1. FIX Overview

1.1 Capablities of FIX Software

Fix is true 'Client/Server' i.e. no replication of dB's is required.

A. Introduction to FIX Software
- Industrial Automation Software
- Provides a "Window into the process"
- Supplies real-time data to personnel and to software applications
- Basic FIX functions are:
  - Data acquisition
  - Data management

A. Data Acquistion
- Ability to retrieve data from the plant floor
- Direct communication with I/O devices in the plant
- Interface to the I/O devices via I/O drivers

B. Data Management
- Ability to process and manipulate acquired data
- Data management is made up of many components, including:
  - process monitoring (graphic display)
  - supervisory control
  - alarming
  - reporting
  - data archiving

1.2 Terminology

A. Node Types

- A computer running FIX is called a *node*
- A node that acquires data from a process is a Scada *server*

  SCADA -- (**S**upervisory **C**ontrol and **D**ata **A**cquisition)
  communicates with process hardware via I/O driver software
  loads and maintains the process database
- A *View Client* is one that does not perform SCADA functions

  this node receives data from SCADA nodes
  A View node can run other application software

B. Node Configurations

Stand alone node

Any node not communicating with nodes on the network
Fig 1.1 shows a stand-alone SCADA server
Fig 1.2 shows a *distributed process*

Local node

describes the node being worked on currently

Remote node

On a distributed system, a node other than the local node
May also refer to a node being accessed via a modem

Run-Time node

Does not allow modification of displays or process database
Not necessarily read-only

PlantTV

A read-only View client with DDE and ODBC options

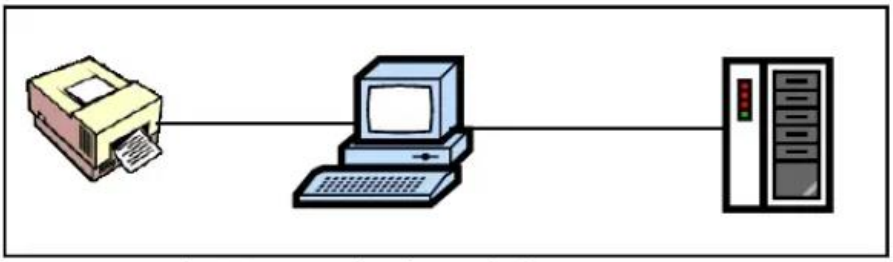

Fig 1.1: Example of a stand-alone FIX system

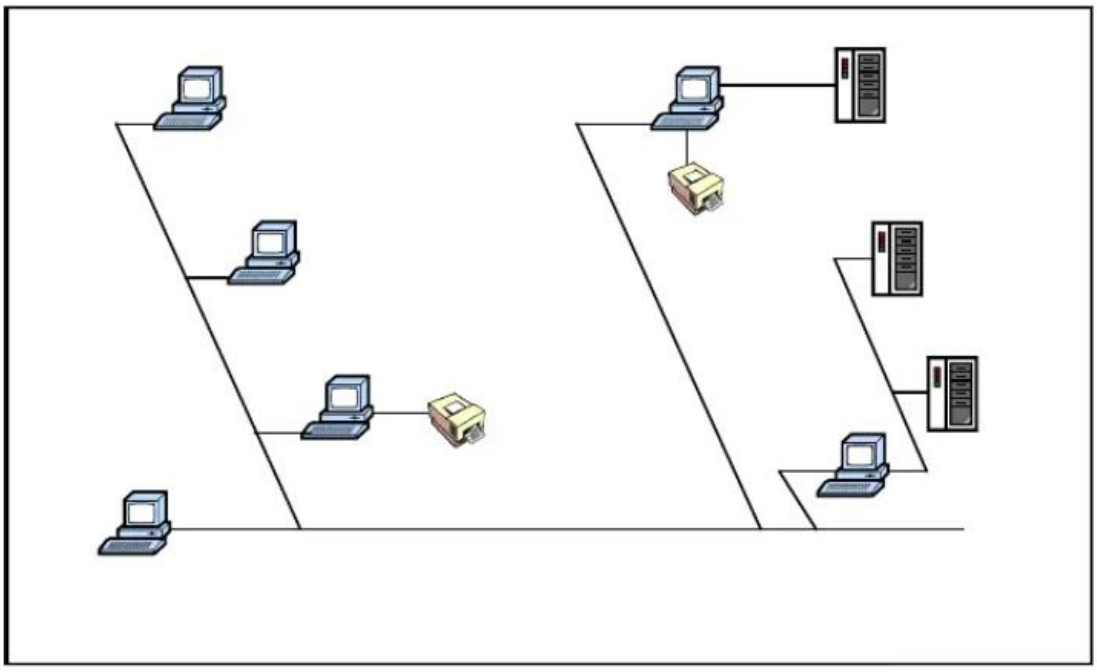

Fig 1.2: Example of a distributed FIX System

2 Basic Architecture of FIX

A. Process Data

- FIX is used with the process instrumentation in a plant.
- Sensors and controls send data to registers in the process hardware.
  Typically this hardware is a PLC
- Fix software acquires raw data from process hardware.

B. I/O Drivers

- The FIX interface to a PLC is called an I/O driver
- Each I/O driver is specific to the PLC hardware
- I/O driver functions:
  Read (and write) from the I/O device (called polling)
  Transfer data to/from addresses in the *Driver Image Table (*DIT)

- An I/O driver collects data from poll records
  poll records are specified by addresses in PLC registers.
  a poll record can be a single data point or a range of points.

