

Informix on ARM: The Future Of Data Management

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Webcast on June 23rd 2015

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Informix on ARM: The Future Of Data Management

- What really is ARM?
- What are some common devices out there?
- Why is this relevant to my life?
- What is IBM doing with ARM?
- What makes Informix suited for ARM devices?
- What can you actually do with Informix on ARM?

What is ARM

- RISC based chipset
- Small, Low Power, low heat
- Non x86 architecture
- Runs Linux, BSD and Android
- Most phones, tablets are on ARM
- The designs are owned by ARM Holdings out of Cambridge England
- Licensed to third party manufacturers to generate a variety of chip types based on ARM

Small



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Common Models

- Raspberry Pi
- Beaglebone (Black)
- Cubieboard/Cubietruck
- Ipad/Iphone, Android Phones, etc
- Long line of Chinese based products
- Range of TVs and media devices
- Shaspa Internet Gateway

ARM Versions

V6 – Older release – Raspberry Pi v1

V7 – Most current Systems

V8 – Offers 64bit support

A[x] line – From Allwinner, a chinese chipset manufacturer.

A10 – Single core, 1080p support GPU

A2x – Dual core, 2160p support (1080p h264)

A3x – Quad core chipsets.

All of those are V7 chipsets.

Common Models – Raspberry Pi (V1)



Raspberry Pi

Several models, A and B, B2 for \$25 - \$35

B has 256-1gb RAM

700-900mhz (Boostable to 1ghz)

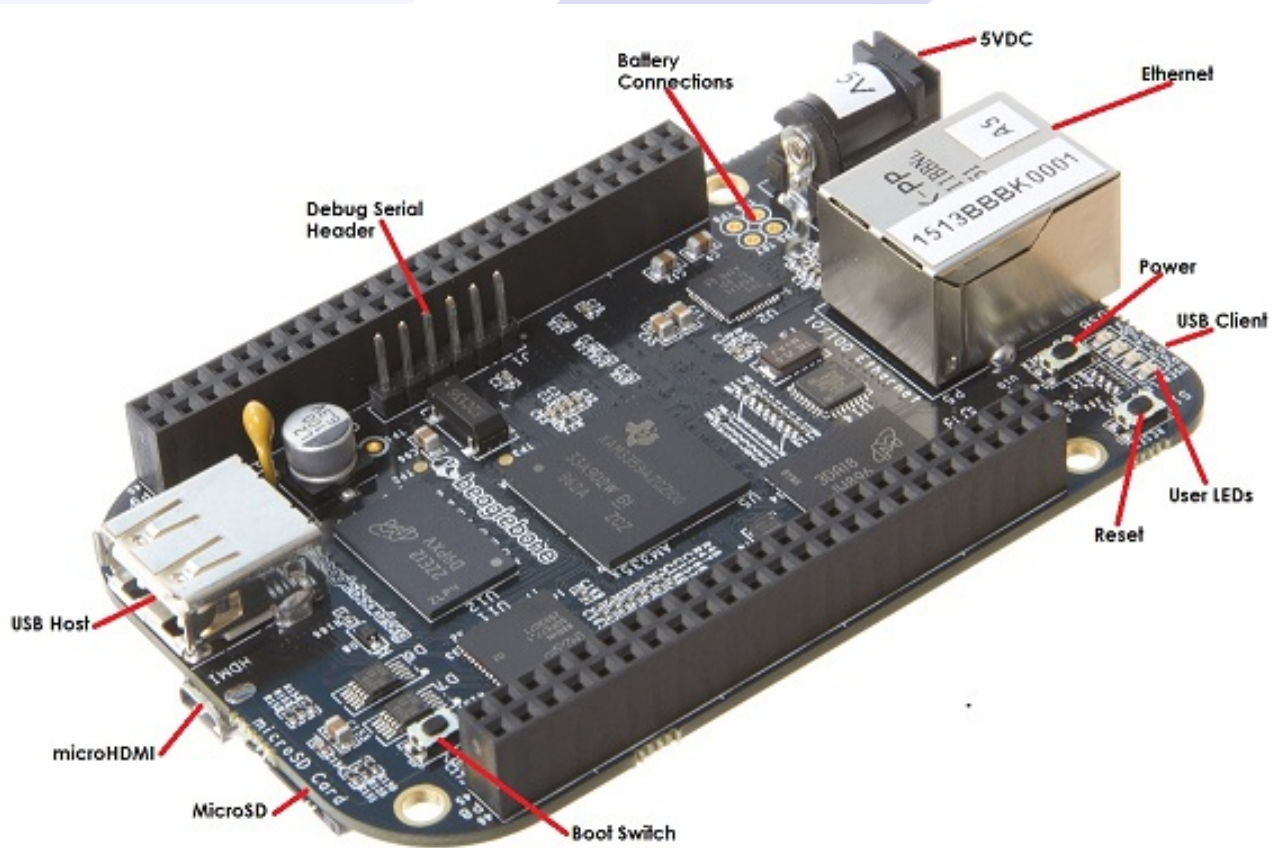
SD Card Slot (Micro on the + models)

