WJHTC / ARTCC Connectivity For Data Transmission Using DSR Support Infrastructure (PVM/RSCS Replacement)

April 4, 2002

Introduction

- This document describes a prototype development effort undertaken at the EIIF to address an Airway Facilities need to find a new way of moving NAS related data between the William J Hughes Technical Center (WJHTC) and each Air Route Traffic Control Center (ARTCC) in a cost effective manner.
- The current Communications model utilizes either overnight delivery of magnetic tape or an antiquated communications path using IBM 3725 communication controllers and IBM PVM/RSCS software under Virtual Machine (VM).
- The new approach taken in this prototype relies heavily on the existing network based ARTCC Display System Replacement (DSR) Support infrastructure.

Prototype Capabilities

- The prototype addresses three different types of communication between the WJHTC and an ARTCC
  - ARTCC login capability to the WJHTC OS/390 Support System
  - NAS data recording transfer from an ARTCC to the WJHTC (NAS SAR and NAS CORE specifically)
  - NAS build fix package (“mailbox fix”) transfer from the WJHTC to an ARTCC

ARTCC Login Capability to the WJHTC Support System

WJHTC OS/390 Support System Login Capability from an ARTCC

- Every ARTCC DSR Token Ring Support LAN currently has network connectivity to the WJHTC DSR System Support Complex (DSSC) via the DSR frame relay. The DSSC provides connectivity to the WJHTC OS/390 Support System.
- DSR Verification Interface (DVI), a DSR support tool, has been modified in the EIIF prototype with an option to connect the WJHTC Support System from the ARTCC over the DSR frame relay.
- This option starts a TN3270 (UNIX telnet using 3270 emulation) session to the WJHTC Support System.

NAS Data Recording Transfer

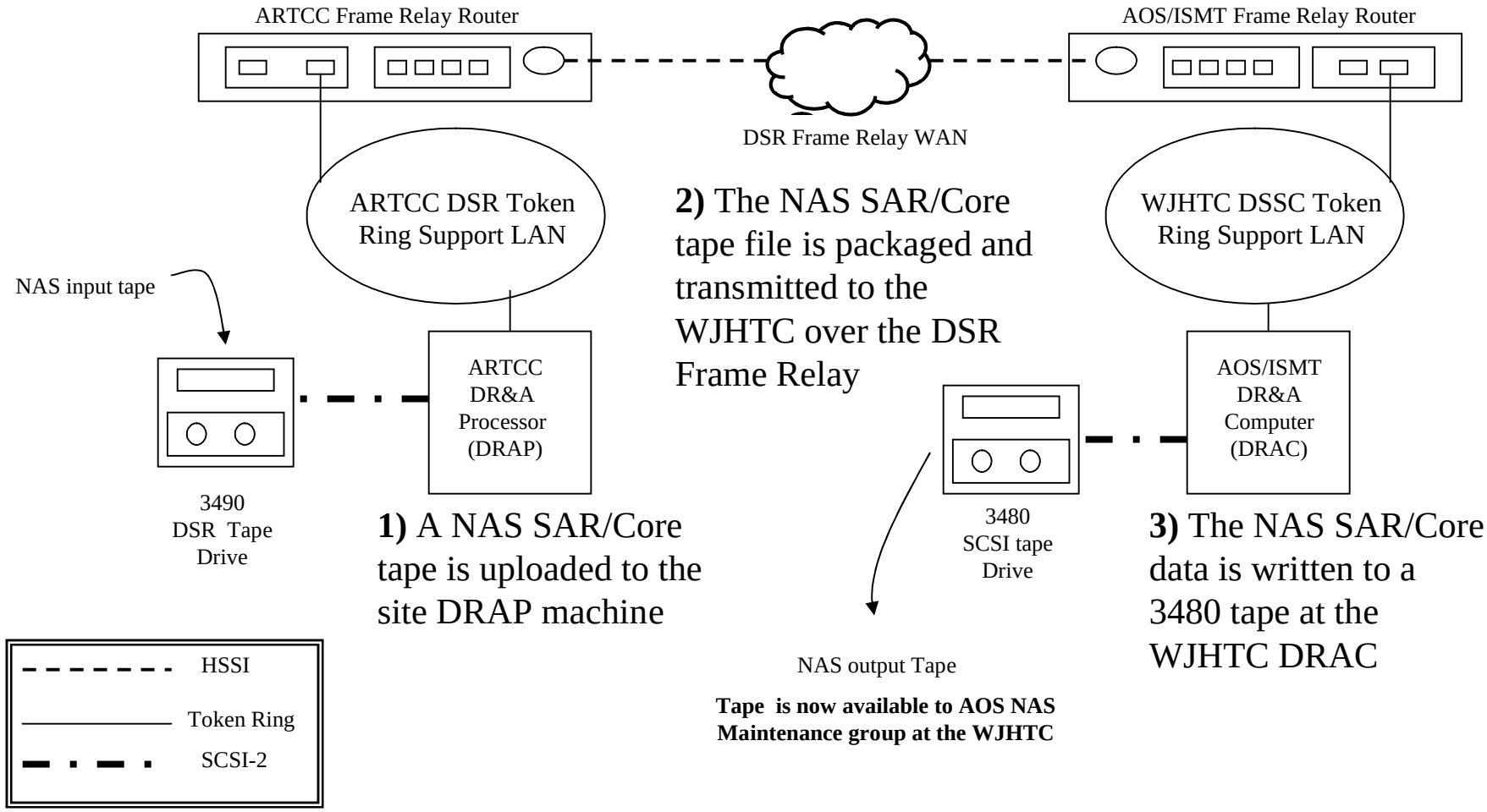
NAS SAR/Core Tape Data

- At the ARTCC, data is stored by the NAS on IBM 3480 magnetic tape cartridges (maximum capacity is approximately 210 Megabytes)
- The NAS Maintenance (AOS) group at the WJHTC routinely request NAS System Analysis Recording (SAR) and NAS Core image data, from the ARTCC, for problem determination

Current NAS SAR/Core Tape Delivery Process

- The current NAS tape delivery method from an ARTCC to the WJHTC relies on using an overnight delivery service.
- The time it takes to transfer a tape may range from 8 to 24 hours, depending on many factors (i.e. the time of day the tape was given to the service, the distance it must travel, the weather, etc).

Proposed NAS Tape Delivery Method



How It Works

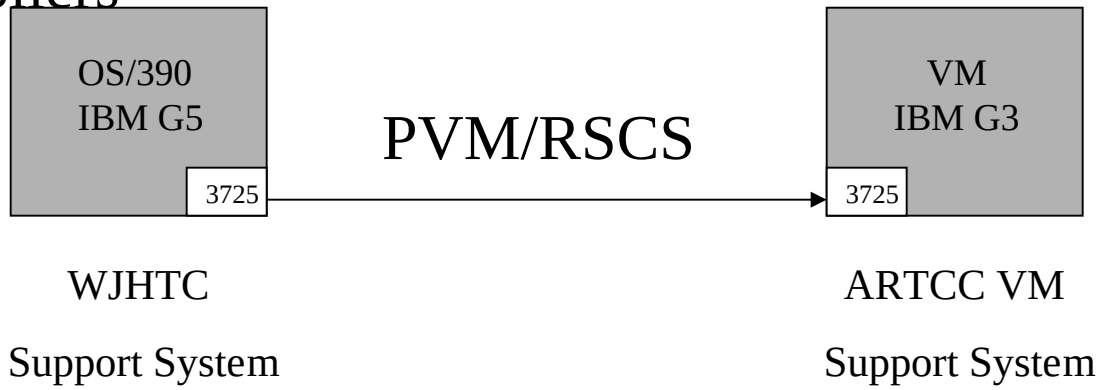
- An ARTCC user logs on to a ARTCC's DR&A Processor (DRAP) and requests a NAS tape to be mounted via the DSR Verification Interface (DVI).
- Using a modified DVI, a NAS SAR*/Core tape is uploaded to a selected directory path on the DRAP.
- The uploaded data is packaged for optimal transmission and transferred via IP to a DR&A Computer (DRAC) at the WJHTC over the DSR Frame Relay.
- A WJHTC user initiates the modified DVI on the WJHTC DRAC.
- The NAS data is written to a SCSI attached 3480 tape using DVI in the same format that it was read from the original NAS tape

***Note** – NAS SAR tapes may already be uploaded via the current DVI

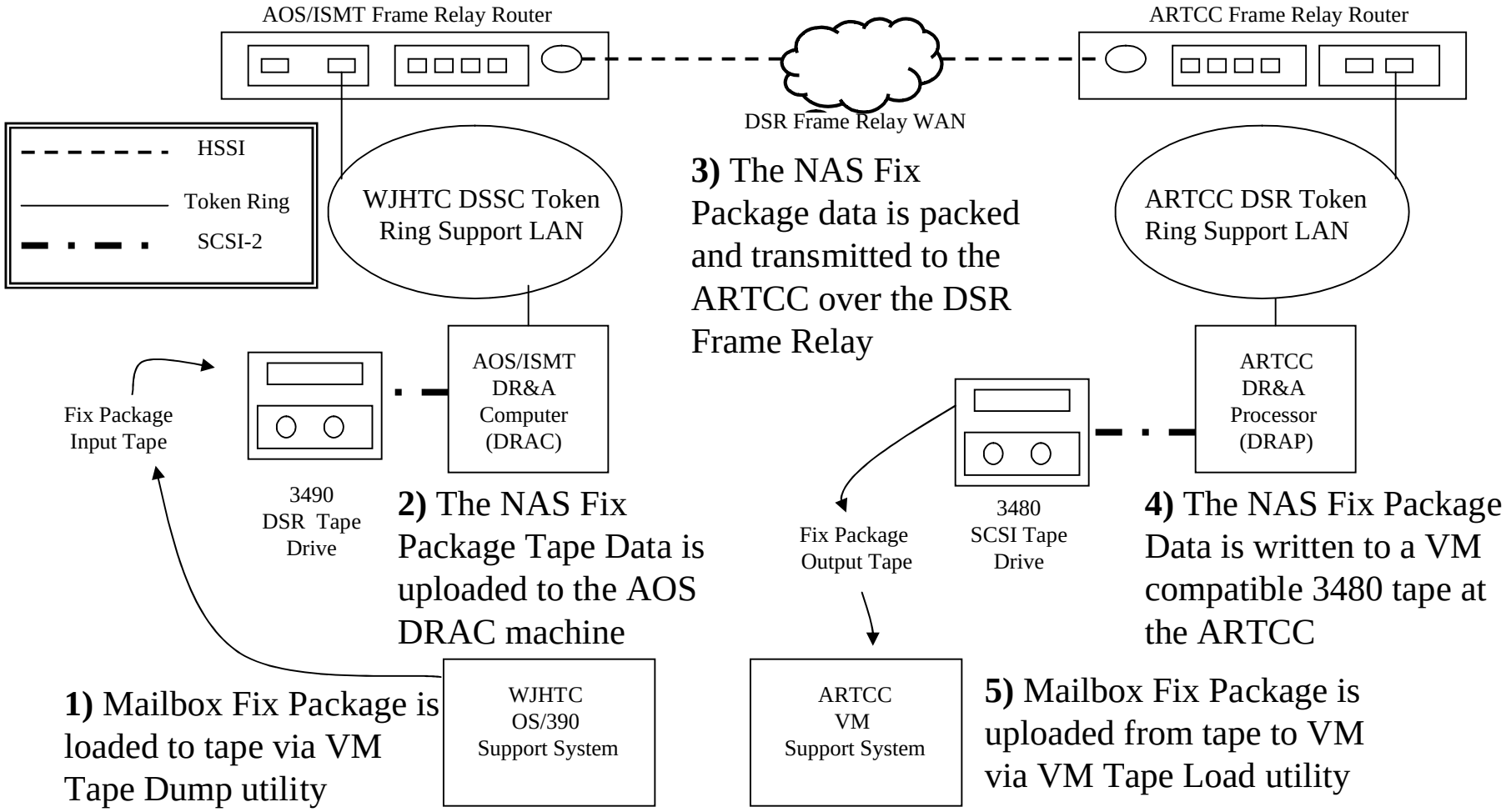
NAS Build Fix Package Transfer

Current NAS Fix Package Transfer

- Current NAS build fixes (called “mailbox fixes”) are transferred over a communication path between the VM System at the ARTCC and the OS/390 Support System at the WJHTC. This path consists of antiquated IBM 3725 Communication controllers connecting each ARTCC Mainframe. VM and OS/390 use IBM’s PVM/RSCS software to communicate over the communication controllers



Proposed Mailbox Fix Package Transfer



How It Works

- A designated AOS representative at the WJHTC gathers the appropriate files for a NAS mailbox fix package (may include patch source as well as documentation). These files are then dumped to tape using the VM Tape Dump utility.
- The user then logs on to the the WJHTC DRAC and requests that the NAS fix package tape be mounted via DVI.
- Using a modified DVI, the NAS fix package tape is uploaded to a selected directory path on the WJHTC DRAC and is packaged for optimal transmission across the frame relay.
- ARTCC personnel are then notified that the fix package is available (perhaps via E-mail).

How It Works (Cont.)

- A designated user at the ARTCC initiates a modified DVI session on the ARTCC DRAP.
- Using a modified DVI, the NAS fix package is transferred via TCP/IP from the DRAC at the WJHTC over the DSR Frame Relay and written to a SCSI attached 3480 tape at the ARTCC DRAP. The output tape is in the same format that as the original VM tape.
- The NAS Fix Package Tape is then upload to the ARTCC VM Support System using the VM Tape Load utility.

Implementation Details

- The proposed data transfer methods use the current DSR Support System Complex (DSSC) network infrastructure and the ARTCC Token Ring Support LAN.
- Minor software changes to current DSR Data Verification Interface (DVI) would be required
  - Approximately 1000 SLOC in prototype
  - Most of the modifications are shell scripting
- No new licensing costs
- Approach is easily extensible (i.e. transmission of additional NAS data types)
- An additional SCSI attached 3480 tape drive would be required for each ARTCC DRA Processor and the WJHTC DRAC Processor (10K per unit x 22 = $220,000)

Implementation Details (Cont.)

- To eliminate issue of WJHTC DRAC proximity to the Job Shop, one of the DRACs from the DSSC could be moved into the job shop “glasshouse” so that operators could respond to DVI mount requests. If this is unacceptable, the IIF could provide a DRAC in the job shop built from spare equipment.
- Implementation could be done as a DSR ISMT “Productivity Aid” so the IIF prototype could be implemented without any rework. This would be the fastest way to the field.
- Using the Productivity Aid approach, the only cost to AUA would be hardware (tape drives).

Additional Information

- The current DSSC infrastructure utilizes a 256k Frame Relay technology.
- The frame relay communication path is used to occasionally transmit DSR build data between the WJHTC and the ARTCCs.
- A patch loader function has also been developed into the IIF DVI prototype. This function is executed at the ARTCC against NAS patches received through the mailbox utility. The DVI patch loader is optional and can still be executed within the mainframe support environment.