



NJA
Navan Job Accounting Facility
Version 6 Release 0 Modification 1

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NJ A - Navan iSeries Job Accounting Facility

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VERSION 6 RELEASE 0, MODIFICATION 1

This edition applies to Version 6 Release 0, Modification level 1 of the NJA Navan Job Accounting Facility Program Product.

Unless otherwise stated, all pages in this edition are to Version 6, Release 0 and refer to the iSeries Operating System, Version 7.3 or greater.

Any references in this manual to NJA, Navan Utilities or NUTIL refer to standard Navan Utility products. Information on these products can be obtained from your nearest Navan agent.

Job Accounting – an overview

Job Accounting is a standard function of the iSeries operating system; supplied by IBM as a means of automatically obtaining 'raw' data on who is using your system, and to what extent.

However, as supplied it is not really usable unless the data gathered is processed into some more meaningful form. This is the purpose of the Navan Job Accounting Facility (NJA) - to collate the data into a set of database files from which it can be manipulated; and then to provide tools to process the data.

As supplied, NJA is an Accounting (financial) tool - it will generate financial documents (invoices) from the information gathered. However, once the information is loaded into NJA files it can be processed by any user method (programs, query, SQL etc) into any management reporting format you require.

Source code is available (for a nominal charge) for NJA, to allow you to see what it is actually doing, as well as to allow you to alter the application to meet your own needs.

Job Accounting in General

i/OS Job Accounting is a standard system function on the iSeries; the definition of this function is explained in the IBM Work Management Guide and it is highly recommended that you read the relevant section of this manual before starting to use Job Accounting.

Basically Job Accounting records the use of your iSeries resources and keeps these statistics in a special system accounting journal. The information recorded is divided into two types:

Job Resource Accounting data, which records an entry at the completion of a job, recording various pieces of information about the job:

- Job Name and User
- Accounting code
- Job Type (batch/interactive)
- Start and End time
- Job completion code
- Number of routing steps
- Auxiliary I/O operations
- Number of database reads/writes
- Number of communications transactions

Printer Resource Accounting data, which records an entry at the completion of printing a spooled or non-spooled printer file (no entry is made if the file is not printed), recording information such as:

- Job Name and User
- Accounting code
- Printer device used
- Number of pages and lines printed

Because this information is journalled at the completion of the relevant function, the system overhead in using Job Accounting is minimal (the statistics are accumulated by i/OS regardless of whether Job Accounting is in operation, so this is not considered an overhead of Job Accounting itself).

The Navan Job Accounting Facility (NJA)

Once i/OS is notified that Job Accounting is in use, it will collate usage information automatically. Periodically (daily, weekly, monthly etc), you will be required to extract this 'raw' i/OS information from the Job Accounting journals and load it into database files that can be used by NJA. You do this by selecting a menu option from the NJA menu.

Whilst *all* accounting data is retrieved and stored within the NJA data files, NJA only calculates values based on a subset of the information retrieved from the Accounting journals:

- The CPU usage of a job (in seconds)

- The number of I/O transactions performed by a job

- The number of print lines processed by printers for the job

You can attach financial values to each of these types of system usage in order to charge users (or groups of users) for their machine usage.

You can optionally apply a penalty loading onto interactive jobs (so that Batch processing is cheaper than Interactive processing).

You can also define penalties between time ranges, that will be applied to any batch processing commencing between the defined times.

All features of NJA are selectable from a menu. The batch processes can be run from this menu, or they can be set to run automatically from an automated Job Scheduling facility (such as the NUTIL Job Scheduler) on a periodical basis.