100mb NIC on B models

Onboard GPU with HDMI out and h264 support

Good for sensors, supported by Informix, earlier models are under powered

Beaglebone Black



BeagleBone Black

Around \$50

1Ghz A8 (v7 of ARM)

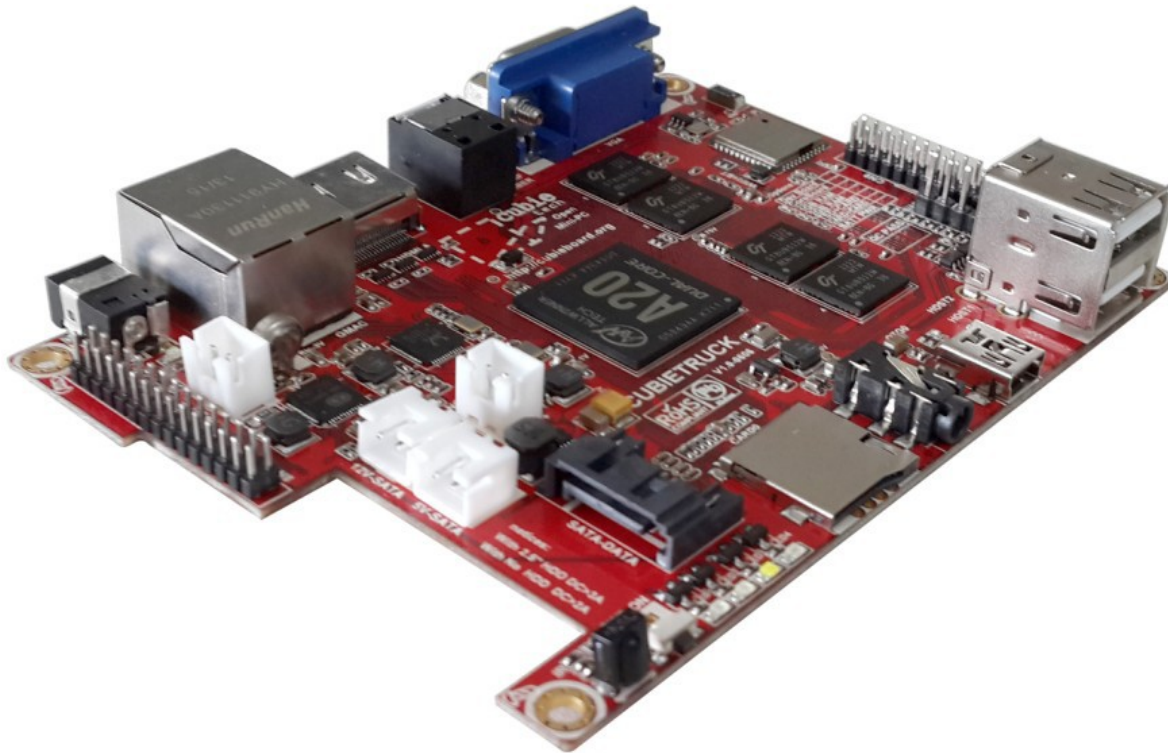
512 RAM

MicroHDMI out with GPU support

4gb Onboard Storage, microSD card slot

Built in private networking via USB

CubieTruck (CubieBoard 3)



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CubieTruck

About \$100

A20 (Dual core 1ghz v7 ARM)

2gb DDR3 memory

SATA port

8GB NAND (SSD) built in storage, microSD

Wifi and Bluetooth

2.3W idle, 4.9Watt running full load.

Why Should You Care?

Small, low power, low cost, low heat.

