



**Migration Guide**

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**Sybase Event Stream Processor**

**5.0**

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# Upgrading to Aleri Streaming Platform 3.x

If you are running version 2.x of Aleri Streaming Platform, use the **esp\_upgrade** utility to upgrade to 3.x before attempting your migration.

Use the **esp\_upgrade** utility to upgrade from Aleri 2.x to Aleri 3.x. The Event Stream Processor conversion tool, which converts AleriML files to CCL, is based on the 3.x version of AleriML. Therefore, convert any models written for Aleri 2.x to Aleri 3.x before migrating them to CCL.

The utility reads project data from a specified AleriML file and writes it to a standard XML output file. The utility handles most upgrade issues automatically, but requires manual updates for:

- Converting rules (**esp\_upgrade** comments these out in the XML file)
- Converting expressions (these occur only within converting rules, so are commented out in the XML file as well)
- Converting row local storage to eventCaches

To perform the upgrade:

1. From a command line, run:

```
esp_upgrade sourcefile.xml > destinationfile.xml
```

where `sourcefile.xml` is the 2.x project file and `destinationfile.xml` is the upgraded 3.x file.

2. Modify the output XML file (`destination.xml`) as necessary to address the manual upgrade issues.
3. Save and close the file.  
You are now ready to run the Sybase® Event Stream Processor migration tool to migrate your AleriML files to CCL.



# Migrating AleriML Models to CCL Projects

Use the **esp\_aml2ccl** utility to migrate existing AleriML models to CCL projects.

For a successful migration overall, obtain a basic understanding of the CCL language. See the *CCL Programmers Guide* before performing any conversions.

To convert your existing models from AleriML to CCL:

1. Run the command:

```
esp_aml2ccl -f <filepath>.xml -p <ProjectName> -l<ProjectLocation>
```

where **-f <filepath>.xml** is the path for the AleriML model file, **-p <ProjectName>** is the name of the target CCL project (the default is the prefix of the xml input file), and **-l <ProjectLocation>** is an absolute path for the project location (the default is the current location).

2. Refer to the three files created by the conversion.

- `<projectName>.ccp` - includes project details.
- `<projectName>.ccl` - includes CCL elements after conversion.
- `<projectName>.err` - includes information on conversion, as well as any errors and warnings generated during the conversion.

---

**Note:** You can also do this from the ESP Studio by selecting **Convert Aleri Model** from the File menu.

---

## See also

- *Chapter 8, Known Limitations* on page 33

## Conversion Report File

---

The conversion report (`.err`) file contains information on conversion steps, as well as any errors that occur during AleriML to CCL conversions.

The conversion report file contains log statements, each of which is assigned a severity:

## CHAPTER 2: Migrating AleriML Models to CCL Projects

Severity	Description
INFO	Introduction for each migration step and overall process. For example: INFO: Initialization start for Store element store1.
WARNING	The migration of the AleriML model file is not complete, and requires manual updates, either in the CCL file or project deployment. For example: The restriction access mechanism in ccl has been changed. It needs to be configured manually.
ERROR	The AleriML model file includes errors. For example: ExtendStream ExtendStream1 could not be converted to ccl as it could not be initialized.



## CHAPTER 3      **Element Migration**

See examples of how the Aleri elements migrate to CCL.

### **StartUp Element Migration**

---

In CCL, the Aleri StartUp element migrates to an **ADAPTER START** statement, and takes connection group references. You can assign connection groups to adapters in the **ATTACH ADAPTER** statements.

AleriML:

```
<StartUp comments="StartUp">
  <ConnectionGroup id="ConnectionGroup1" type="start">
    <ConnectionRef connection="Connection1"/>
  </ConnectionGroup>
  <ConnectionGroup id="ConnectionGroup2" type="nostart">
    <ConnectionRef connection="Connection2"/>
  </ConnectionGroup>
</StartUp>
```

CCL:

```
ADAPTER START GROUPS
ConnectionGroup1 , ConnectionGroup2  NOSTART ;
```

### **DataLocation Element Migration**

---

The Aleri DataLocation element does not migrate directly to CCL because CCL has no equivalent element. However, you can define all the Aleri DataLocation properties as CCL adapter properties in the **ATTACH ADAPTER** statement.

AleriML:

```
<DataLocation id="xml_file_input" type="xml_in">
  <LocationParam name="dir" value="C:/test"/>
  <LocationParam name="matchStreamName" value="false"/>
  <LocationParam name="filePattern" value="*.xml"/>
  <LocationParam name="file" value="test.xml"/>
</DataLocation>
```

No equivalent CCL.

## Store Element

---

See how the store element migrates from AleriML to CCL.