C. Driver Image Table (DIT)

- Area of SCADA's memory where the I/O driver stores poll records
- I/O drivers update poll records in the DIT
  Each poll record has a rate at which updates are processed.
  Update rate is called the poll time and is default of 1 second

D. Scan, Alarm and Control (SAC)

- SAC functions include:
  Fetching data from the Driver Image Table (DIT)
  Transferring data to the *Process database (*PDB)
- SAC reads from the DIT at a rate called the *scan time*
  Default 1 second, minimum of 0.05secs (don't believe it)!

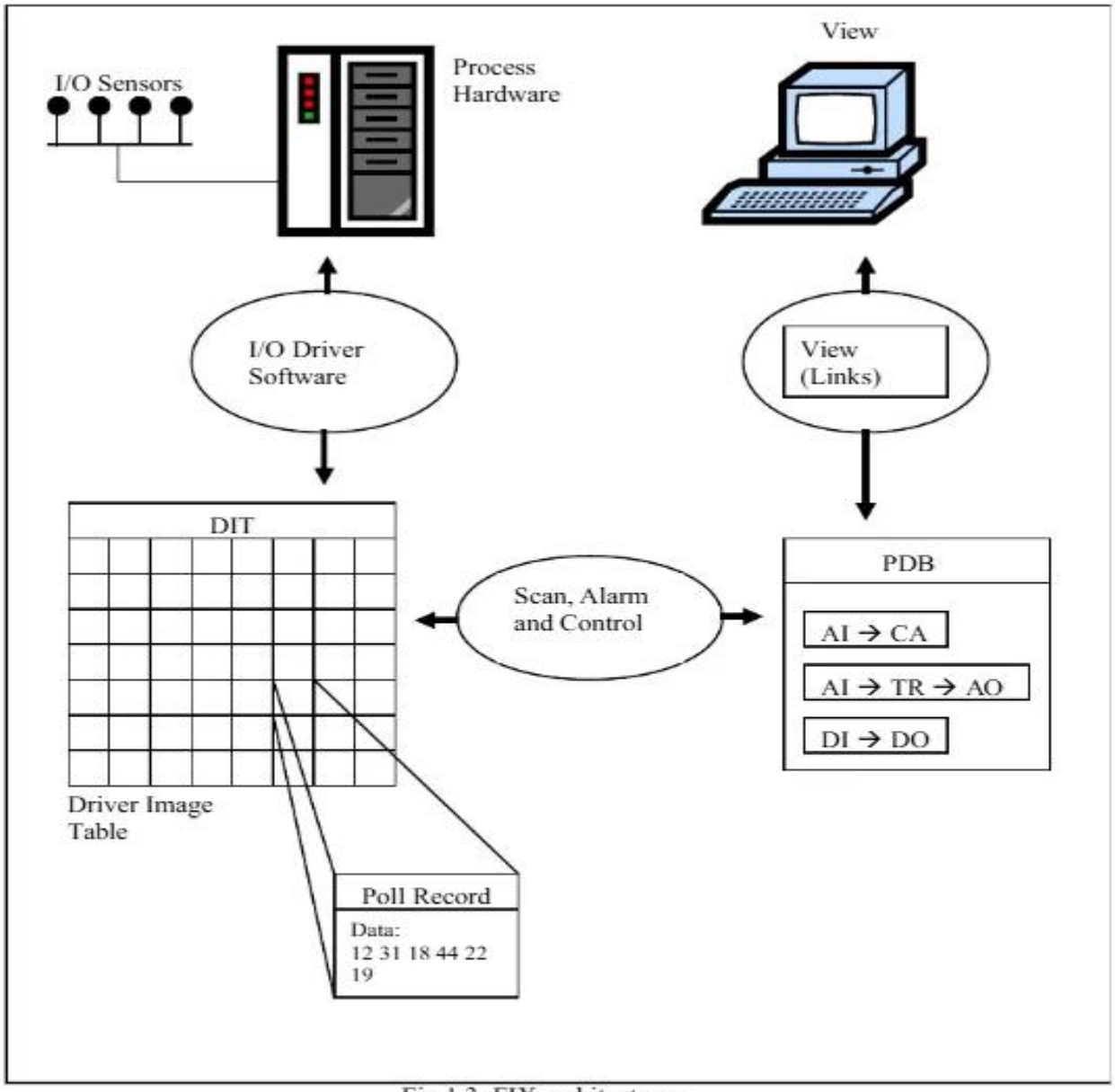

Fig 1.3: FIX architecture.

3 Development Applications

A. Development applications used

- The Draw application is the program used to develop pictures.
- The View application is used for viewing the pictures
- Database Builder is used to add tags to the Process database (PDB)
- The System Configurator is used to set options within FIX (referred to as the SCU, pronounced 'skew')
- Startup (Used to start the Scada application)
- Mission Control

Each of these is described in detail later.

4 iFix versus FIX32

iFix ver 3.5 is the latest product from Ge-Fanuc and is used extensively throughout industry. iFix is different to Fix32 in that it uses VBA ® instead of the scripting language as used in Fix32, this makes iFix software a much more powerful tool for accessing and manipulating not only data and screens, but allows the user to actually write programs from within the iFix environment. The capabilities of the software are only limited by the user himself and inherent limits of VBA ®.

The basic components of iFix, are however very similar. The Database builder is the same (very similar), the SCU is the same. The main differences are the 'Workspace' view and the driver implementation. Alarming is the same.

IFix is in-line with latest technologies and uses objects extensively. It support's embedded externally written ActiveX objects within it's own runtime window. This allows for extremely powerful solutions to be developed with the minimum effort and securely.

For the purpose of this document we are going to concentrate on FIX32 as it is a sound basis for understanding Fix and Scada applications. Fix32 is still the main workhorse of the Hot Mill Scada network.

New developments should consider moving to iFix as a solution within the Hot Mill.