Can take an Informix instance in your pocket

Easily scalable horizontally

Useful to manage sensors or more complex tasks interacting with the real world

Run services off of a dedicated device without needing your laptop

They are just going to get smaller, faster and better supported

Power Usage



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Sensors

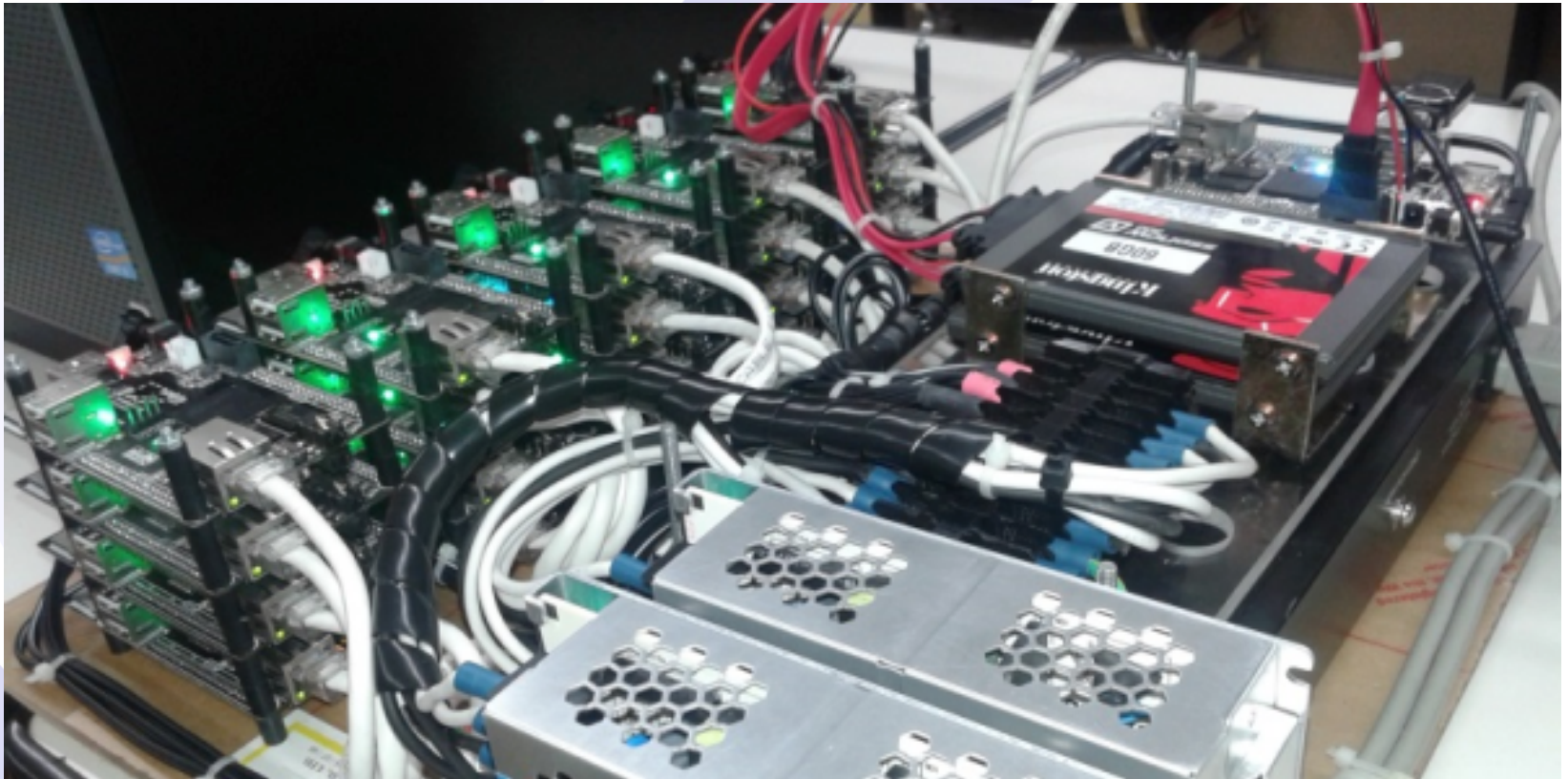
Most ARM boards are specifically set up to easily integrate with breadboards or with sensors

Lots of community support and information on how to get up and running hooking sensors into ARM based devices

Low cost, low power, easy to work with

Easy to set them up to do more planned data crunching on sensor data before it leaves the device – The 'gateway' concept.