AleriML has three types of stores: stateless, memory, and log. CCL has only two types: memory and log. In CCL, the Aleri memory store migrates to a **CREATE MEMORY STORE** statement, and the Aleri log store migrates to a **CREATE LOG STORE** statement.

### Example: Memory Store Migration

In CCL, the Aleri memory store element migrates to a **CREATE MEMORY STORE** statement. By default, the `indextype` and `indexsizehint` properties are set.

The Aleri `index` property migrates to the `indextype` property in CCL. AleriML has `index="{tree|hash|list}"` while CCL has `INDEXTYPE={'tree'|'hash'}`. By default, the AleriML `index="list"` migrates to the CCL `INDEXTYPE='tree'`.

AleriML:

```
<Store file="store1" id="store1" kind="memory" index="tree"/>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE='tree',
INDEXSIZEHINT=8;
```

### Example: Log Store Migration

In CCL, the Aleri log store element migrates to a **CREATE LOG STORE** statement. By default, the `reservepct`, `indexsizehint`, `sync`, and `ckcount` properties are set.

AleriML:

```
<Store id="events" kind="log" fullsize="1024" file="store/events" />
```

CCL:

```
CREATE LOG STORE events PROPERTIES FILENAME='store/events',
MAXFILESIZE=1024, RESERVEPCT=20, SYNC=false, CKCOUNT=10000,
INDEXSIZEHINT=8;
```

## InConnection Element Migration

---

In CCL, the Aleri InConnection element migrates to an **ATTACH INPUT ADAPTER** statement, and the InConnection and DataLocation properties are defined as adapter properties. The Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the SourceStream element migrates to a **CREATE INPUT WINDOW** statement.

AleriML:

```

<Store file="store1" id="store1" kind="memory"/>
  <DataLocation id="xml_file_input" type="xml_in">
    <LocationParam name="dir" value="C:/test"/>
    <LocationParam name="matchStreamName" value="false"/>
    <LocationParam name="filePattern" value="*.xml"/>
  </DataLocation>
<SourceStream id="alldatatypes" store="store1">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
  <InConnection location="xml_file_input" name="InConn1">
    <ConnectionParam name="file" value="test.xml"/>
  </InConnection>
</SourceStream>

```

CCL:

```

CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
STORE store1;
ATTACH INPUT ADAPTER InConn1
TYPE xml_in
TO alldatatypes
PROPERTIES
dir='C:/test',
file='test.xml',
filePattern='*.xml',
matchStreamName=false;

```

## OutConnection Element Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, the SourceStream element migrates to a **CREATE INPUT WINDOW** statement, and the OutConnection element migrates to an **ATTACH OUTPUT ADAPTER** statement.

The Aleri OutConnection and DataLocation properties are defined as adapter properties.

AleriML:

```

<Store file="store1" id="store1" kind="memory"/>
  <DataLocation id="xmlOut" type="xml_out"></DataLocation>
<SourceStream id="alldatatypes" store="store1">
  <OutConnection location="xmlOut" name=" OutConn1">
    <ConnectionParam name="dir" value="output"/>
    <ConnectionParam name="file" value="testOut.xml"/>
    <ConnectionParam name="outputBase" value="true"/>
  </OutConnection>
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
</SourceStream>

```

## CHAPTER 3: Element Migration

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE = 'tree',
INDEXSIZEHINT = 8;
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
STORE store1;
ATTACH OUTPUT ADAPTER OutConn1
TYPE xml_out
TO alldatatypes
PROPERTIES
dir='output',
file='testOut.xml',
outputBase=true;
```

### SourceStream Element

---

See how different cases of the SourceStream element migrate from AleriML to CCL.

#### Example: SourceStream with Stateful Store Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement and the SourceStream element migrates to an input window.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<SourceStream id="alldatatypes" store="store1">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
</SourceStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE = 'tree',
INDEXSIZEHINT = 8 ;
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a )
STORE store1;
```

#### Example: SourceStream with insertOnly Attribute Migration

The Aleri store element migrates to a **CREATE MEMORY STORE** statement. In CCL, streams are stateless and support only INSERT opcode, and windows are stateful and support all opcodes.

Therefore, this example migrates to an input stream followed by an output window:

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1"
insertOnly="true">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
</SourceStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE INPUT STREAM Ccl_0_alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING);
CREATE OUTPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
  PRIMARY KEY DEDUCED
  STORE store1
AS
  SELECT Ccl_0_alldatatypes.id, Ccl_0_alldatatypes.a,
Ccl_0_alldatatypes.charData FROM Ccl_0_alldatatypes GROUP BY
Ccl_0_alldatatypes.id, Ccl_0_alldatatypes.a;
```

### Example: SourceStream with FilterExpression Migration

In CCL, the Aleri store element migrates to the **CREATE MEMORY STORE** statement and FilterExpression migrates to a **WHERE** clause.

Therefore, this example migrates to an input window followed by an output window with a **WHERE** clause.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
  <FilterExpression>alldatatypes.charData in ('aa','bb','cc')</
FilterExpression>
</SourceStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE INPUT WINDOW Ccl_0_alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
  PRIMARY KEY (id, a)
  STORE store1;
CREATE OUTPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
  PRIMARY KEY (id, a)
  STORE store1
AS
```

```
SELECT * FROM Ccl_0_alldatatypes
WHERE Ccl_0_alldatatypes.charData in ('aa','bb','cc');
```

### Example: SourceStream with autogen Attribute Migration

In CCL, nextval() is equivalent to the Aleri autogen attribute, and the Aleri store element migrates to a **CREATE MEMORY STORE** statement.

Therefore, this example migrates to an input window followed by an output window, and the id column is included for the output window schema with nextval() set as the value in the **SELECT** clause.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1"
insertOnly="true">
  <Column datatype="int64" key="true" name="id" autogen="true"/>
  <Column datatype="int64" key="false" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
</SourceStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE INPUT STREAM Ccl_0_alldatatypes
SCHEMA (a LONG, charData STRING);
CREATE OUTPUT WINDOW alldatatypes
SCHEMA (id LONG, a LONG, charData STRING)
PRIMARY KEY (id)
STORE store1
AS
SELECT nextval() AS id, Ccl_0_alldatatypes.a AS a,
Ccl_0_alldatatypes.charData AS charData FROM Ccl_0_alldatatypes;
```

### Example: SourceStream with InputWindow Migration

In CCL, the Aleri InputWindow element maps to the **KEEP** clause.

Therefore, this example migrates to an input window with a **KEEP** clause:

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1" >
  <InputWindow type="records" value="1000" slack="500"/>
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
</SourceStream>
```

CCL:

```
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
```

```
PRIMARY KEY (id, a)
STORE store1
KEEP 1000 ROWS SLACK 500;
```

### **Example: SourceStream with Stateless Store Migration**

In CCL, the Aleri SourceStream element with an attached stateless store migrates to an input stream element because streams are stateless in CCL.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="stateless"/>
<SourceStream id="alldatatypes" store="store1"
insertOnly="true">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a"/>
  <Column datatype="string" key="false" name="charData"/>
</SourceStream>
```

CCL:

```
CREATE INPUT STREAM alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING);
```

## **CopyStream Element**

See how different cases of the CopyStream element migrate from AleriML to CCL.

### **Example: CopyStream with Stateful Store Migration**

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement and the CopyStream element migrates to an output window.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<CopyStream id="copydatatypes" store="store1"
istream="alldatatypes"/>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE='tree',
INDEXSIZEHINT=8;
CREATE OUTPUT WINDOW copydatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
STORE store1
AS
SELECT * FROM alldatatypes;
```

### **Example: CopyStream with InputWindow Migration**

In this example, the Aleri CopyStream element has an attached stateful (memory) store, and an InputWindow for the input stream "alldatatypes". In CCL, the Aleri store element migrates

## CHAPTER 3: Element Migration

to a **CREATE MEMORY STORE** statement and the InputWindow element maps to a **KEEP** clause.

Therefore, this migrates to a local window with a **KEEP** clause followed by an output window:

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <CopyStream id="copydatatypes" store="store1"
istream="alldatatypes">
  <InputWindow stream="alldatatypes" type="records" value="1000"
slack="500"/>
  </CopyStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE LOCAL WINDOW Ccl_1_alldatatypes SCHEMA (id INTEGER, a LONG,
charData STRING)
PRIMARY KEY (id, a)
STORE store1
KEEP 1000 ROWS SLACK 500
AS
SELECT alldatatypes.id AS id, alldatatypes.a AS a,
alldatatypes.charData AS charData FROM alldatatypes;
CREATE OUTPUT WINDOW copydatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
STORE store1
AS
SELECT * FROM Ccl_1_alldatatypes;
```

## UnionStream with Stateful Store Migration

---

In this example, the Aleri UnionStream element has an attached stateful (memory) store and two input streams ("alldatatypes" and "alldatatypes1") that participate in a union operation. In CCL, the Aleri Store element migrates to a **CREATE MEMORY STORE** statement and the UnionStream element migrates to an output window with a **UNION** clause.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<UnionStream id="uniondatatypes" istream="alldatatypes
alldatatypes1" store="store1">
</UnionStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE OUTPUT WINDOW uniondatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
```



```
STORE store1
AS
SELECT * FROM alldatatypes
UNION
SELECT * FROM alldatatypes1;
```

## FilterStream Element

---

See how different cases of the FilterStream element migrate from AleriML to CCL.

### Example: FilterStream with Stateful Store Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the Aleri FilterStream element migrates to an output window.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<FilterStream id="filterdatatypes" store="store1"
istream="alldatatypes">
  <FilterExpression>alldatatypes.charData in ('aa','bb','cc')</
FilterExpression>
</FilterStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE OUTPUT WINDOW filterdatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
  STORE store1
  AS
SELECT * FROM alldatatypes
WHERE alldatatypes.charData in ('aa','bb','cc');
```

### Example: FilterStream with InputWindow Migration

In this example, the AleriML FilterStream has an attached stateful store and an InputWindow for the input stream "alldatatypes". In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement and the InputWindow element maps to the **KEEP** clause.

Therefore, this example migrates to a local window with a **KEEP** clause, followed by an output window with a **WHERE** clause.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<FilterStream id="filterdatatypes" store="store1"
istream="alldatatypes">
  <InputWindow stream="alldatatypes" type="records" value="1000"
slack="500"/>
  <FilterExpression>alldatatypes.charData in ('aa','bb','cc')</
```

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```
FilterExpression>  
</FilterStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',  
INDEXSIZEHINT =8;  
CREATE LOCAL WINDOW Ccl_1_alldatatypes SCHEMA (id INTEGER, a LONG,  
charData STRING)  
PRIMARY KEY (id, a)  
STORE store1  
KEEP 1000 ROWS SLACK 500  
AS  
SELECT alldatatypes.id AS id, alldatatypes.a AS a,  
alldatatypes.charData AS charData FROM alldatatypes;  
  
CREATE OUTPUT WINDOW filterdatatypes  
SCHEMA (id INTEGER, a LONG, charData STRING)  
PRIMARY KEY (id, a)  
STORE store1  
AS  
SELECT * FROM Ccl_1_alldatatypes  
WHERE Ccl_1_alldatatypes.charData in ('aa','bb','cc');
```

## ComputeStream with Stateful Store Migration

---

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement and the ComputeStream element migrates to an output window. The value of the name attribute in the ColumnExpression element becomes the name of the column in the **SELECT** clause of the output window, and the value of the ColumnExpression element becomes the value in the **SELECT** clause.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>  
<ComputeStream id="Normalizeddatatypes" store="store1"  
istream="alldatatypes">  
  <ColumnExpression key="true" name="idl" >alldatatypes.id</  
ColumnExpression>  
  <ColumnExpression name="a1">alldatatypes.a * 5</  
ColumnExpression>  
  <ColumnExpression name="charData1">alldatatypes.charData</  
ColumnExpression>  
</ComputeStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',  
INDEXSIZEHINT =8;  
CREATE OUTPUT WINDOW Normalizeddatatypes  
SCHEMA (id 1 INTEGER, a1 LONG, charData1 STRING)  
PRIMARY KEY (id)  
STORE store1  
AS
```

```
SELECT alldatatypes.id AS id1, alldatatypes.a * 5 AS a1,
alldatatypes.charData AS charData1
FROM alldatatypes;
```

## ExtendStream with Stateful Store Migration

---

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement. Since the Aleri ExtendStream element extends all columns from its input stream, in CCL, it migrates to an output window with extended columns from the input stream.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<ExtendStream id="Extenddatatypes" store="store1"
istream="alldatatypes">
  <ColumnExpression name="a1">alldatatypes.a * 109.0</
ColumnExpression>
  <ColumnExpression
name="charData">concat(alldatatypes.charData,'test')</
ColumnExpression>
</ExtendStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE = 'tree',
INDEXSIZEHINT = 8;
CREATE OUTPUT WINDOW Extenddatatypes
SCHEMA (id INTEGER, a LONG, charData STRING, a1 FLOAT)
PRIMARY KEY (id, a)
  STORE store1
  AS
SELECT alldatatypes.id AS id, alldatatypes.a AS a,
concat(alldatatypes.charData,'test') AS charData, alldatatypes.a *
109.0 AS a1 FROM alldatatypes;
```

## AggregateStream with Stateful Store Migration

---

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the AggregateStream element migrates to an output window. The value of the name attribute in the ColumnExpression element becomes the name of the column in the **SELECT** clause of the output window.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
<AggregateStream id="Aggrdatatypes" store="store1"
istream="alldatatypes">
  <ColumnExpression key="true" name="id">alldatatypes.id</
ColumnExpression>
  <ColumnExpression key="false" name="maxA">max(alldatatypes.a)</
```

## CHAPTER 3: Element Migration

```
ColumnExpression>  
</AggregateStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE = 'tree',  
INDEXSIZEHINT = 8;  
CREATE OUTPUT WINDOW Aggrdatatypes  
SCHEMA (id INTEGER, maxA LONG)  
PRIMARY KEY DEDUCED  
STORE store1  
AS  
SELECT alldatatypes.id AS id, max(alldatatypes.a) AS maxA  
FROM alldatatypes  
GROUP BY alldatatypes.id;
```

### JoinStream Element

See how different cases of the JoinStream element migrate from AleriML to CCL.

Using joins in Event Stream Processor differs from Aleri Streaming Platform in several ways.

Aleri Streaming Platform	Event Stream Processor
Supports inner joins only when joining insert-only streams.	No restrictions on inner joins.
Does not support MANY-MANY.	Supports MANY-MANY.
Supports specifying retention indirectly. Create a CopyStream with retention from the join source. Use this copy as the source for the join.	Supports specifying retention directly on the join sources for memory stores only. <b>Note:</b> For log stores, create a retention on the copy of the join source. Use this copy as the source for the join.
Join streams run in a single thread only.	Multiple threads can be created depending on the complexity and type of the join.
Does not support joining a stream (stateless store element) with a window (memory store or log store element).	Supports joining a stream (stateless store element) with a window. This join is performed when a record arrives on a stream, so that the stream acts as a trigger for the join.
Does not support deducing primary keys.	The primary key can be deduced.
Does not support specifying multiple operations in single statement. Each operation must be defined separately.	Supports specifying joins, filters, and aggregates in a single statement. The compiler breaks this into multiple threads.

### Restrictions

Aleri Streaming Platform does not validate whether the key's fields on the target are valid for a join. It silently ignores any joins that produced null values and bad inserts, updates, and deletes. The compiler in Event Stream Processor strictly enforces what can be selected as keys within a join.

---

**Note:** See *Key Field Rules* in the *CCL Programmers Guide*.

---

As a result, joins that do not follow the key rules in AleriML do not compile when converted to CCL. To compile, you must edit the resulting CCL to correct the key fields.

### See also

- *Chapter 8, Known Limitations* on page 33

## Example: JoinStream with InnerJoin Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the JoinStream element migrates to an output window with JOIN expressions.

In this example, the AleriML JoinStream "EqJoindatatypes" has an inner join between the input streams "alldatatypes" and "alldatatypes1", with One-One mapping between them. These SourceStream elements (alldatatypes and alldatatypes1) migrate to input windows in CCL.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1">
    <Column datatype="int32" key="true" name="id"/>
    <Column datatype="int64" key="true" name="a"/>
    <Column datatype="string" key="false" name="charData"/>
  </SourceStream>
  <SourceStream id="alldatatypes1" store="store1">
    <Column datatype="int32" key="true" name="id"/>
    <Column datatype="int64" key="true" name="a"/>
    <Column datatype="string" key="false" name="charData1"/>
  </SourceStream>
  <JoinStream id="EqJoindatatypes" istream="alldatatypes
alldatatypes1" store="store1">
    <Join constraints="id=id a=a" table1="alldatatypes"
table2="alldatatypes1" type="inner"/>
    <ColumnExpression key="true" name="id">alldatatypes.id</
ColumnExpression>
    <ColumnExpression key="true" name="a">alldatatypes.a</
ColumnExpression>
    <ColumnExpression key="false"
name="chardata">alldatatypes.charData</ColumnExpression>
    <ColumnExpression key="false"
name="chardata1">alldatatypes1.charData1</ColumnExpression>
  </JoinStream>
```

CCL:

## CHAPTER 3: Element Migration

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE = 'tree',
INDEXSIZEHINT = 8;
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
STORE store1;
CREATE INPUT WINDOW alldatatypes1
SCHEMA (id INTEGER, a LONG, charData1 STRING)
PRIMARY KEY (id, a)
STORE store1;
CREATE OUTPUT WINDOW EqJoindatatypes
SCHEMA (id INTEGER, a LONG, charData STRING, charData1 STRING)
PRIMARY KEY (id, a)
STORE store1
AS
SELECT alldatatypes.id AS id, alldatatypes.a AS a,
alldatatypes.charData AS charData, alldatatypes1.charData1 AS
charData1 FROM
alldatatypes
INNER JOIN
alldatatypes1
ON alldatatypes.id = alldatatypes1.id AND alldatatypes.a =
alldatatypes1.a;
```

### