



IBM i2 Analyst's Workstation Quick Start Guide

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This edition applies to version 8, release 9 of *IBM® i2® Analyst's Workstation* (product number 5725G14) and to all subsequent releases and modifications until otherwise indicated in new editions.

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Quick Start

Welcome to IBM® i2® *Analyst's Workstation 8*.

Analyst's Workstation provides powerful solutions for accumulating, investigating, analyzing, and displaying complex information and relationships in link and entity data.

This guide aims to introduce you to the key concepts and basic operations of *Analyst's Workstation*. Read this guide to familiarize yourself with the software before you start to read the other product documentation to learn more about *Analyst's Workstation*.

Further documentation exists for each of the individual applications that make up *Analyst's Workstation*. For further information please refer to *Learning More About Analyst's Workstation* on page 27. If you need more information or help when using a specific feature of *Analyst's Workstation*, you can press the F1 key at any time to access the online help.

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What is Analyst's Workstation?

Analyst's Workstation is an integrated suite of applications that support a wide range of analytical activities at strategic and tactical levels. Using *Analyst's Workstation* you can employ a number of analysis techniques on a central data source. The results of your analysis in one application can be passed on to other applications for further analysis.

Your central data source, in *IBM i2 iBase*, is typically populated by manual input or by importing data from an external system. An *iBase* import specification can be configured to import records from a wide variety of sources.

IBM i2 iBase

iBase is the central repository for *Analyst's Workstation* and serves as both a data modeling tool and as a data analysis tool in its own right. You can use it to:

- store data in the form of records so that it is available to the other analysis applications
- analyze your data by querying and organizing the resulting data
- manage the data by creating, editing, and deleting records
- import data from and export data to, external files
- produce reports

When you create data in or import data into *iBase*, you do so as either entities or links. For example, an entity can represent an individual, location, organization, or object and a link can represent an association, transaction, or ownership.

To get started using *iBase*, refer to the *IBM i2 iBase Quick Start Guide*.

IBM i2 Analyst's Notebook

IBM i2 Analyst's Notebook® is a graphical application designed to display and analyze intelligence relating to an investigation. You can create charts, both manually and automatically, using data from *iBase* or from reports, photographs, email messages, spreadsheets, and so on. You can create charts to depict:

- associations between entities such as people, vehicles, and organizations
- the flow of data such as telephone calls and financial transactions
- how related events unfold over time

To get started using *Analyst's Notebook*, refer to the *IBM i2 Analyst's Notebook Quick Start Guide*.

Data Miner

Data Miner is a numerical analysis application. It allows you to analyze large amounts of data and find whether patterns exist in subsets of data, and whether these patterns repeat in predictable ways.

To get started using *Data Miner*, refer to *Getting Started with Data Miner* on page 7.

IBM i2 iBase Geographic Information System Interfaces

IBM i2 iBase Geographic Information System (GIS) Interfaces enable you to use third party GIS systems as an extension to your investigative analysis. You can plot *iBase* data such as people, places, vehicles, organizations, and their associations, onto any relevant map using their coordinates.

To get started using *Base GIS Interfaces*, refer to *Getting Started with iBase GIS Interfaces* on page 23.

Typical Workflow

The following subsections describe a typical workflow in *Analyst's Workstation*.

Storing information in iBase

You can import data into *iBase* or create it manually. When you want to create a person record, you select the Person entity type in *iBase* and then supply the data to create a record.

Investigating using Data Miner

Data Miner allows you to analyze large volumes of data that are stored in *iBase*. For example, by considering events and the months in which they occurred, you can generate a statistical construct known as a cube and display the information in a number of different ways such as histograms, pie charts, grids, and so on.

You can then drill down further into the data to show a more refined set of results. For example, you can select each month and show each day in a month in more detail. Again you can show a variety of different presentations of the data. This may allow you to identify a peak period for events.

Identifying locations using a GIS system

After identifying a peak period in *Data Miner*, you can investigate the locations of those events using *iBase GIS Interfaces*. On a map, you can display the events based on their location.

A density grid can help to identify areas with significantly higher event rates. The darkest squares in the grid indicate the areas with the highest density, allowing you to zoom in to these areas.

Finding sightings on the streets using iBase

Once you have identified a target location and date range, you can create a query in *iBase* that looks for people sighted in a specific area on the dates of the peak period. Running the query returns any matching results.

Analyzing data in Analyst's Notebook

Once the results have been returned, you can investigate the data on these people and places by visualizing the results in an *Analyst's Notebook* chart.

You can arrange the query results into person-based groupings. For example, a number of events relating to jewelry might indicate a common factor. You could make the people related to the jewelry events your main targets.

Once you have established a theme, you can investigate further, removing any non-related items and adding extra information to your chart. For example, you may already be investigating another person. You can find that person using *iBase*, and add him/her to the chart.

To investigate whether there are any links between your target and the other people on the chart, you could use the *iBase* Find Path facility within *Analyst's Notebook*. For example, paths may be found between your target and five other people on the chart, suggesting the possibility of an organization behind the events. To emphasize this you could select the Hierarchy layout with your target as the root.

A Hierarchy layout may highlight evidence of an organization more clearly, implicating further targets (those people related to non-jewelry events but who are involved in the organization). They can be added to the Target set.

You have now reached a conclusion and can make a report naming your targets.

Producing a report in iBase

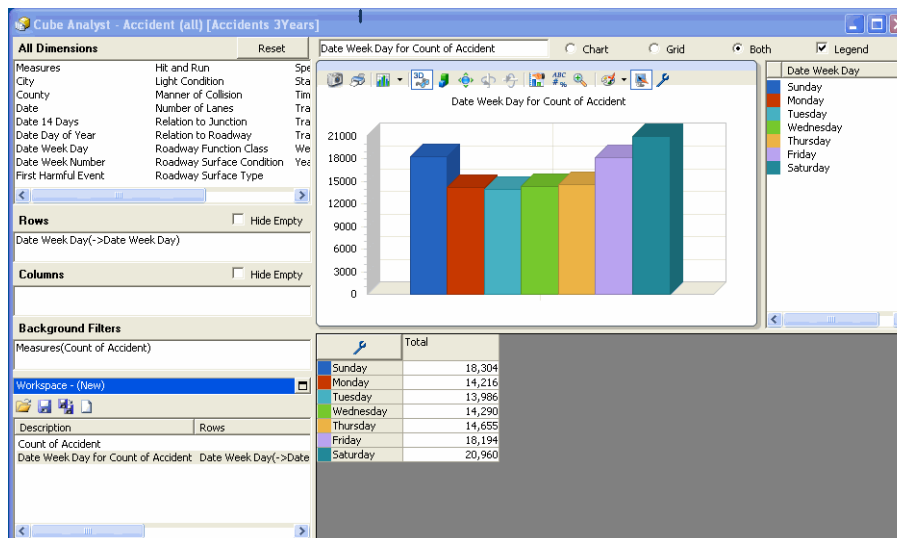
Once you have completed your investigation, you can generate reports based on existing standard report definitions and Microsoft Word templates. You can open these in Microsoft Word to review the pages showing the details of the targets.