Clusters



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Clusters

You can run several if not dozens of ARM systems in the space and power of one conventional system

Easily scale horizontally just by adding new low cost systems

Spread out the IO between systems rather than having a central storage subsystem

Get all of those marketing buzzwords ready to impress the NoSQL folks

HP Moonshot

- New ARM based server architecture
- Up to 720 Cores and 11.5TB of storage in a 4.3U Chassis
- Individual types of cards, up to 45 cards per chassis, can be customized
- Far lower power cost

HP Moonshot



What Is IBM Doing With ARM

- IoT Starter Kit for rapid development
- Releasing Docker images for Informix on ARM
- Informix/ARM developer edition
- Informix IoT Hackathons

Bluemix

- Series of cloud based services from IBM
- Just sign up and get access to processing and storage
- Scalable, just purchase more resources
- Really easy to set up sensor data to feed directly into Bluemix
- “Timeseries” is Informix under the covers
- Use REST, MongoDB or JDBC APIs to query data

What Makes Informix Suited

Low Memory Manager

Flexible Grid

Grid Queries

Sharded queries

Auto Tuning

Auto Log Rotation

Storage Pool

Custom Deployment Installs

Informix Features

- Low Memory Footprint
- Low Install Footprint (50mb)
- Extremely Reliable, DBA-Free Running
- Very Tunable For Any Workload
- Full MongoDB API Support
- Built In Scheduler
- Informix Cloning Tool (ifxclone)

Low Memory Manager

- Used to have the engine automatically terminate memory hogging sessions when the defined threshold has been exceeded
- EXECUTE FUNCTION task("scheduler Imm enable",
"LMM START THRESHOLD", "10MB",
"LMM STOP THRESHOLD", "20MB",
"LMM IDLE TIME", "300");
- Will start when the server has less than the start threshold free
- Will stop when it gets above the stop threshold
- The idle time is how long a session has been inactive before it is considered idle (in seconds)
- When triggered it:
 - Goes through the idle sessions killing them
 - Goes through the highest memory sessions
 - Runs onmode -F to free memory

Enterprise Replication

- Asynchronous replication for Informix
- Can be targeted updates or update-anywhere
- Configurable collision management
- Configurable by table and column
- Fast and reliable
- Allows for horizontal scaling of Informix
- Allows for distributed queries

Flexible Grid

- Monitor and manage multiple servers in ER as easily as a single system
- Can be a mixed environment of hardware and operating systems
- Data can be replicated across many nodes
- Can use the Connection Manager to define rules for how and where connections occur
- No downtime upgrades
- Push out changes from a single SQL statement

Grid Queries

- Introduced in version 12
- Used to do a simplified distributed query
- Select partnum, sku from inventory GRID ALL grid1 where order_date >= today;
- Or if SELECT_GRID_ALL is set
- Select partnum, sku from inventory where order_date >= today;

Sharded Queries

- Used for JSON queries in Informix
- Data can be sharded across multiple servers
- Can be built with automatic segmentation elimination if the documents do not contain that characteristic
- Created using the mongodb commands

Auto Tuning

- **AUTO_TUNE**
 - Will turn any of the below on that are not defined
- **AUTO_AIOVPS**
 - Automatically add AIO VPS as needed
- **AUTO_CKPTS**
 - Will trigger checkpoints more often if it thinks it will help avoid blocking checkpoints later
- **AUTO_LRU_TUNING**
 - Will adjust the LRUs to keep dirty pages in a reasonable level
- **AUTO_READAHEAD**
 - Calls read ahead when the query waits on IO, can also be tuned aggressive
- **AUTO_REPREPARE**
 - Will automatically re-prepare spl and queries that are prepared when the schedule of a table changes.
- **AUTO_STAT_MODE**
 - During update statistics it will try and only update stale or missing distributions rather than all

Auto Tuning Continued

- **AUTO_LLOG**
 - Automatically add logical logs to improve performance into defined dbspace
- **DYNAMIC_LOGS**
 - Automatically add logical logs to prevent blocking
- **AUTOLOCATE**
 - Automatically adds new databases if not defined into a non root database
 - Adds round robin fragmentation by default

Auto Stats

- Auto Update Stats uses the scheduler
- Checks all of the tables to see how much they have changed
- Creates update stats statements and adds them to the aus_command table
- Runs the commands based on the times defined in the scheduler
- By default Sat and Sun mornings between 1-5am

