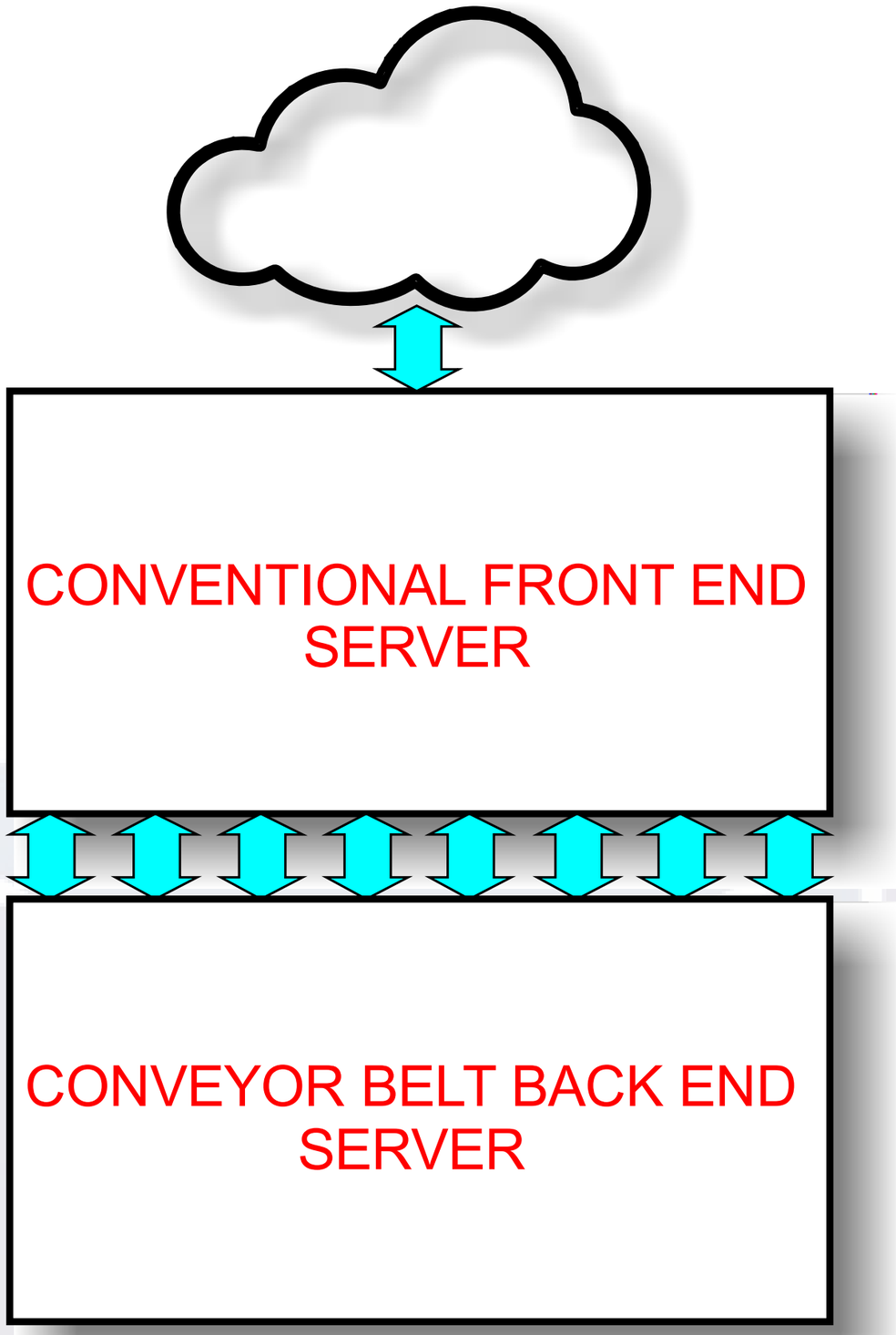
- Patented ‘Conveyor Belt’ Architecture
- Utilizes FPGA (Field Programmable Gate Array) device to store and run programs in hardware
- Data is moved from Station to Station on the Conveyor Belt in one direction
- At each Station one or more operation(s) are carried out on the Data before it is moved onto the next station
- **100x Faster** because data flows only in one direction on a ‘data super -highway’ and operations are carried out at hardware speeds
- Consumes about **20%** the power of conventional servers because all operations are carried out ‘on -chip’



Cirrus Architecture

- Conventional Front -End Server runs Unix/Windows to allow compatibility with existing programs and applications

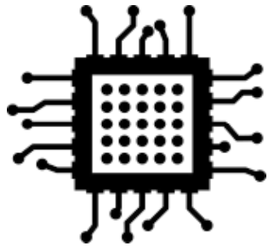
- Conveyor Belt Back -End Server provides high -speed, multi -thread, power efficient data processing



Specification

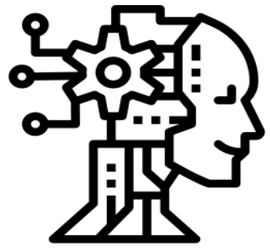
Electronic	
Architecture	Conventional and Coneyor Belt
Configuration	16 Banks; each Bank comprising 10 Conventional Servers and 10 Conveyor Belt Servers
Layout	Conventional Servers in front and Conveyor Belt Servers in back
Operating System	
Front End	Windows / Unix Blade Servers
Back End	Proprietary
Mechanical	
Size	7ft (H) x 4ft (W) x 5ft (L)
Weight	320lbs
Temperature	10 - 70° C
Humidity Range	20 - 90% RH Non-Condensing
Security	Locking and alarmed front/rear doors and side panels
Electrical	
Type	AC or DC
Voltage	180 - 264 V
Input Frequency	0Hz or 47 - 63HZ
Current	100A @ 240VAC
Nominal Power	64,000 W

Uses



GENERAL

Can be used as a GPU, which handles computation only for computer graphics to perform computation in applications traditionally handled by the CPU.

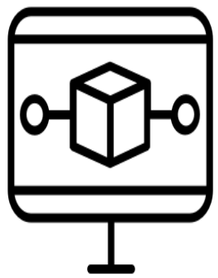


ARTIFICIAL INTELLIGENCE

Can be used to perform tasks that normally require human intelligence.

MACHINE LEARNING

Can run AI applications that provide systems the ability to automatically learn and improve without being programmed.

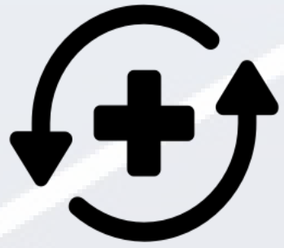


MODELLING

Can create an abstract model to simulate the behavior and response of a wide range of systems and prototypes exponentially faster than our competition.

MOBILE

Can be easily moved from one location to another and deployed within hours



DISASTER RECOVERY

Can quickly be delivered and connected to provide immediate data center support.

Comparison

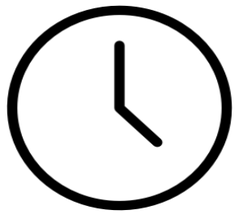
Processing Power

1 Cirrus Cloud Server = 1,280 Conventional Blade Servers

Benefits

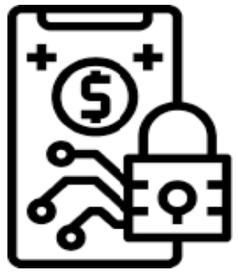
PERFORMANCE

Parallel processing in conveyor belt hardware allows speeds of up to 100x



FLEXIBILITY

Can be setup practically anywhere and operational in hours



SECURITY

Increased security means reduced risk of data leaks, data hijacking and system crashes

RELIABILITY

Higher reliability means less downtime due to failures and preventative maintenance

Our Solution

REAL ESTATE

Specialized real estate is no longer necessary

DEPLOYMENT TIME

Can be quickly setup practically anywhere and requires little cooling and power infrastructure

COST

Infrastructure cost is considerably reduced

MORATORIUM

Since power consumption is reduced, Cirrus technology can be deployed even in areas that have moratoriums in place

SECURITY

Practically impenetrable because FPGA backend utilizes only hardware

PERFORMANCE

Processor intensive programs can be assigned to run on the FPGA backend to increase system performance

POWER CONSUMPTION

FPGA backend ensures much reduced power consumption

EQUIPMENT FAILURE

Operates at much lower temperatures ensuring the system operates for longer without maintenance or failure