Sine Nomine Associates

Introduction to the NJE/IP Bridge

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Agenda

- NJE Overview
- Why NJE Today?
- Interesting Enhancements to a Linux-based Appliance
- Scenarios for Using the NJE/IP Bridge
  - Unattended Encrypted File Transfer
  - Development Workstation
  - Delivering Mainframe Output to a Program for Post-Processing
  - Remote execution of Linux applications from z/OS
- Demonstration (network permitting)
- Q&A

NJE Overview

- Network Job Entry (NJE) is embedded in most IBM mainframe operating systems as a method of transmitting and receiving job streams, output, and interactive messages between nodes.
- Characteristics:
  - 8 character userid
  - 8 character node name
- Network is fully defined at all points (with some exceptions)

NJE Overview

- NJE supported as a application over different transports
  - Native BSC communications
  - Native CTC communications
  - SNA networks
  - TCP/IP (VM and VSE only)
- Protocol governed by NJE Protocols and Formats manual

NJE Overview

- IBM has implemented NJE capability only for mainframe and iSeries OS
  - No AIX
  - No Linux
  - No Windows
  - No non-IBM workstation OS
- Large amounts of effort and expense necessary to integrate file transfer and output management capabilities between these systems

Why NJE Today?

- Why do NJE over IP?
  - Clean bidirectional integration of programmable workstations with mainframe data transfer
  - Leverage Linux-based development tooling and skills in tandem with mainframe services (right tool, right job).
  - Increasing necessity of data movement between IBM and non-IBM environments without complex automation requirements
  - Death of the 37x5 FEP
  - Demonstrate construction of Linux-based companion appliance
- Eliminate SNA requirement for z/OS to participate in NJE networks

NJE/IP Bridge

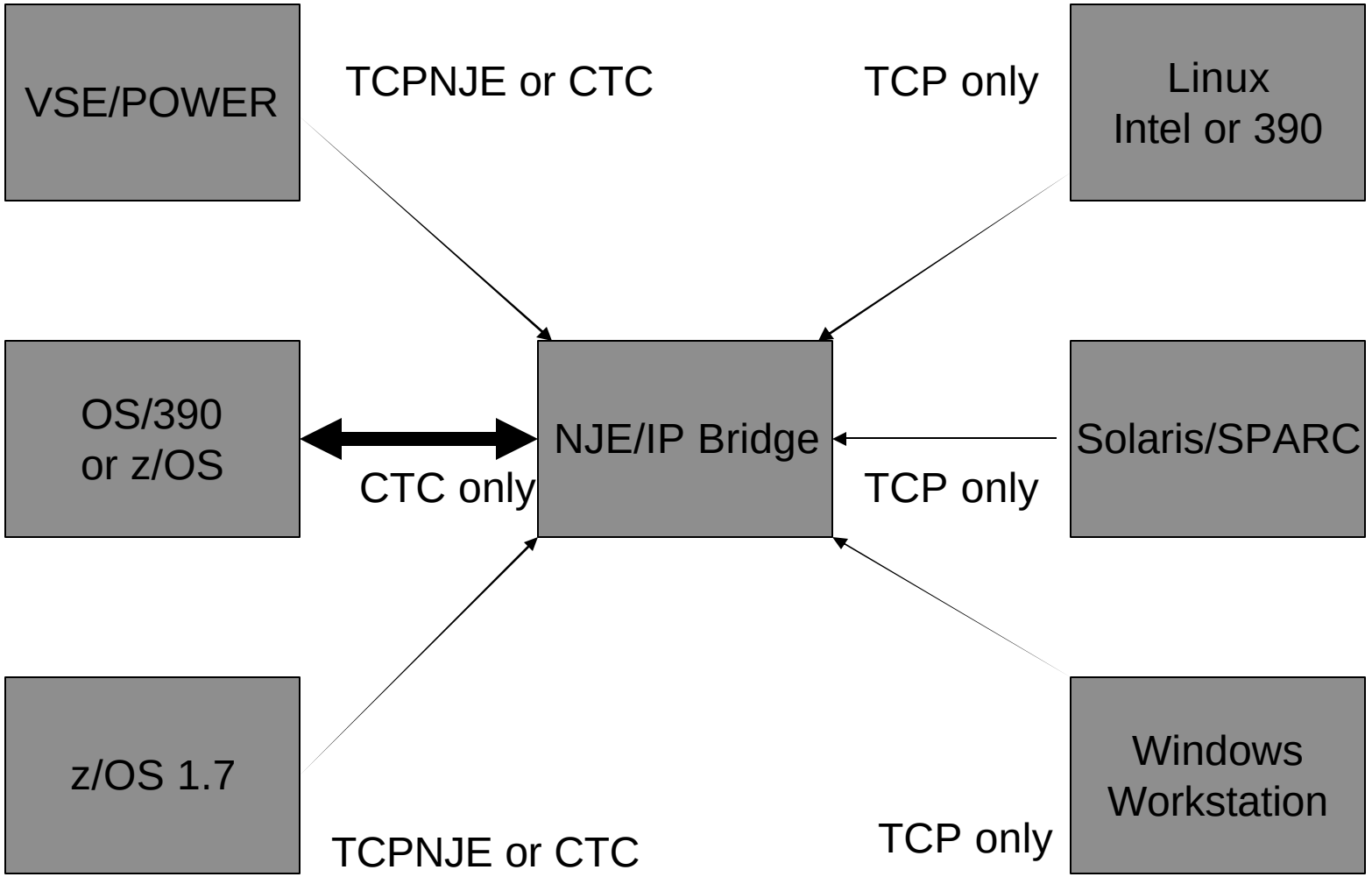
- NJE/IP Bridge implements a complete set of NJE over IP server and client applications, allowing complete NJE over IP or NJE over CTC peer functionality, including routing and output management functions.

- Three configurations:
  - –LPAR appliance (s390, s390x only)
  - –31/64-bit preconfigured guest for z/VM (s390, s390x only)
  - –Open systems packages
    - – Linux (s390, s390x, IA32, IA64, AMD64, PPC)
    - – Solaris (SPARC, x86)
    - – AIX 5.x
    - – HP/UX 11 and 11i
    - – Windows
    - – Mac OS X

NJE/IP Bridge Features

- IP connections are protected with SSL if desired
- No SNA stack or SNA services are required on host or workstation
- NQS integration provides RJE function for Unix/Linux systems

Configuration Example



Linux Enhancements: CTC Driver

- Parallel, ESCON, FICON CTC necessary to communicate with unmodified IBM operating systems
- New device driver needed: /dev/njectc0
  - Implements NJE line discipline over physical or virtual CTC
  - Presented to application as connection similar to serial link

Scenario: Unattended File Transfer

- Mainframe:
- DEST=(node, userid) in JCL
- SENDFILE/XMIT cmd

- Open Systems:
- sendfile /etc/hosts userid@node

- Benefits:
  - Automatic retry
  - Multiple file transmission in parallel
  - Positive success/fail return code
  - ASCII/EBCDIC translation if needed
  - Easily automated with mainframe tools

Scenario: Development Workstation

- JCL submission operates identically to remote NJE workstation
- Any development tools available on the workstation can be used
- Preserves module attributes in transmission automatically (within scope of NJE protocol)
- Output can be automatically routed back to workstation w/o complex transfer procedure

- Possible uses:
  - Using COBOL or PL/1 language-sensitive editing in Eclipse with z/OS COBOL applications
  - Online debugging using IDE against z/OS code
  - Low cost configuration management using CVS or Subversion for z/OS or VM applications

Scenario: Delivering Output to a Program

- Easy mapping of NJE node/userid to workstation program input via mapping table in NJE Bridge
- Mapping table specifies application and command line to use, and file is supplied to application standard input for processing
- Examples (not included, but easily constructed):
  - Automatic faxing of output to specified number
  - Line printer emulation for PostScript or PCL printers (full CUPS support, plus mainframe output management)
  - Automated PDF conversion and archival on DVD

Scenario: Remote Job Execution on Linux

- Available only on Unix/Linux variants
- Uses NQS to queue jobs and manage the remote execution.
- NQS selects system from a pool, transfers the job to the execution node and returns output and status info via NJE messages
- NJE/IP Bridge integration via program interface

  Messages and files produced by Linux application can be tracked and automated via standard mainframe tools (eg, Netview, PROP, CA products, TWS, etc)

Demonstration (network permitting)

- Link Status
- Interactive messages
- Unattended file transfer
- Job transmission from open system to IBM system
- Job transmission from IBM system to open system
- Remote control and logging via NJE messages

Licensing and Packaging

- zSeries appliance packages licensed by physical CEC (no per-image or per-LPAR charges), processor size neutral
- Open systems packages licensed by platform (no per-seat or per-copy charges)
  - Platform = HW processor architecture + operating system major version
- Requires activation code per platform or appliance to function
- Source code available

Summary

- The NJE/IP Bridge allows IBM and non-IBM operating systems to interoperate in a natural, supported, integrated fashion
- The NJE/IP Bridge allows rapid implementation of sophisticated output and application development solutions at very low cost.
- The NJE/IP Bridge enables IBM and non-IBM systems to leverage common and sophisticated system management solutions already in place in either environment
- In environments where the only SNA networking in place is to support a NJE link between z/OS and a system supported by the NJE/IP Bridge, the NJE/IP Bridge can allow elimination of VTAM and SNA networking completely.

For More Information

- Available from Barnard Software Intl.
- Check out the BSI WWW site at www.bsiopti.com
- Call +1 407 323 4773 for pricing and terms.