

## **Unit 9. MODIFY ATTRIBUTES AND VSAM ALTERNATE INDEX PROCESSING**

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## Objectives

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- **HOW TO MODIFY ATTRIBUTE BYTES**
- **VSAM ALTERNATE INDEX PROCESSING**

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Figure: 8-1. Objectives

**Notes :**

## HOW TO MODIFY ATTRIBUTE BYTES

One of the content of symbolic map definition is attribute byte field. We can do modifications on this attribute byte field before performing a SEND MAP command.

For example during UPDATE we will make changes on the same map for an existing user. Or in the case of DELETE the fields should be protected. For that we will make attribute Byte Field as protected.

To modify attribute byte IBM supplies a standard copy member called DFHBMSCA and a user can copy it in the Working-Storage Section.

Syntax:

### **01 copy DFHBMSCA.**

This member defines many attribute bytes.

<b>02</b>	<b>DFHBMPRO</b>	<b>PICTURE X VALUE IS ‘-‘</b>
<b>02</b>	<b>DFHBMCRY</b>	<b>PICTURE X VALUE IS ‘H‘</b>
<b>02</b>	<b>FHBMDAR</b>	<b>PICTURE X VALUE IS ‘&lt;‘</b>
<b>02</b>	<b>DFHBLUE</b>	<b>PICTURE X VALUE IS ‘1‘</b>
<b>02</b>	<b>DFHRED</b>	<b>PICTURE X VALUE IS ‘2‘</b>
<b>02</b>	<b>DFHPINK</b>	<b>PICTURE X VALUE IS ‘3‘</b>
<b>02</b>	<b>DFHGREEN</b>	<b>PICTURE X VALUE IS ‘4‘</b>
<b>02</b>	<b>DFHUNDLN</b>	<b>PICTURE X VALUE IS ‘4‘</b>
<b>02</b>	<b>DFHLEFT</b>	<b>PICTURE X VALUE IS ‘.’</b>
<b>02</b>	<b>DFHRIGHT</b>	<b>PICTURE X VALUE IS ‘.’</b>
<b>02</b>	<b>DFHOVER</b>	<b>PICTURE X VALUE IS ‘.’</b>
<b>02</b>	<b>DFHUNDER</b>	<b>PICTURE X VALUE IS ‘.’</b>

Once changed the attribute type make sure to restore it to original value. This can be done in 3 ways

- Send map with MAPONLY option.
- Move LOW-VALUE to the Symbolic map and issue a SEND MAP Command with MAPONLY option.
- Move original values to the attribute bytes in the symbolic map and issue a SEND MAP command with DATA ONLY option.

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## VSAM ALTERNATE INDEX PROCESSING

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**Alternative indexes :**

A VSAM alternate index lets you access the records a key-sequenced data set in an order other than that provided by the data set's primary key. The dataset over which an alternate index exists is called a base cluster.

**Alternate index**

<b>SOCIAL SECURITY NUMBER</b>	<b>EMPLOYEE NUMBER</b>
200-45-4567	1017
201-34-5673	1009
390-35-5679	1021
573-89-7890	1008
874-84-5890	1009

**Base Cluster**

<b>EMPLOYEE NUMBER</b>	<b>SOCIAL SECURITY NUMBER</b>	<b>DEPARTMENT NUMBER</b>
1008	573-89-7890	145
1009	201-34-5673	101
1017	200-45-4567	123
1021	390-35-5679	101

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Here the base cluster is a KSDS containing employee records. Each record of the base cluster contains three fields : employee number, social security number and department number. The primary key for the base cluster is employee number. We can access the base cluster sequentially by employee number

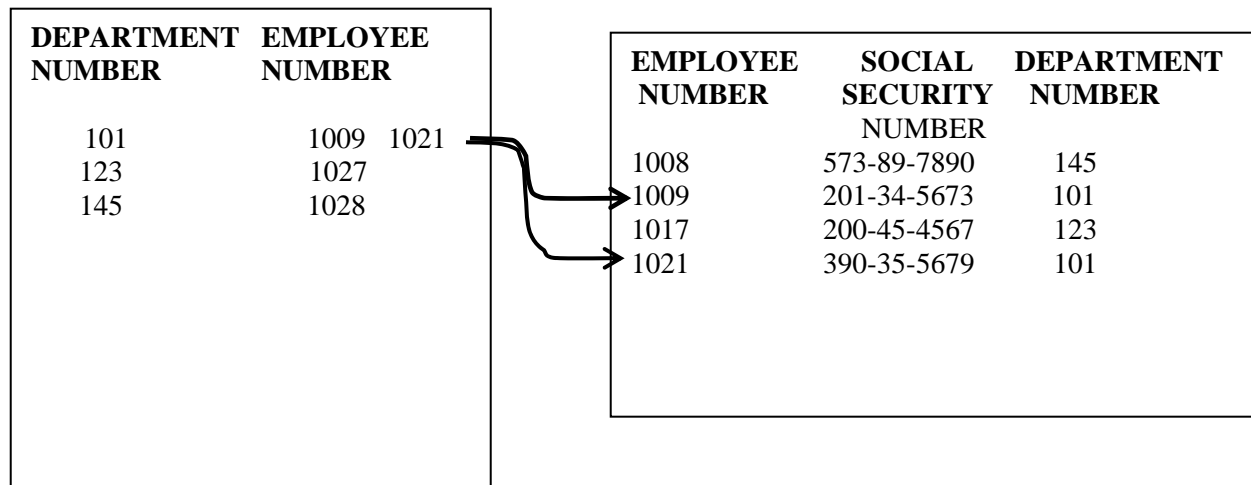
The alternate index process the base cluster in social security number sequence by relating each alternate key value to a primary key value.

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## VSAM ALTERNATE INDEX PROCESSING(Contd...)

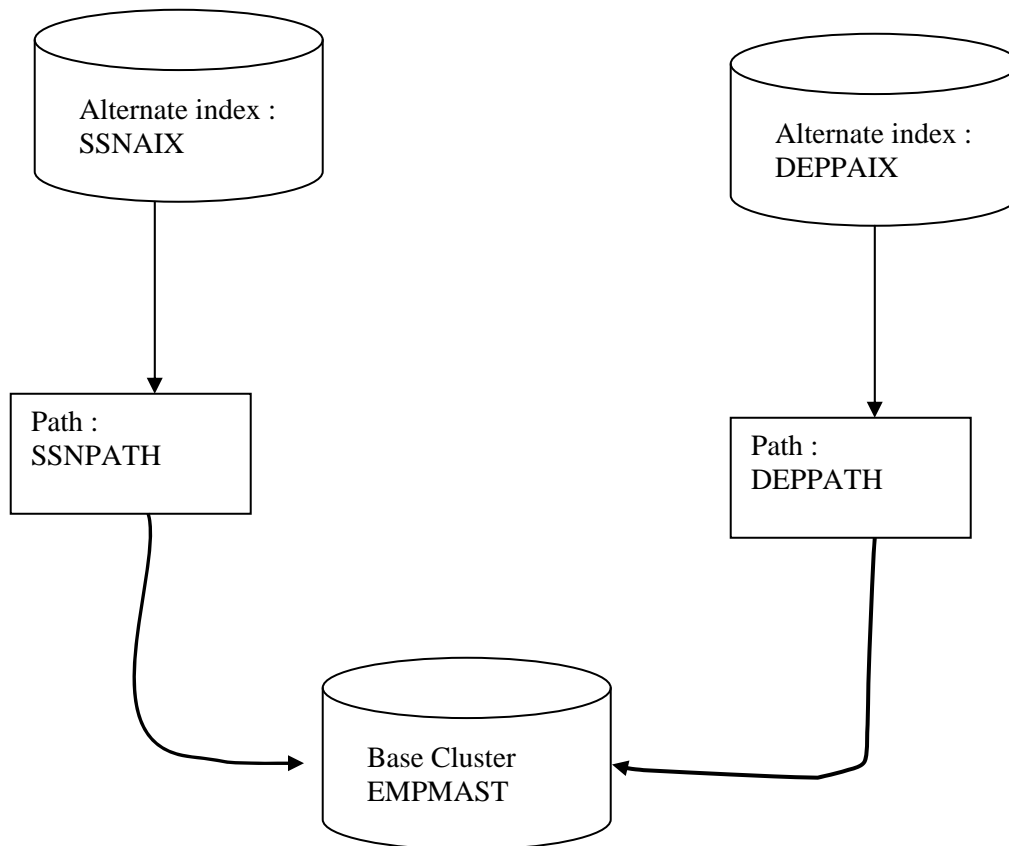
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Consider the alternate index record for department number 101, Here two employee numbers are specified: 1009,1021 When we use browse commands to process this alternate index sequentially, all two of these employee records are retrieved in order. However, when an alternate index with duplicate keys is processed directly, only the first base cluster record for each alternate key value is available.



## THE RELATIONSHIP AMOUNG ALTERNATE INDEXES, PATHS, AND A BASE CLUSTER

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### Path :

Before we can process a base cluster using an alternate index, we must define a VSAM catalog entry called a path to establish a relationship between the alternate index and its base cluster. Here, two alternate indexes(SSNAIX and DEPAIX) are defined for a single base cluster( EMPMAST). Each alternate index is related to the base cluster through a path(SSNPATH and (DEEPPATH)).

## UPGRADE SET

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In VSAM, the process of updating an alternate index is called upgrading. VSAM doesn't require that an alternate index be upgraded each time its base cluster is changed. An alternate index is an upgradeable index if you specify (via AMS) that it should be automatically upgraded by VSAM whenever changes are made to the base cluster. The collection of upgradeable alternate indexes for a base cluster is called the base cluster's upgrade set. Every time a change is made to the base cluster that affects the alternate indexes, each affected alternate index in the upgrade set is automatically updated by VSAM.

Whether an alternate index is upgradable has no effect on how you code your CICS programs.