7.2   **AWIPS: THEN AND NOW**

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1.0 Introduction

NOAA's National Weather Service (NWS) has been using the Advanced Weather Interactive Processing System (AWIPS) technology in its forecast offices since 1997. Between the time when AWIPS was first fielded as a national prototype and its use today, there have been many significant changes in technology, NWS concept of operations and AWIPS itself. As AWIPS completes the migration to the Linux operating system and embarks on a re-architecture of its software, it is useful to reflect on the changes in technology and operations over the last nine years.

Over the last nine years, AWIPS has transitioned from a system built on Hewlett Packard (HP) hardware and the operating system HP UX 10.2, used in 1997 but still running on AWIPS hardware in fall 2005, to a system built around the Linux operating system and commodity hardware. During the same time, NOAA's NWS has transitioned from text based public forecasts to forecasts generated from a 5 km gridded forecast data base. Industry trends have been similarly dramatic, ranging from the ubiquitous presence of the Internet, dramatic increases computing and storage capacity to the emergence and acceptance of the open source software paradigm.

This paper traces the changes in the AWIPS system against the corresponding changes in technology and weather operations.

2.0 Technology Trends and AWIPS

It is useful to look at technology trends in the past as we anticipate the future. Over the last fifteen years, there have been significant advances in the state of technology (See Figure 1).

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2.1 Operating Systems and Architectures

Linux has emerged as a significant alternative to the operating systems available in 1997. The transition to the Linux operating system has enabled AWIPS to take advantage of the rapid increases in capacity of commodity hardware. In addition, open source software has become a viable alternative to many commercial software packages.

The World Wide Web, as we know it, is only fifteen years old. The first web server was set up on a NEXT cube in November of 1990. Web services and the various standards (HTML, XML, etc.) are at the core of new architectural concepts such as Service Oriented Architecture. These standards are both young and rapidly evolving.

2.2 Computing and Storage

There have been significant increases in the computing, networking and hard drive capacities of personal computers over the last eight years. Clock speeds of microprocessors have increased by more than an order of magnitude. While recent increases in the chip clock speeds have been less dramatic, the use of multiple and multi-core microprocessors have enabled similarly dramatic increases in computing capacity. There have been similarly dramatic gains in hard drive capacity over the same period of time, with more than an order of magnitude increase in storage capacity.

Refreshing technology every three years is a critical component of keeping AWIPS up to date with current and emerging technologies. The days of going more than eight years on the same HP UX 10.2 operating system are gone. More frequent operating system and hardware updates will become the norm.

3.0 Emerging Trends

There are several clear trends in technology, such as:

   o   Increasing use and capacity of wireless technology,

- o Increasing network speeds,
- o Continued growth in hard drive capacity,
- o Continued growth in flash memory capacity,
- o Multi-core microprocessor technology,
- o Increased bus speeds, and
- o Continued growth of graphic card capabilities.

Some of these trends present alternatives to the technologies used in AWIPS today, such as:

- o Can wireless technology replace our current terrestrial network technology?

- o Can increasing network speeds enable an on demand data pull paradigm?
- o Can increased computing capacities support local modeling at higher resolutions?

There are also the technological advances that are occurring in niche or little known areas that will suddenly become significant. The emergence of Linux and the open source community is a good example of trends that were present ten years ago, but whose significance was not recognized at the time. We must be aware of sudden and potentially destabilizing shifts in technology as we plan for the re-architecture of AWIPS
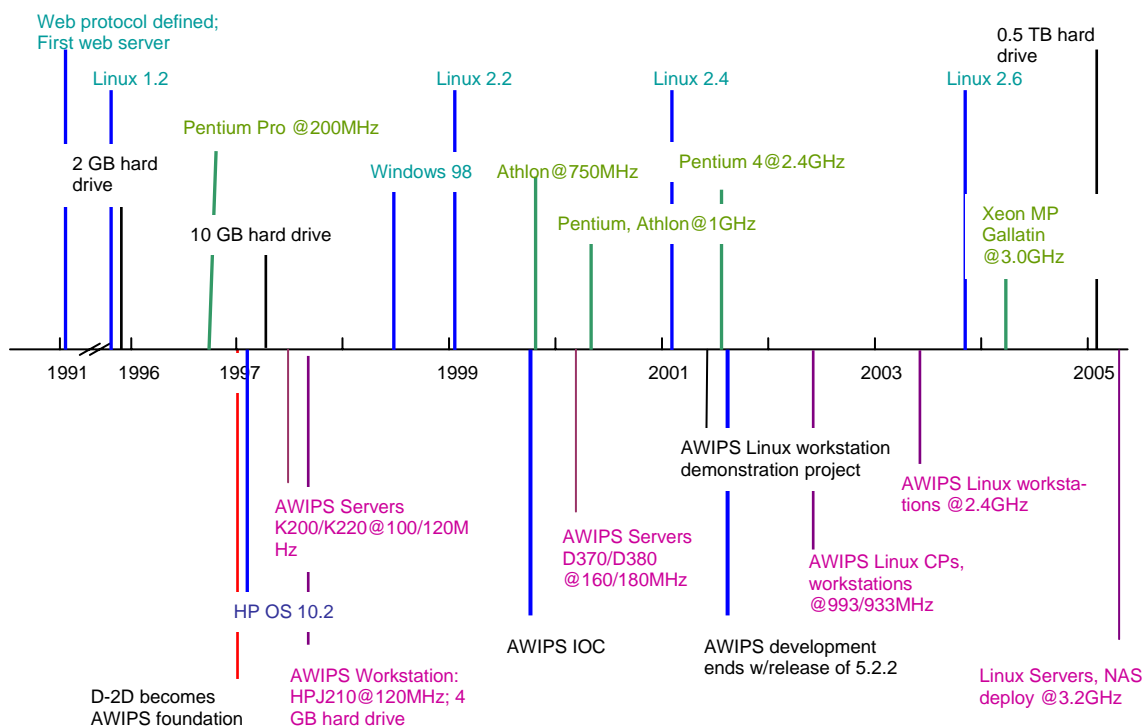

Figure 1. Time line of AWIPS and Technology Trends

4.0 Summary

There have been significant advances in computer and operating system technologies over the last eight years. The transition to the Linux operating system has enabled AWIPS to cost effectively take advantage of the increasing computing capabilities of commodity hardware.

The future will bring similarly dramatic changes to technology. It is important to note the magnitude and pace of recent changes as we plan for the future architecture of AWIPS.