Getting Started with Data Miner

With your data stored in *iBase* (for more information refer to the *IBM iBase Quick Start Guide*), you can use *Data Miner* to analyze that data and find whether patterns exist in subsets of data, and whether these patterns repeat in predictable ways. You can use it to:

- define a cube in which to take a snapshot of your *iBase* data
- present the cube data in a number of data charts, such as vertical/horizontal bar charts, pie charts, or line charts as well as in grid format
- filter out aspects of chart detail
- drill down into the detail of a chart to reveal a finer level of detail

The following example shows a bar chart and its legend together with a grid of values:



Data Miner data can be:

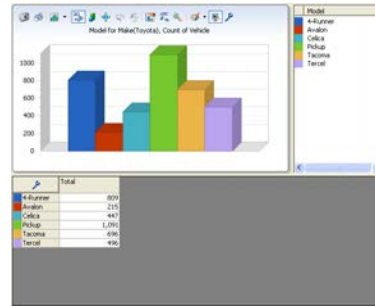
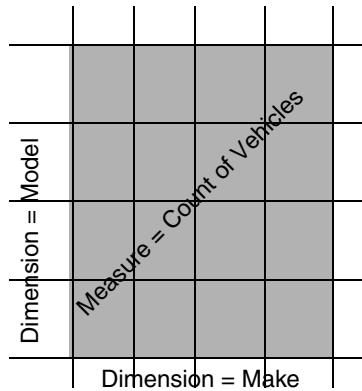
- put into an *iBase* data set
- used to create a new *Analyst's Notebook* chart
- sent to third party mapping applications via *iBase GIS Interfaces*, for display on a geographical data map

- copied and printed as an image or pasted into other applications such as a spreadsheet

Data Miner data

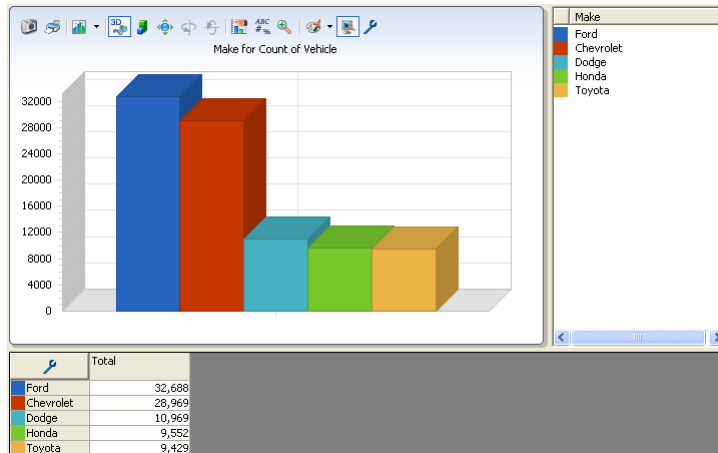
Before describing many of the powerful facilities of *Data Miner* it is important to understand the concept of how *Data Miner* handles data. This is key to understanding how *Data Miner* charts are produced and analyzed.

Field Name	Type	Size
Body Type	Text	100
Case Number	Counting Number	
Crash Avoidance Maneuver	Text	100
Extent of Deformation	Text	100
Initial Impact Point	Text	100
Make	Text	50
Model	Text	100
Principal Impact Point	Text	100
Travel Speed	Text	50
Vehicle Maneuver	Text	100
Vehicle Number	Counting Number	
Vehicle Role	Text	100
Vehicle Year	Text	5
VIN Number	Text	20
Violations Charged 1	Text	150
Violations Charged 2	Text	150
Violations Charged 3	Text	150
Year	Text	4



iBase data

Data Miner requires that data is categorized in *iBase* with appropriate labels so that it can be retrieved and plotted. For example, a vehicle could be categorized as falling into a make and model. If the make and model of every vehicle that was stolen were recorded in *iBase*, you could plot the total number of stolen cars by manufacturer, for example:



There may be additional categories that you want to use to group the data. For example, you could also add state or city as a further classification so that the total count of stolen vehicles for cars, commercial vehicles, motorbikes, and so on can be plotted for Chicago, Detroit, or Dallas, and for specific months of the year. The greater the degree of categorization of the data in *iBase*, the greater the level of detail will be available for analyzing in *Data Miner* charts.

Note: Not all fields are suitable for use in *Data Miner* as categories. Fields that contain unique values are not suitable. For example, if you use the License Number field (of vehicles), then each license number would have its own bar (as they are unique); you would have a large number of bars and the count of each bar would be 1.

Before generating your *Data Miner* charts, you will need to select the database fields that you will use as the available data categories for input into your data cube as described below.

Data cube

A data cube is used to organize the entities, links and *iBase* database fields that will be used to generate all your charts. The cube is a snapshot of the *iBase* data that will be used for analysis in *Data Miner*.

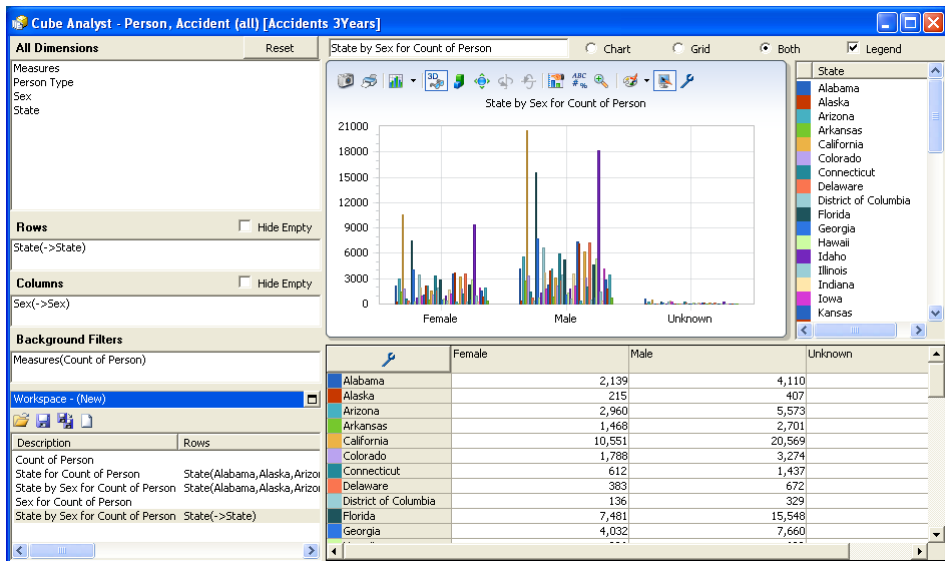
In *Data Miner*, you do not see the view of the cube data as in the above example but only as the entity and database records that you select for a cube definition and the resulting charts.

It is important that you understand the areas of the interface in which you select the data to be charted and how those areas relate to what you can see on the chart itself.

The data selection part of the interface on the left side of the screen comprises three areas - Rows, Columns and Background Filters. The selection of data in each of these areas directly affects what appears on the chart.

In the following example, the chart:

- is counting people - this is determined by the measure selected in the **Background Filters** area, Count of Person. The type of data that the chart is counting is always shown in the chart title, above the chart.
- categorizes the data by Sex - determined by the selection in the **Columns** area
- categorizes the data by State - determined by the selection in the **Rows** area.



The data shown in the chart is always a direct result of the selection in these three areas.

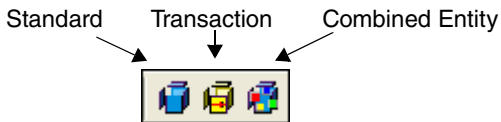
Building a cube

One of the first things you will want to do with *Data Miner* is to create a cube that you will use to create your charts. When you create a cube in *Data Miner*, you can save and then re-use it when your database is updated.

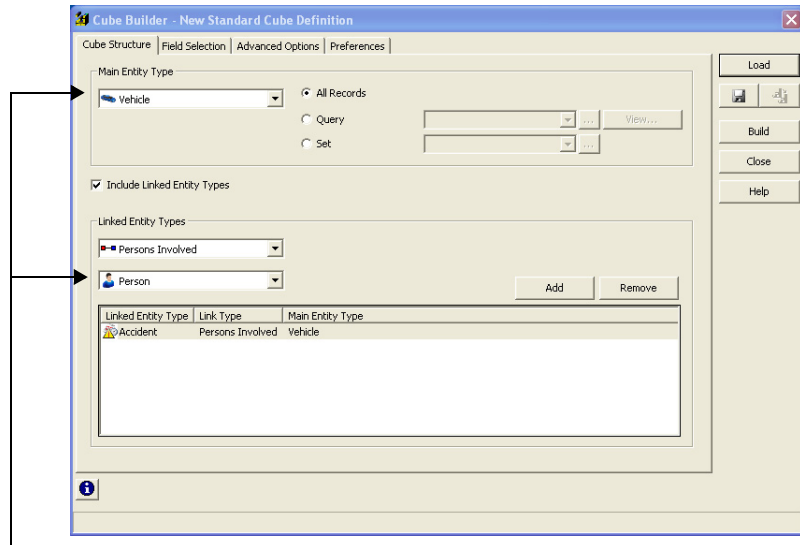
There are three types of cube available:

- **Standard:** Uses a single main entity type. You can also include data from entities that are linked to the selected entity.
- **Transaction:** Uses one main link type that links two entities of the same type. Suitable for analyzing commodity transfers, financial data and any other linked data.
- **Combined entity:** Uses several main entity types, amalgamating fields from different entities that are all the same underlying type. For example, different entities for various types of people such as offenders and victims.

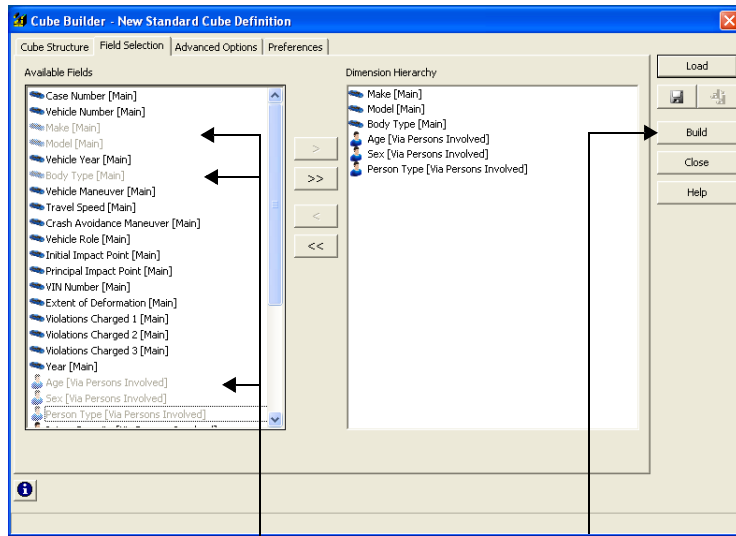
Display the Cube Builder dialog by clicking on the main toolbar to choose the type of cube you want.



All cubes are created and modified using the Cube Builder dialog, which enables you to select the main *iBase* entity and linked entities, and the related database record fields that can be selected as dimensions to produce your charts. In the following example, a cube is created that includes Vehicle Body Type, Make, and Model, and linked Person entities:



Step 1.
Select the main
database entity, and
any linked entities.