The NJA Main Menu

To access NJA, you simply add NJA to your library list and call up the NJA main menu:

```
:: ADDLIBLE NJALIB
:: GO NJA
```

```
NJA                      Navan Job Accounting Facility

Select one of the following:

  1. Control Factors Maintenance                JAR010
  2. Exchange Rates Maintenance                JAR030
  3. Time of Day Penalty Rates Maintenance     JAR035
  4. Account Master File Maintenance           JAR020
 10. Load Accounting files from Journalling     JALOAD

 11. Maintain Job Resource lines                JAR040
 12. Maintain Printer Resource lines            JAR050
 13. Check all Uninvoiced lines for valid Account numbers JAACCTCHK

 20. Print Invoices and Invoice Register        JAGENINV

 30. Invoice Reprint                            JAR060
 40. Invoice Inquiry                            JAR070

 50. Cleanse all files of old data              JARGZ

100. Year End Processing                        JAR085
200. Installation Procedure                    JAINSTALL

Selection or command

F3=Exit   F4=Prompt   F9=Retrieve   F12=Previous   F13=User Support
F10=Command Entry   F14=Work with Submitted Jobs   F18=Work with output
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```

This menu provides a simplified access to all NJA facilities. Should you need to access any (or all) of the options by any means other than via this menu, you simply call the appropriate program (the program to call is shown beside each option on the menu). If you do this, please ensure NJALIB is in your library list.

Installing the Navan Job Accounting Facility

Installation of NJA is quite simple, but the installation process must be performed, otherwise the application will not work.

Installing NJA (part I)

Important Note for existing users...

If you already have NJA installed on your machine and you are upgrading to a new release, you **MUST** do the following **BEFORE** installing your upgrade:

1. Run an Accounting data file load (option 10, JALOAD, from the NJA menu)
2. Invoice any currently uninvoiced resource lines (option 20, JAGENINV, from the NJA menu)

Failure to do this may mean the loss of some accounting data.

Install the NJA Library

The first step in installing this application is to restore the library from the tape supplied. You must do this as a system Security Officer:

Sign on as QSECOFR, or as a user with *ALLOBJ authority assigned to your user profile. From the command line, type in the command:

```
:: LODRUN DEV(TAP01)
```

If you are using a tape device other than TAP01, alter the device parameter in the above command accordingly.

The procedure will then install the NJA library; when loaded it takes up less than 5 megabytes of storage. The NJA facility is completely contained in this library.

Installing NJA (part II)

Running the Initialization procedure

Before you can use NJA, you must initialize it. This is achieved by taking the 'Install NJA' option from the application main menu:

<u>:: ADDLIB NJALIB</u>	Include NJA in your library list
<u>:: GO NJA</u>	Access the main menu
<u>:: 200</u>	Take option 200 from the menu

This initialization procedure first checks to see whether i/OS Job Accounting is already installed on your machine. If it is, the existing definition **WILL BE REPLACED**. For this reason, it is important that you finalise any processing on your old Job Accounting system before installing NJA.

The Accounting Journal QSYS/QACGJRN is then created (if it doesn't already exist), and a journal receiver is attached to it. Journal Receivers will follow the naming standard required by OS/400 Operational Assistant.

The system value QACGLVL is then set to advise the iSeries that it should now start collating usage information.

You are then asked to define control information. This is explained later in this manual. You must enter information, but this can be changed later if necessary (via option 1 of the menu).

Navan Job Accounting is now installed. After this initialization procedure is completed, the 'Install NJA' option of the menu is disabled (it will no longer work).

It is suggested that you now save a copy of your installed version of NJA. Please use a tape OTHER than the one supplied to perform this:

```
:: SAVLIB NJALIB DEV(TAP01) VOL(*MOUNTED)
```

Co-existence with i/OS Operational Assistant

Operational Assistant is a standard feature of the iSeries operating system. One of the options it provides is to allow you to control your printed output. It performs some of the features of this facility by processing entries in the job accounting journal - the same journal used by Navan Job Accounting.

The two functions will co-exist quite successfully on the same iSeries, but you should be aware that if you use the cleanup function of Operational Assistant you may lose some of your accounting data - *unless* you ensure that the 'Load Accounting files from Journalling' option of the NJA menu (option 10, program JALOAD) is **always** run *before* the Operational Assistant cleanup processing is performed.

For information on Operational Assistant, and Operational Assistant Cleanup Functions, refer to the IBM iSeries System Operators Guide chapter 8, 'Cleaning up your system'.

Installing NJA (part III)

Defining Account codes

Account Codes can be defined in two places, on a User Profile and on a Job Description.

The code on the Job Description is only used when the *JOBID is used to start a job. It is not used when a user submits a job using the SBMJOB command (the users Account Code is used).

Account codes can be manipulated within a job using the CHGACGCDE (Change Account Code) command, provided the user is authorised to use this command.

When assigning Account Codes, you should consider how you wish your user information to be grouped for invoicing purposes. So you could assign one code to all Accounts system users, another to all Sales users, and so on.

It is not necessary (and is probably undesirable) to have unique codes for *each* user of the system. If you ever wish to extract all information for one user, it is possible to do this from the NJA files via a Query or other HLL program.

Installing NJA (part IV)

Setting up NJA Control Information

The control information within NJA must be set up before Invoices can be produced. This is stored as follows:

The *Control Factors Data Area* JACTRL, which stores information about how NJA is required to be used. JACTRL is created in the initialization procedure, and can be updated using option 1 of the menu.

The *Exchange Rates Master File* JAPEXRT, which is only required where you are producing invoices in more than one currency. JAPEXRT is loaded using option 2 of the menu.

The *Time of Day Penalty Rates File* JAPTODP, which is only required where you are penalising batch jobs for running during specified times within the day. JAPTODP is loaded using option 4 of the menu.

The *Account Master File* JAPACCT, which must contain an entry for each Account Code defined (including *SYS, which is a system entry used for recording things that the system does independently of users). JAPACCT is loaded using option 4 of the menu.

The following pages show you how this control information is set up.

Control Factors

Control Factors must be defined tell the system how to work, as well as to provide default information for other processes in the system.

The Control Factors maintenance screen must be loaded when you initialize NJA (option 200 on the menu). Also, the information can be changed at any time by using option 1 on the menu.

```
JAR010D1          Accounting Control Data - Maintenance
Change

      Next Invoice Number.....: 1
      Last Processing Run.....: 00-00-00
      Invoice Retention (mths).....: 6
      System Base Currency Code.....: GBP

      Standard Charge Rates
      VAT %.....: 17,50
      Charge per CPU Second.....: 0,050
      Charge per 100 I/O operations.: 0,060
      Charge per 100 print lines....: 0,085
      Charge per Kb Disk Storage.....: 0,025

      System Control Factors
      Apply Time Of Day Penalties?..: Y   (Y=Yes, N=No)
      Apply Interactive Penalty %...: 5
      Load Invoicing *OUTFILE?.....: Y   (Y=Yes, N=No)

F3=Exit
```

Next Invoice Number. The next number to be used when creating invoices. This number is automatically updated by the system as it creates new invoices. If you ever need to alter this value, make sure you do not change it to a value that may cause duplicate invoice numbers in NJA, otherwise unexpected results could occur.

Last Processing Run. The date of the last Invoice Generation run. You should not need to change this, as it is for information purposes only.

Invoice Retention (mths). This defines how many months historical information you wish to keep in NJA. It is used by option 50 of the menu to remove historical information older than the specified number of months.

System Base Currency Code. This is the Currency Code you normally operate in. It must be entered, but is only of real importance if you are generating invoices in foreign currencies.

Standard Charge Rates

VAT%. This is the Value Added Tax rate that is usually applied to invoices generated by the system. The value entered here is used in Account Maintenance (menu option 4) as a default. Tax is an optional feature. If you don't apply tax, type 0 for the VAT%.

Charge per CPU second. This is rate that will be applied to CPU usage. The value entered here is used in Account Maintenance (menu option 4) as a default. CPU charging is a mandatory field.

Charge per 100 I/O operations. This is rate that will be applied to I/O usage. The value entered here is used in Account Maintenance (menu option 4) as a default. I/O charging is a mandatory field.

Charge per 100 print lines. This is rate that will be applied to printer usage. The value entered here is used in Account Maintenance (menu option 4) as a default. Print Line charging is a mandatory field.

Charge per Kb Disk Storage. This is the charge for disk storage used. The rate will be applied to Storage allocated against user profiles within an Account Code. The value entered here is used in Account Maintenance (menu option 4) as a default. Storage charging is an *optional* feature; if you don't intend to charge users for storage, enter 0 in the charge rate.

System Control Factors

Apply Time of Day Penalties? If this is set to 'Y' (Yes), you can penalize batch jobs that run with specified timeframes. Penalty times are defined using option 3 of the menu.

Apply Interactive Penalty %? The value entered here is applied as an uplift loading factor (penalty) on any interactive processes. This allows you to charge more for interactive CPU usage (compared to Batch CPU usage).

*Load Invoicing *OUTFILE?* If set to 'Y' (Yes), the Invoice Generation processing run will write invoice detail information records to file JAPJIDTA. This feature gives you the capability of transferring invoiced job accounting data into another application.

Exchange Rates

If you are generating invoices in more than one currency, you must enter the currency exchange rates using option 2 on the menu. The exchange rates information defines, for each currency in use, its relationship to the system base currency (defined on the control factors using option 1 of the menu).

```
JAR030D1          Exchange Rates - Maintenance

Type options, press Enter.
4=Delete

      Currency   Description                Exchange
      Code                               Rate
-----
   ___  EUR      Euro                    0,320
   ___  SEK      Swedish Kronor                0,120
   ___  NOK      Norwegian Kroner                0,150

Position list to:

      EUR

F3=Exit
```

If you already have some rates defined, they will be listed at the top of the list. These can be changed by typing over the information shown. To delete an existing entry, type a '4' in the column beside the rate to be deleted and press enter. To add a new rate, enter all information for the new rate in one of the spare lines at the bottom of the list.

Currency Code. This is a code that identifies this currency. You cannot enter the System Base Currency code (the code defined on Control Factors) here, as it is assumed to be a rate of 1.

Currency Description. This is to describe what the currency is.

Exchange Rate. This is a *divisor* used to relate the value of this (prime) currency to the System (base) currency.

For example, if the rate was .10, which signifies a ratio of 1 (prime) :10 (system), then 2 units of this currency would be worth 20 units of System Base currency.

The rate is used for converting system information (kept in system, or *base*, currency) into a foreign currency for invoice printing.

Time of Day Penalty Rates Maintenance

This facility allows you to define certain times within normal daily activity during which batch jobs will be penalized for running. The penalty to be applied is based on the **START** time of the batch job. If the job starts within a penalty timeframe, the penalty will be applied when calculating the value of the job.

If you already have some penalties defined, they will be listed at the top of the list. These can be changed by typing over the information shown. To delete an existing entry, type a '4' in the column beside the penalty to be deleted and press enter. To add a new penalty, enter all information for the new penalty in one of the spare lines at the bottom of the list.

A warning will be displayed at the bottom of the screen if the control flag is not set (Time of Day penalties will not be applied).

```
JAR035D1          Time of Day Penalty Rates - Maintenance
Type options, press Enter.
 4=Delete

   From      To      Description      Penalty
   Time      Time
-----
 00:00    02:30    Backup processing      40
 07:30    10:00    Morning Peak           5
 14:00    16:00    Afternoon Peak         8
 19:00    21:00    Heavy Dayend Processing 12
   :00      :00
   :00      :00

Position list to:
   :00      2:30

F3=Exit
```

From Time/To Time. This defines the range between which to apply the penalty. Any batch jobs starting between the times specified will be subject to the defined penalty.

'From' Time 0 is assumed to be midnight.
 'To' Time cannot be the same as From Time
 'To' Time of 2400 is assumed to be midnight.

If two date ranges overlap, only the **FIRST** will be considered. The time range must be defined within the same day. If you need to define a timeframe that spans midnight you must specify two ranges; one *before* and one *after* midnight.

Description. This is an informational description as to why the penalty is being imposed.

Penalty %. This is the factor that will be added to the costing of any batch job that is subject to this penalty.

Accounts Master File

All account codes that have been defined on iSeries user profiles **must** be defined to NJA. This is achieved by using option 4 of the menu. The information screen for loading account information looks like this:

```
JAR020D2          Account Master File - Maintenance
Change

Account Number.....:4160 OPERATIONS
Account Name.....:Operations
Account Address.....:Internal

Telephone Number.....:
Customers Reference.....:
Our Reference.....:
Account Currency Code.....:GBP

Account Type Int/Ext.....:I      Last Invoice Number...: 46
Invoice Type.....:2      Last Processed.....: 98-09-01

Account Charge Rates (Base Currency)
VAT%.....: 17,50
Charge per CPU second.....: 0,050
Charge per 100 I/O ops.....: 0,060
Charge per 100 Print lines.: 0,085
Charge per Kb Disk Storage.: 0,025

F3=Exit  F11=Delete  F12=Previous
```

Account Number. This must be defined exactly the same as it was entered on the user profile.

Name and Address. This information will print on the invoice. Name and at least one line of address information must be entered.

Telephone. Information only. This does not need to be entered

Customer Reference. Information only. If entered, it will appear on the invoice. This can be used to store the customer order number, for example.

Our Reference. Information only. If entered, it will appear on the invoice. This can be used to store the agreement number, for example.

Account Currency Code. When adding a new account, the system default currency code (defined on the Control Factors) is assumed. If this account should be invoiced in a currency other than the default code, enter the appropriate currency code. The code should have previously been defined in the Exchange rates file (option 2 of the menu).

Account Type. Defines whether the account is Internal (I) or External (E). An *Internal account* is an account for users within your own organisation. An *External account* is where the user is not part of your own organisation (an external services user, for example). This is purely informational within NJA, but it may be of use when analysing the data for other purposes.

Invoice Type. Specifies what type of invoice will be produced for this account, either 1 - Full detail, or 2 - Summary only. *Full detail* will print summarised totals of information by run date; *Summary* will print only a single total.

VAT %. This is the tax rate that is to be calculated. When adding a new account, the system default (defined on the Control Factors) is assumed. If this account should have a different VAT rate applied, enter the appropriate rate. An entry of zero is valid, which assumes that no VAT is to be calculated for this account.

Charge rates. These are the rates that will be used to invoice this account. When adding a new account, the system defaults (defined on the Control Factors) are assumed. If this account should have different rates applied, enter the appropriate rates. It is important to note that these rates must be defined in the SYSTEM Currency, and not the ACCOUNT currency.

Last Invoice/Date Last Processed. This is information only, that tells you when this account was last processed in an Invoice Generation run.

Loading Job Accounting data into NJA

Information is extracted from the iSeries job accounting journals by taking option 10 from the menu. This option submits a job for batch processing that will process the journal and load the data into NJA files. Should any errors be found on any of the data extracted, reports will be printed that can be used for correction purposes later.

All data is extracted, whether it is correct or not. The journal is then reset (to ensure duplicate extraction does not occur).

Data from the Accounting journal is stored in two files within NJA:

- *Job Resource* data is stored in physical file JAPJBDA
- *Printer Resource* data is stored in physical file JAPPTDA

The Account Information Load process only LOADS the NJA files - it does not PROCESS the information. Invoicing occurs by using option 20 of the menu. The reason for this is to allow you the option to extract accounting information daily, but only to invoice periodically.

Correcting any problems in the raw Job Accounting data

It is possible that Job Accounting data loaded into NJA is not acceptable for processing. This is usually caused by one of the following situations:

1. An Account code was used on a user profile, but the Account code has not yet been defined in NJA
2. A user profile was created without an Accounting code
3. A user profile was created with the wrong Accounting code

All of these situations can be resolved quite simply, but until corrected the data in error will not be processed on invoices.

In case 1, you simply have to access the NJA Account Maintenance procedure (menu option 3) and add the new Accounting code.

In case 2 and 3, you can take option 11 or 12 from the menu to maintain the accounting code on the resource records.

After making corrections, you can check that all uninvoiced data is now correct by taking option 13 of the menu. This will submit a batch job to print a list of any information still requiring corrections to be made.

Generating Invoices

Invoice generation is performed using option 20 from the menu. This will submit a job for batch processing.

The first part of the processing checks all information that has not yet been invoiced. A test is performed on the Account code on each record to ensure it is a valid code. If an incorrect code is found that record will be reported on an exception list and will be ignored in this processing run. It is possible to correct this information later (using option 11 or 12 of the menu) and resubmit the corrections in another invoice generation run.

The next step in the processing prints the invoices and the invoice register. The invoice for each account will print in one of two ways, depending on the Invoice type flag on the Account. If a summary invoice is to be produced the invoice will print totals only for the Job and Print information. If a detail invoice is to be produced, the information is summarised to print one line for each date that processing was recorded.

If the control record has been defined to generate an invoicing *OUTFILE, then details will be written for each job accounting entry processed in this invoicing run to file JAPJIDTA.

Invoice Calculation

The charges on an invoice are calculated using the following formulae. The calculations are performed on a *line-by-line* basis and a charge is calculated for *each line*. These line charges are then accumulated into a total for each resource type. VAT is then calculated on the resource total.

JOB RESOURCE

$$\begin{aligned} \text{CPU Time} & \quad * \quad \text{CPU charge} & = & \text{CPU Value} \\ \frac{\text{Auxiliary I/O}}{100} & \quad * \quad \text{Auxiliary I/O charge} & = & \text{I/O Value} \\ \text{CPU Value} & \quad + \quad \text{I/O Value} & = & \text{Line Value} \end{aligned}$$

If *interactive*, apply penalty percentage to Line Value
 If *batch*, apply applicable Time of Day penalty to Line Value

PRINTER RESOURCE

$$\frac{\text{Total Lines Printed}}{100} \quad * \quad \text{Print charge} \quad = \quad \text{Print Value}$$

STORAGE CHARGES

$$\text{Total Storage Used} \quad * \quad \text{Storage charge} \quad = \quad \text{Storage Value}$$

VAT APPLICABLE

$$\frac{\text{Line Value} + \text{Print Value}}{100} \quad * \quad \text{VAT\%} \quad = \quad \text{Resource VAT}$$

$$\frac{\text{Storage Value}}{100} \quad * \quad \text{Storage VAT\%} \quad = \quad \text{Storage VAT}$$

$$\text{Resource VAT} \quad + \quad \text{Storage VAT} \quad = \quad \text{Invoice VAT}$$

JAPJIDTA, the invoicing *OUTFILE

If the NJA control data specifies that an *OUTFILE is to be generated, the Invoicing process will load records into file JAPJIDTA based on the information it has used to generate the invoice.

The data is 'low level' information which can be used as a link file into your accounts system or as a reporting file for you to use with the iSeries Query product.

<p>NJA does not use this file; it only loads it with information if requested. Similarly, NJA does not clear or reset this file at any time - it is a user responsibility to manipulate the data in this file as you require.</p>
--

The layout of the file is described on the next page. For a detailed description of any of the job accounting fields you can refer to the IBM iSeries Work Management Guide.

File Name: **JAPJIDTA** - Job Invoicing *OUTFILE
 Record Format Name: JARJIDTA

Field	Description	Attributes	Comments
<i>...Information common to all record types</i>			
JIACT	Account Number	Character (15)	
JIATP	Account Type	Character (1)	I=Internal E=External
JIITP	Invoice Type	Character (1)	1=Full detail 2=Summary only
JIRTP	Record Type	Character (1)	1=Job Resource data 2=Printer Resource data 3=Storage Used data
JIINV	Invoice Number	Packed Dec (7 0)	
JIIDT	Invoice Date	Packed Dec (8 0)	in Year/Month/Day format
JILIN	Invoice Line Number	Packed Dec (7 0)	
JIJOB	Job Name	Character (10)	
JIUSER	Job User	Character (10)	
JINBR	Job Number	Zoned Dec (6 0)	
JITYPE	Job Type	Character (1)	A=Autostart job B=Batch job I=Interactive job M=Subsystem monitor R=Spooling reader W=Spooling writer
JISDTE	Date the job started	Character (6)	in Year/Month/Day format
JISTIM	Time the job started	Character (6)	in Hour/Minute/Second
format			
<i>...Information for Record type 1 - Job Resource Data</i>			
JICCDE	Job completion code	Packed dec (3 0)	
JICPU	CPU time used	Packed dec (11 0)	in milliseconds
JIAUX	Auxiliary I/O operations	Packed dec (11 0)	
JITRNT	Total transaction time	Packed dec (11 0)	in seconds
JITRNS	Number of transactions	Packed dec (11 0)	
JIDBPT	Database puts	Packed dec (11 0)	
JIDBGT	Database gets	Packed dec (11 0)	
JIDBUP	Database updates	Packed dec (11 0)	
JICMPT	Communication puts	Packed dec (11 0)	
JICMGT	Communication gets	Packed dec (11 0)	
<i>...Information for Record type 2 - Printer Resource Data</i>			
JITPAG	Total pages printed	Packed dec (11 0)	
JITLIN	Total lines printed	Packed dec (11 0)	
<i>...Information for Record type 3 - Storage Allocation Data</i>			
JISTG	Disk storage allocation	Packed dec (7 0)	in bytes
<i>...Information common to all record types</i>			
JIAPP	Applied penalty %	Packed dec (3 0)	any penalty applied to type B or I jobs
JIVAL	Line Value	Packed dec (9 2)	calculated value of the line in system currency

Miscellaneous Topics

Invoice Inquiry and Reprint functions

Invoice Inquiry is available using option 40 of the menu. The first display will show all accounts defined to NJA. When you select one of the accounts shown, you will then be given a list of all invoices that have been produced for that account. From this list you can then select to see the actual detail that was used to generate the invoice, if you wish.

Invoice Reprints are available using option 30 of the menu. You will be asked to enter the invoice number you require to be reprinted. The invoice reprint is exactly the same format as the original invoice, but the word

***** REPRINT *****

appears at the top of the document printed.

File Cleanse procedures

It is entirely at your discretion as to how much historical information you wish to keep in NJA, but as files get larger they take up more space on your iSeries and processing does slow down. For this reason an option has been provided to remove historical invoice data that is older than a specified date.

On your Control Factors (defined using option 1 of the menu) there is an entry titled 'Invoice Retention (mths)'. This tells NJA how long you want to keep invoices for.

When you take option 50 on the menu, a job is submitted for batch processing that will remove all historical invoice information from NJA that is older than this. All information is retained until you process option 50.

It is essential that, while this processing is being performed, *no other options* are used within NJA.

The invoicing *OUTFILE, JAPJIDTA is not cleansed by NJA. this file should be cleaned using your own user applications.

Year-End processing

At the end of the financial year you should run the 'Year End Processing' option. This will reset all account 'year-to-date' values to zero.

NJ9000 – Display NJA Installation Attributes

This program allows the user to display the attributes for the installed version of NJA. This information will assist Navan in problem resolution, should you require assistance. The program can be called from the NJA main menu, option 201:

```

NJ9000D1          NJA Installation Attributes
Display

      System name.....:  SYSNAME
      Serial number.....:  12A456B
      Model number.....:  520
      Processor feature.....:  7450
      OS/400 Release level.....:  V5R3M0

      NJA Version/Release.....:  V6R0M1
      Release Date.....:  2005/03/15

F3=Exit
    
```

Appendices

Setting your initial charging values

Probably the most complex decision you are going to have to make in running this application is, unfortunately, going to be made when you first install it - "How much do I charge for the resources?".

This is not a simple question to answer, since the values in use by one installation may be totally irrelevant to another installation. Are the charges to be based on the cost of running your iSeries? Should they allow for profit margins? There are just so many variables it is impossible to recommend values that will apply to everyone.

The values we initially advise for covering running costs in England are as follows:

Charge per CPU second	0.05
Charge per 100 I/O Operations	0.06
Charge per 100 Print lines	0.085
Interactive penalty %	5

You may use these as a starting point. Convert them to your own currency first, then apply any markups you consider necessary. **Don't forget** to take into account all of your operations costs, even the cost of the paper for printing.

Analysing the results

You should request that the Invoicing *OUTFILE be loaded (this is an option on the Control Factors maintenance screen) - *at least* for when you first start using NJA. You can always switch it off at a later date if you no longer need it to be loaded. This *OUTFILE gives you a fully detailed database file showing all of the resource information, as well as all the charges applied. It is an ideal format for using with the iSeries Query product.

Once the initial values are set, and Job Accounting is in operation, let the system collect data for a reasonable period (a week or a month). Then load the data into NJA (using option 10 of the menu) and if all data is valid (based on the reports from the previous load), run an Invoicing run using option 20 of the menu. From the Invoice Register you can see a total amount that has been charged. You can then analyse the details of this run by using the OS/400 Query product, generating reports over the Invoicing *OUTFILE, JAPJIDTA.

If you are happy with the results, then operations can continue as normal. If you need to adjust the values, you have this capability - but **ONLY ON THIS FIRST INVOICING RUN.**

Re-starting the initial Invoicing run

If you are not happy with the initial values set for the charge rates you can rerun this initial invoicing run with new values. The procedure for doing this is as follows:

1. Reset the default charge rates in the Control Factors to your new values, by using option 1 of the menu.
2. Correct each account in the Account Master File, by using option 4 of the menu (*a handy tip*: If you wish to reset the account to the new defaults loaded onto the Control Factors, just blank out the entries on the Customer. This will cause the program to retrieve the defaults and load them onto the customer's record).
3. From the menu, type in the command CALL JARESTART and press enter. A prompt will advise you that the procedure will reset all Invoicing Data; type in a 'G' to continue. The program will then clear all Invoicing data and reset all Resource lines to 'not yet invoiced'.
4. Run Invoice processing again, using option 20 of the menu.

You can rerun this procedure against your initial processing run as many times as you wish. However, once you have accepted this initial invoice run

YOU MUST NOT USE THIS PROCEDURE AGAIN

The procedure resets *ALL* invoicing in *ALL* files and could cause double-charging to occur if you use it at a later date. In fact it is our advice that, after you accept this initial invoice run, you remove this rerun feature by using the following command:

```
:: DLTPGM PGM(NJALIB/JARESTART)
```

Job environments and object authority

All objects in NJALIB are owned by QPGMR, for use by any user, **EXCEPT** for procedures @CHGACG, JAINSTALL and JALOAD. These objects are owned by the security officer so that the manipulation of the i/OS Job Accounting journals may be performed successfully by any user of NJA.

All batch processes are performed using job description NJAJOB, which will submit jobs to QBATCH and direct spooled output to PRT01. If these options are not correct for your installation, please use the CHGJOB (Change Job Description) command to alter them to your requirements.

It is also important to mention that any change to Job Accounting in the iSeries should be done via NJA. If you change the system value QACGLVL, or alter the journal or journal receiver, unpredictable results could occur.

Modifying the application

Source code for the application is available for a nominal charge. As such, it is possible to customize the application to your own needs. For example, you may need to modify program JAR300 to write records to your Financial system.

All programs in the NJA facility were generated using the NUTIL (Navan Utilities) program generator. Should you need to add new programs to this application you can ensure that you follow on the programming standard by using this utility.

It should also be noted that many of the programs have 'compiler directives' attached to them. You can see these at the top of each source member in the source files. These are used by NUTIL utilities to direct certain things to happen before, during and after program compilation. If you do not use NUTIL you must manually perform these directives, otherwise the object creation may fail.

Effect of user modifications on product warranty

Any warranty implied or expressed by Navan Ltd relating to this product does not apply to any portion of the product altered by someone other than an authorised Navan Ltd employee.

In other words, user modifications to the NJA facility are not covered by any Navan Ltd warranty or support agreement.

NJA reports

As supplied, all printed output will be to a page size of 66 lines, with page overflow occurring at line 62.

Should you wish to alter this to conform to a different standard you should use the
CHGPRTF FILE (NJALIB/*ALL) command, specifying your own definitions as required.

Object compression

The library objects are supplied in compressed form. You should give consideration to decompressing the objects in order to improve user access times. Refer to the IBM CL Reference manual for a discussion of the Decompress Objects (DCPOBJ) command.

Security Auditors note

The NJA installation procedure is performed by the QINSTAPP installation program, which can be found at SEQNBR 1 on the supplied tape. Should you need to review the installation procedure for security purposes you can do this as follows:

```
CRTSRCPF FILE(QTEMP/QCLSRC)

RSTOBJ   OBJ(QINSTAPP) DEV(TAP01) SAVLIB(QTEMP) +
         OBJTYPE(*PGM) RSTLIB(QTEMP)

RTVCLSRC PGM(QTEMP/QINSTAPP) SRCFILE(QTEMP/QCLSRC)
```

The source for the installation program is then in file QTEMP/QCLSRC, member QINSTAPP. Should you have any security objections to this installation procedure, please advise Navan directly.

It is possible (*but not recommended*) to install NJA using a modified version of the retrieved CL source but in doing so you remove any liability from Navan for the successful operation of the installation procedure.

Operating System configuration

NJA is designed to work with a standard iSeries operating system as supplied by IBM. Should any local changes have been applied to any portion of this standard operating system, there is no guarantee of correct operation of the system.

Such local changes to i/OS include any alterations to system object authorisations; changing command parameter defaults; changing command processing environment defaults.

It is important to note that if i/OS is reinstalled again AFTER the installation of this utility, **you must rerun the JAINSTALL command before restarting your operations.**

Failure to do this may mean that the utility does not process job accounting data. Refer to the JAINSTALL command for further information.

Support Contacts

This program product is supplied as Freeware and, as such, no warranty is implied or expressed. The following contacts (preferably done via email) are provided to assist you in resolving initial installation difficulties.

We are interested in receiving your feedback and comments on the product, which can be sent to either of the addresses mentioned below.

Ideas, additions and enhancements to the product are always welcomed. If you have developed functions that you think may benefit other installations we would be happy to host them for distribution at our website - provided the function (both source code and object code) is released as freeware by the author. But fear not, authoring credit will be given where credit is due!

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