Auto Log Rotation

- Used to manage the size of the online or onbar logs
- **EXECUTE FUNCTION** task("file rotate",
"/opt/informix/online.log", 10);
 - **Tells it to rotate the online log and keep the most recent 10 logs**
 - **Can be set up through the scheduler to run on a regular basis**
 - **Can be configured via OAT**

Storage Pool

- Allows definition of space on disk, raw disk, or a directory as available storage space
- Can set it up to easily add new dbspaces or chunks
- Can also tell tables to automatically grow
- Can also set it up to automatically grow as needed
- EXECUTE FUNCTION task("storagepool add",
"/informix/STORAGE_DIR", 0, 0, "20 GB", 2);
 - **Add to the storage pool the directory /informix/STORAGE_DIR**
 - **0 Offset**
 - **0 Max size (unlimited)**
 - **20gb of size**
 - **Medium priority**

Custom Deployments

- Can select a series of options during the install to remove unneeded components to save space
- Can clone an instance with ifxclone
- Can use the Deployment Wizard to create a compressed version of Informix to deploy on a new system
- Can create a response file and use that with the installer to silently do an install

Informix On ARM

- Mobile OAT
- On-Demand Processing
- Gateways for IOT
- Feeders for Enterprise System
- Networking Devices
- Developing Solutions

Really Mobile OAT

OAT runs really nicely on ARM

Take it with you, plug it into the server and you are up and managing

Easily integrate it into your network, very small footprint

Run it entirely off of USB if needed.

Offload Processing

Low power and form factor allows you to put computers where you could not do so before

Expand your Informix infrastructure with ARM systems

Use the Flexible Grid to replicate some subset of your data on to an ARM system

Set up specific reports or queries to run off of the ARM system rather than slowing down the main data server

Set up a dynamic small data warehouse off of an OLTP system with no impact on the main server

Use it for testing or tuning of queries without impact of your production system

Have specific power users have their own mini server with just their data

IOT Gateway

- Informix is already being used for this in commercial products
- Consolidate your data from all of your in-home sensors into a single place
- Combines data of many types into a single location to run reports, backup, and make intelligent decisions.
- Used to handle multiple protocols and types of data into a single point, often will be used to feed to the cloud as well

Feeders

- Informix on ARM is a full featured database
- Supports all replication types as well as JDBC and ODBC connections
- Can be set up to feed data back to a primary instance or data warehouse
- Can also be used to replicate data using ER to a primary system

Networking Devices

- ARM and Informix make a great pair for networking or Telco needs
- Fast, reliable, and on low power small devices
- Runs on top of Linux which is already used in many devices
- Many networking companies already run using Informix

Developing With Informix

- Free developer edition available for ARM now
- Can get up and running with writing applications that use Informix now
- If you develop a product or an idea contact IBM or a partner to discuss OEM sales options
- Modern time to market is drastically cut over old models
- You **CAN** make a real physical product that really works

Links

- https://iiug2015.org/files/IIUG2015Jef_TreeceIIUG_2015_Informix_Platforms.pdf
 - Interesting presentation by Jef Treece on Informix on the different platforms
- https://www.ibm.com/developerworks/community/wikis/home?lang=en#!/wiki/W9efce3555f87_4d65_bb6b_e4002ded0917
 - Informix IoT Hackathon Information
- http://www.iiug.org/conf11/D17-Koerner-Embedding_Informix_11.70_Extreme_low_footprint_configurati.pdf
 - Great presentation on many of the embeddability features and minimizing the footprint.
- <http://beagleboard.org/BLACK> - BeagleBone Black
- <https://www.raspberrypi.org/> - Raspberry Pi
- <http://www8.hp.com/us/en/products/servers/moonshot/> - HP Moonshot

Questions?



Send follow-up questions to
tom@advanceddatatools.com

Next Webcast

- Date: July 28th 2015
- Time: 2:00pm EST
- ***The basics of getting up and running with Informix by Tom Beebe***

Informix Training in 2014

- October 12-15, 2015
 - **Informix for Database Administrators**
- July 20-23, 2015
 - **Advanced Informix Performance Tuning**
- All courses can be taken online on the web from your desk or at our training center in Virginia.
- We guarantee to *NEVER* cancel a course and will teach a course as long as one student is registered!



Thank You

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For more information:

<http://www.advanceddatatools.com>