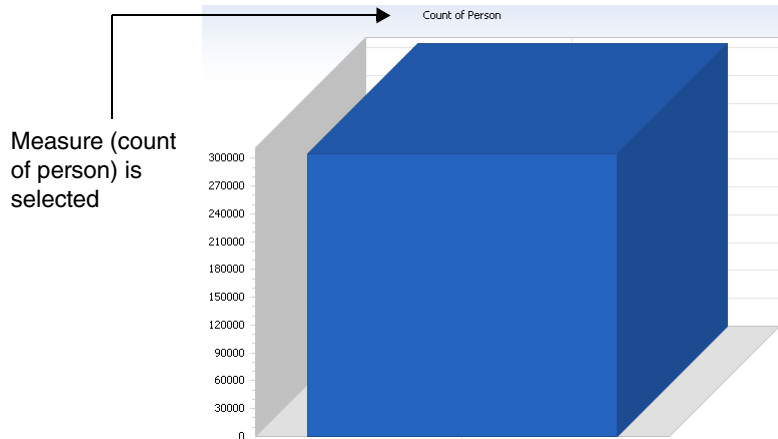


Step 2.
Select from the list of available fields to use as dimensions.

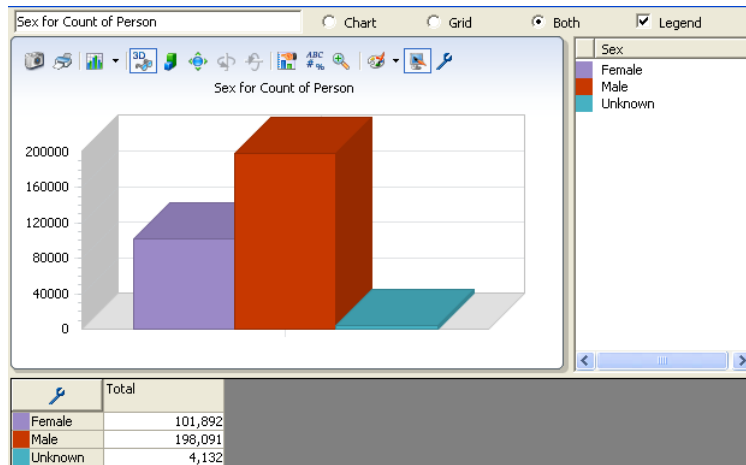
Step 3.
Click **Build** to create a cube containing the selected data.

Producing Charts

When you start to analyze a cube in *Data Miner*, a single vertical bar chart is displayed. This single bar chart represents the total measure for the dimension selected.



This chart represents the highest level in the hierarchy of data, from which you can drill down and produce more detailed charts. Drag a dimension into the Rows area, turn on **Drill down to show every individual member** in the dialog that appears. If it is a multi-level dimension, for example date with days, months, quarters, and years you may have to select a dimension from a drop-down list and then select the parts of that dimension you wish to include. When you click **OK**, a vertical bar chart is produced. You can turn on the display of both grid and chart as well as turning on the legend, for example:

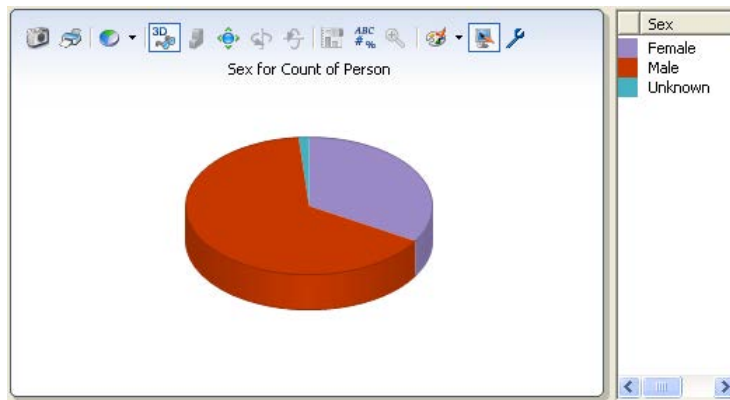


If you hold your pointer over a bar on a chart, it is highlighted and the data values are shown in a tooltip.



The type of chart can be changed easily using a special menu. The types of chart include Bar, Line, Curve, Pie, and so on.

For example, the bar chart above can be changed instantly into a pie chart. The data has also been pivoted to swap the rows and columns.

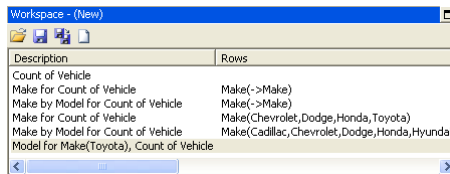


Working with charts

This section briefly looks at things that you can do when you have your chart data displayed.

Using the workspace

As you perform analysis in *Data Miner* each step is recorded in the current workspace and shown in the Workspace area of the screen. You can select entries in the workspace to move backwards or forwards in your analysis—going back to look at a previous chart for example:

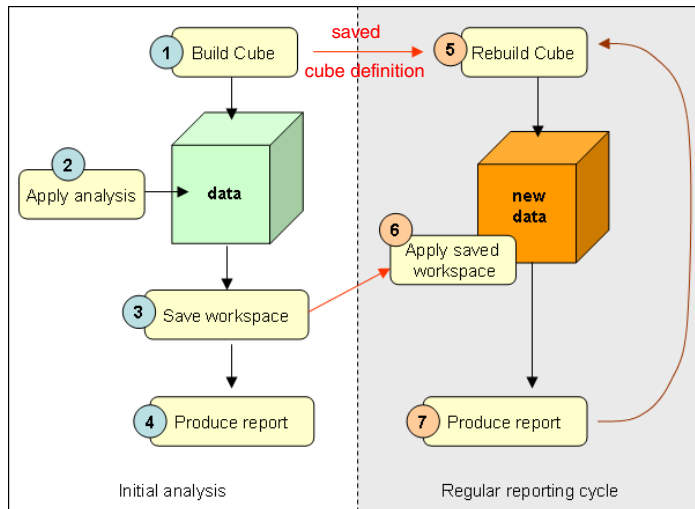


Each analysis step is represented by a workspace entry

You can click Maximize to see the entries in more detail.

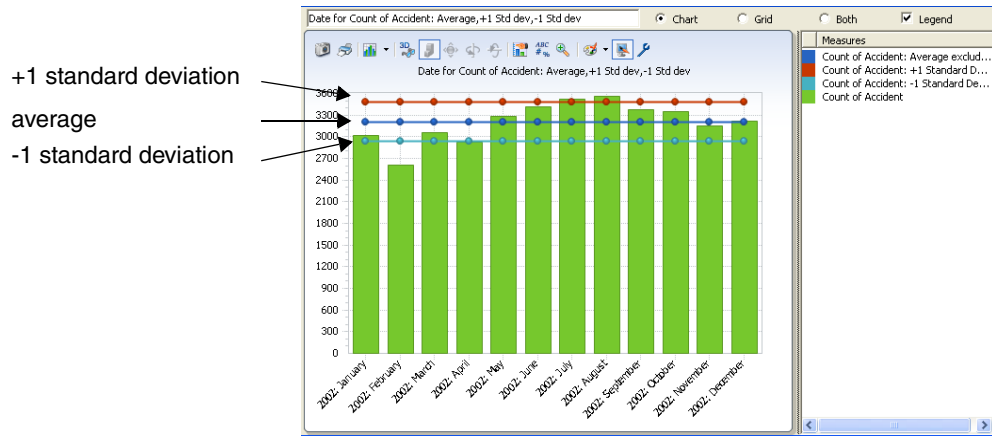
You can save and reapply the workspace to another cube with the same structure (that is, built using the same cube definition). In this way you can reproduce your analysis using new or updated data. For example if you often need to produce the same type of charts, you can produce them once and save the workspace. If a cube is built each week with the latest data, you could then apply the saved workspace and automatically produce all the charts you created the first time.

In this way workspaces can be used to produce consistent intelligence products for documents such as weekly reports.

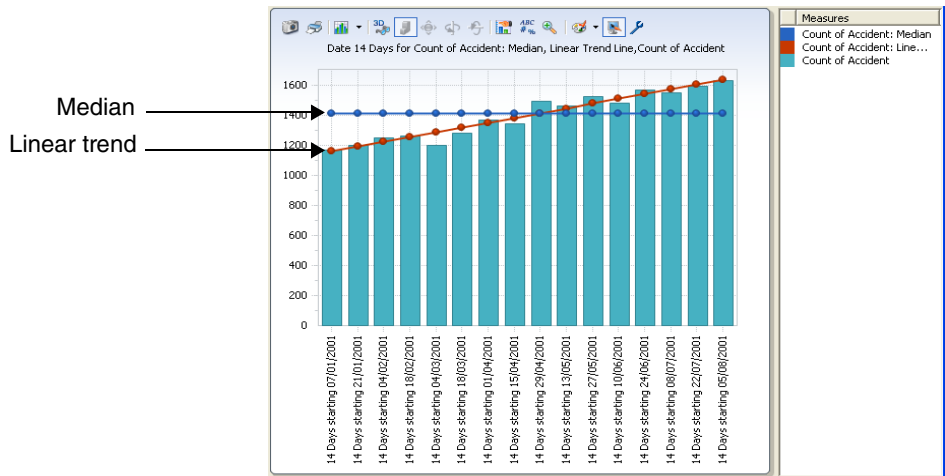


Displaying statistics

You can add statistical indicators, such as average and standard deviation lines, to your charts. The statistics options are available from the Select members for Measures dialog (displayed when you double-click Measures in All Dimensions). There is a set of statistics for each measure.

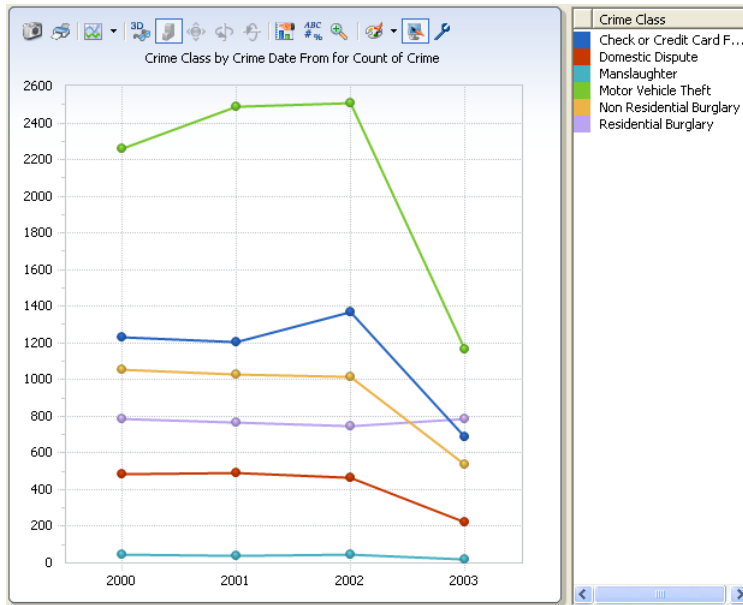


Other available indicators include the median, and linear trend lines.



Line charts

Line charts are good for showing time-dependent trends. They are also useful for showing multiple series (each line is a series), especially if they cross over.



Grids

Grids are spreadsheet-type presentations of the data. Instead of a bar or pie segment that represents the measure value, you see the value in a table cell. Grids are particularly useful for quickly showing the absolute measure values. You can display the grid with the chart or on its own.

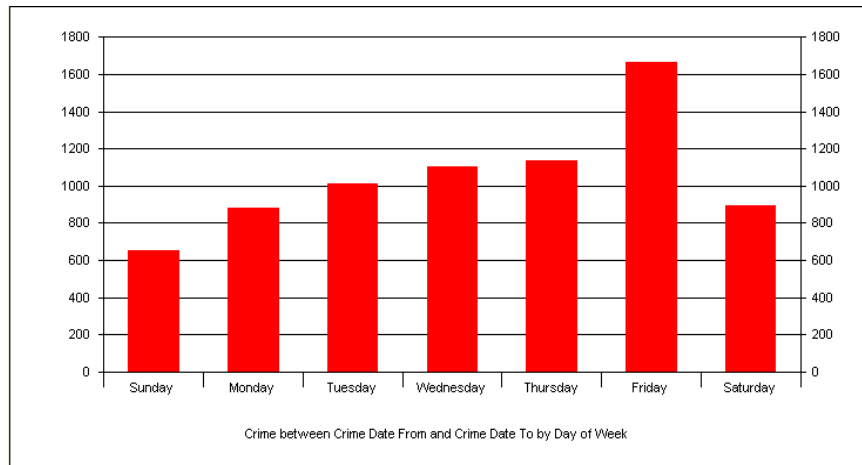
	2000	2001	2002	2003
Check or Credit Card Fraud	1,228	1,206	1,366	690
Domestic Dispute	482	488	465	223
Manslaughter	45	42	49	22
Motor Vehicle Theft	2,262	2,491	2,506	1,163
Non Residential Burglary	1,053	1,025	1,018	534
Residential Burglary	787	764	744	785

Range charts

A range chart is a bar chart used to provide a statistical view of the frequency of events within a defined time period. You can use a range chart to analyze data with start and end dates and times, to see when events occur. For example, you can analyze the frequency of crimes by the hour.

Range charts are particularly useful if you do not know the exact time an event took place but you know it happened within a given duration.

The information you gain from range charts may help you to formulate tactical intelligence, for example showing that most vehicle thefts in a parking lot take place on a Friday could help to make sure that surveillance operations are planned for the most effective days or times.



Range charts are not based upon a cube, the chart is derived directly from the *iBase* data in your chosen database. They can only be created if there are relevant entities or links with at least two date or time fields.

Range charts are not saved as part of a workspace.

Creating a breakdown tree

A breakdown tree is just one of many ways in which data in a cube can be selected and represented by *Data Miner*. It can be a useful starting point, since it helps to give you an understanding of how your data is structured in *Data Miner* before moving on to produce your charts.

A breakdown tree is a view of your data cube, showing how each dimension member breaks down into further members that are contained within it. A cube containing Vehicle data may have a breakdown tree of:

---Vehicle

 ---Make (for example, Honda)

 ---Model (for example, Civic)

Creating a breakdown tree we could answer the questions:

- What percentage of vehicles in the car database are Hondas?
- What percentage of Honda vehicles in the database are Civics?

The questions are answered automatically for you by drilling down through the results.



From the **Analysis** menu, select **New Tree** or clicking the toolbar button. The chart and grid are replaced with a tree and a chart. The dimension selection area is disabled.

The initial tree shows the total for the first measure in the cube. The results show that there are 175,000 cars in the data cube for all makes of car which represent 100% of the database.

To break down the tree, right-click the Total and select **Drill Down** and choose the dimension to reveal details for the next level. For example if you want to break down by Make of car, select **Drill Down** and **Make**:

Total	174,856	100.00%
Ford	32,688	18.69%
Chevrolet	28,969	16.57%
Dodge	10,969	6.27%
Honda	9,552	5.46%
Toyota	9,429	5.39%
Pontiac	5,996	3.43%
Nissan/Datsun	5,681	3.25%
GMC	5,126	2.93%
Buick	4,550	2.60%
Oldsmobile	4,412	2.52%
Mercury	3,778	2.16%
Jeep	3,354	1.92%
Freightliner	3,491	2.00%
Harley-Davidson	3,299	1.89%
International Harvester	2,774	1.59%
Unknown Make	2,773	1.59%
Mazda	2,594	1.49%
Plymouth	2,440	1.40%
Chrysler	2,200	1.26%
Mitsubishi	2,136	1.22%
Cadillac	1,887	1.08%
Suzuki	1,887	1.08%
Other Make	1,856	1.06%
Peterbilt	1,623	0.93%
Yamaha	1,622	0.93%
Lincoln	1,617	0.92%
Kenworth	1,599	0.91%
Saturn	1,537	0.88%
Mack	1,413	0.81%
Volvo	1,253	0.72%
Hyundai	1,252	0.72%
Acura	1,251	0.72%
Kawasaki	1,228	0.70%
Volkswagen	1,180	0.67%
Isuzu	1,170	0.67%

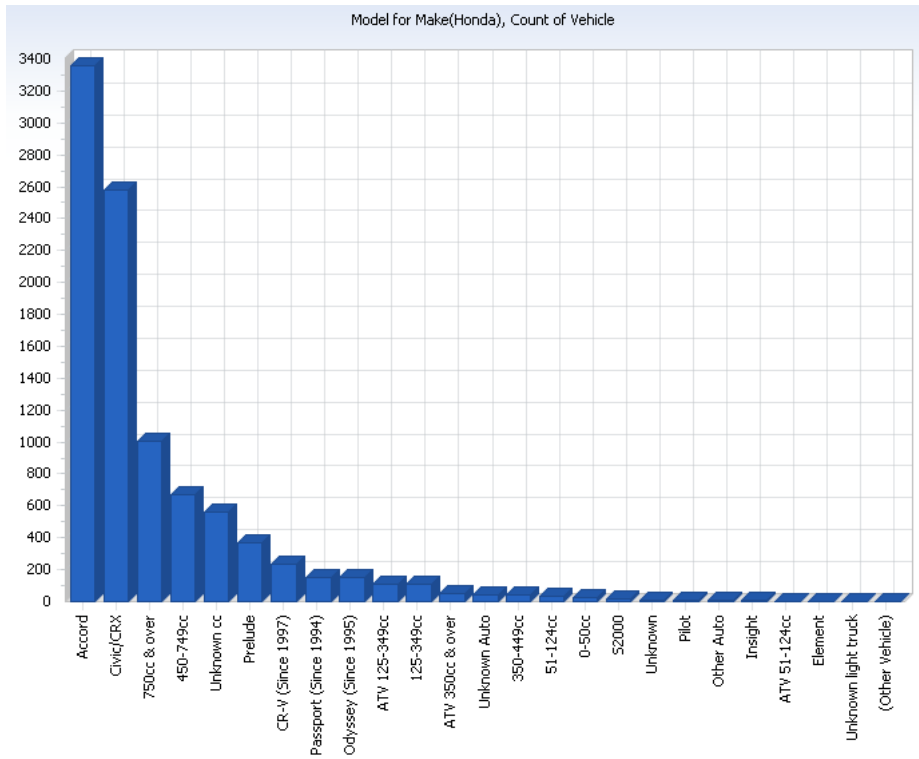
This tree shows, for example, that there are 10,000 Honda cars in the database representing 5% of the total records.

Drilling down into the next level for Honda and choosing Model will show you more detail.

Total	174,856	100.00%
Ford	32,688	18.69%
Chevrolet	28,969	16.57%
Dodge	10,969	6.27%
Honda	9,552	5.46%
Accord	3,362	35.20%
Civic/CRX	2,579	27.00%
750cc & over	1,007	10.54%
450-749cc	669	7.00%
Unknown cc	564	5.90%
Prelude	371	3.88%
CR-V (Since 1997)	233	2.44%
Passport (Since 1994)	153	1.60%
Odyssey (Since 1995)	150	1.57%
ATV 125-349cc	113	1.18%
125-349cc	106	1.11%
ATV 350cc & over	49	0.51%
Unknown Auto	45	0.47%
350-449cc	38	0.40%
51-124cc	33	0.35%
0-50cc	26	0.27%
S2000	15	0.16%
Unknown	10	0.10%
Pilot	7	0.07%
Other Auto	6	0.06%
Insight	5	0.05%
ATV 51-124cc	4	0.04%
Element	3	0.03%
Unknown light truck	3	0.03%
(Other Vehicle)	1	0.01%
Toyota	9,429	5.39%
Pontiac	5,996	3.43%
Nissan/Datsun	5,681	3.25%
GMC	5,126	2.93%
Buick	4,550	2.60%
Oldsmobile	4,412	2.52%

This now shows that out of 10,000 Honda cars in the database, 2,579 of them are Honda Civics representing 27% of the total number of Honda vehicles.

If you now click **Close**, *Data Miner* displays just the chart showing the breakdown of all models for Honda.

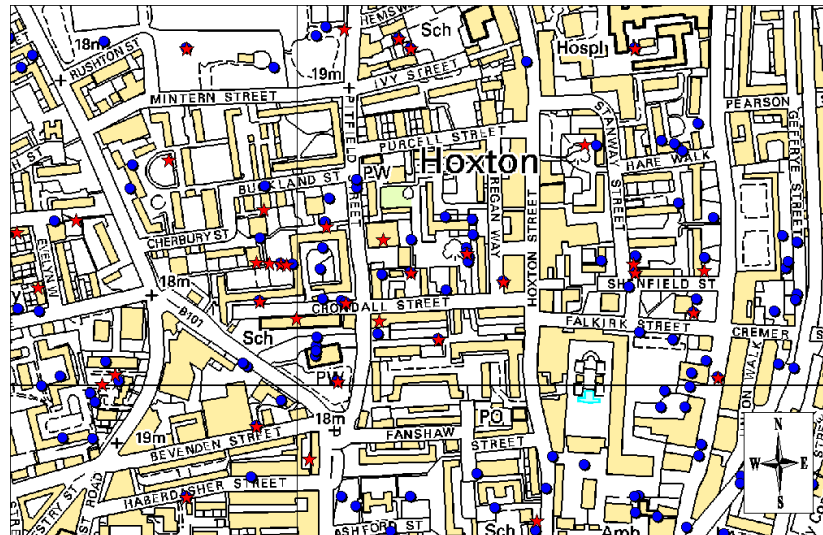


Getting Started with iBase GIS Interfaces

iBase GIS Interfaces are interfaces, accessible by *iBase*, that enable you to use third party GIS systems as an extension to your investigative analysis.

You can use the interfaces to:

- send data to a mapping application, with geographical coordinates, so that you can appreciate intelligence in its relevant geographical context
- make *iBase* data available for further querying and analysis using several popular mapping applications



Map reproduced from Ordnance Survey digital map data © Crown copyright 2007. All rights reserved

When using *Analyst's Workstation*, you can use *iBase* functions with the mapping application to:

- show *iBase* data records for map items
- create *iBase* data sets from the map for use in *iBase* and other *Analyst's Workstation* applications
- create *iBase* queries based on a rectangular area of a map
- add or expand map items to an *Analyst's Notebook* chart
- send selected map data to *Data Miner* for further numerical analysis

Using coordinates in iBase

If the database designer has set up coordinate field types on suitable records, *iBase* users will be able to:

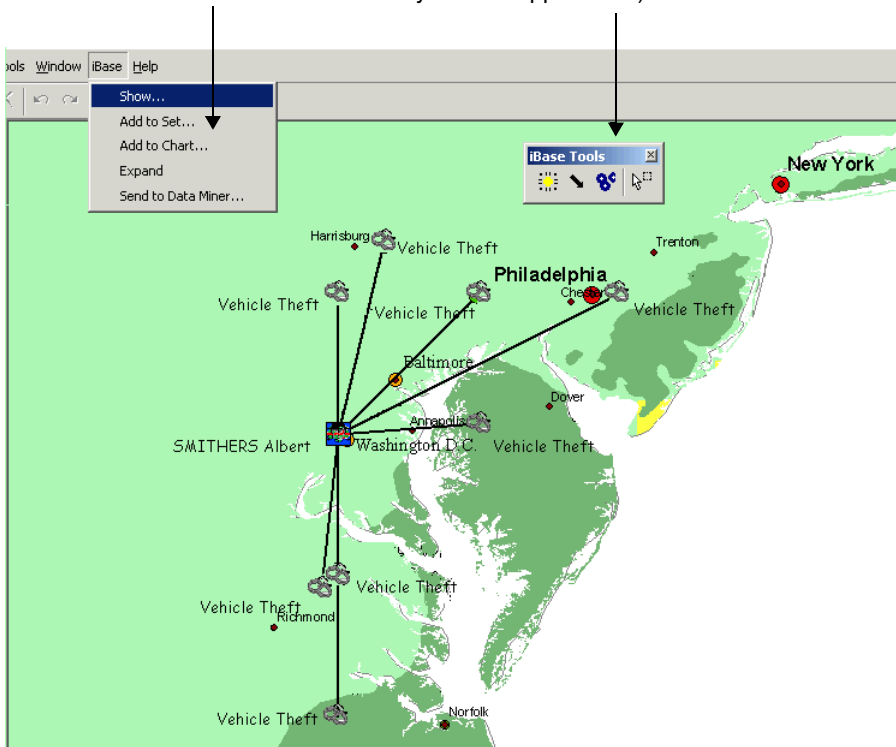
- Enter geographic data in a wide range of formats, which are then automatically converted to a single format (decimal degrees) for storage and comparison.
- Create coordinate queries to find out which records are located in, or near, a specified area.

System Interface

The following diagram shows *iBase* data plotted on a typical GIS system map:

Options for interfacing with other *Analyst's Workstation* applications.

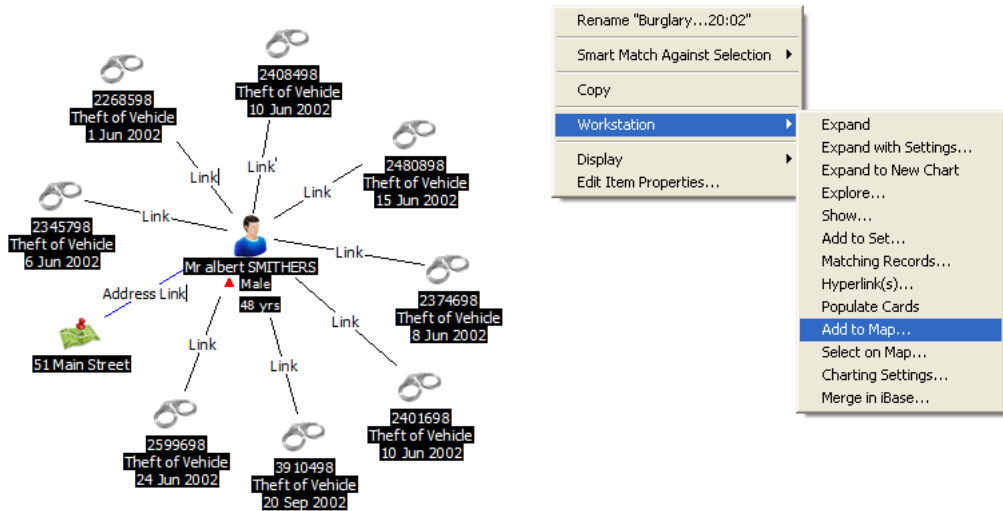
Buttons for using the analysis features and working with the icons. (You may not have all these buttons, and they may not be exactly in this form; it depends on your GIS application.)



Plotting data

You can plot data onto a map from any of the other *Analyst's Workstation* applications.

For example, you could select the entities on an *Analyst's Notebook* chart and use a shortcut menu option; here is how the map on the previous page could have been produced:



Choosing location sources

When you are plotting entities and links you can choose the source for their geocoded locations. For example, you can plot an entity at a location specified by the coordinates recorded with the entity record, or at a location recorded with one of its linked entities.

At different times you can use different sources for the locations, as defined in a mapping configuration. You create a number of mapping configurations and choose the one most appropriate for your analysis when you plot to a map.

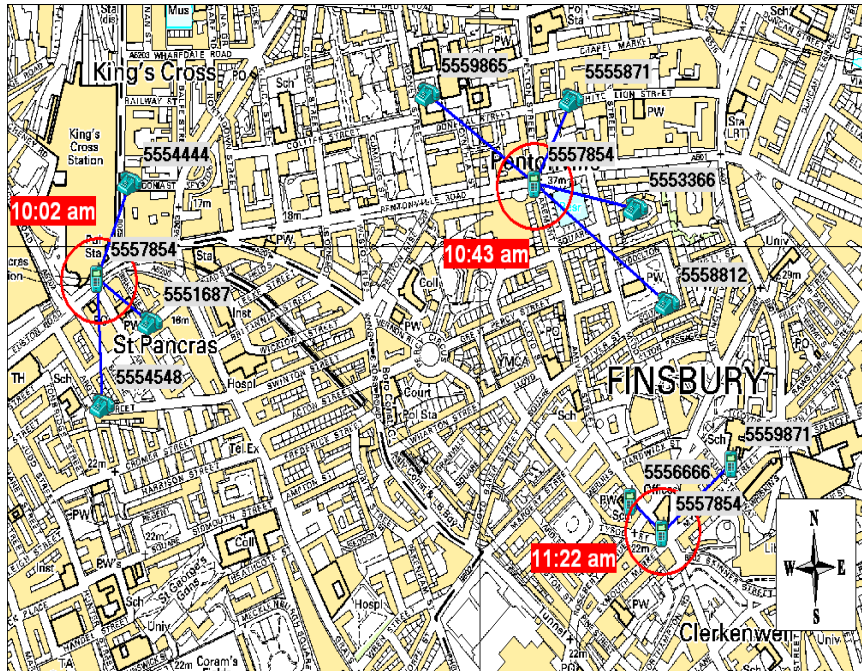
A cellphone example

As an example of how this can be useful, you could plot the positions of two cellphones calling each other.

The location of a cellphone can vary between the calls it makes. You therefore plot the links for the calls of a cellphone, rather than the cellphone entity itself.

A cellphone call link stores the locations of both the calling and receiving cellphones. You therefore create a mapping configuration that plots at the location of the calling cellphone, and a mapping configuration that plots at the location of the receiving cellphone. By plotting twice, once with each configuration, you can plot both ends of the call.

With a mechanism for tracking the movement of a cellphone between cell sites, you might find a series of plots along a major highway, perhaps giving some indication of the likely destination.



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Learning More About Analyst's Workstation

References

The *Quick Start Guides* aim to give you a general idea of the terminology and concepts involved in using *Analyst's Workstation*. However, they only describe the most basic concepts. You can attend a training course, and read the other *Analyst's Workstation* documentation, to learn about the more advanced techniques which will enable you to get the most out of your software.

Online Help Comprehensive online help is available within all parts of *Analyst's Workstation*. You can access the help at any time from the **Help** menu or by pressing the F1 key.

Other References Administrators also have access to an online *Administration Center*, giving reference information on setting up and administering *Analyst's Workstation*.

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Procedure

To contact IBM Support about a problem:

1. Define the problem, gather background information, and determine the severity of the problem. For more information, see the Getting IBM Support topic in the Software Support Handbook.
2. Gather diagnostic information.
3. Submit the problem to IBM Support in one of the following ways:

Online through the [IBM Support Portal](#): You can open, update, and view all of your service requests from the Service Request portlet on the Service Request page.

By phone: For the phone number to call in your region, see the [Directory of worldwide contacts](#) web page.

Results

If the problem that you submit is for a software defect or for missing or inaccurate documentation, IBM Support creates an Authorized Program Analysis Report (APAR). The APAR describes the problem in detail. Whenever possible, IBM Support provides a workaround that you can implement until the APAR is resolved and a fix is delivered. IBM publishes resolved APARs on the IBM Support website daily, so that other users who experience the same problem can benefit from the same resolution.

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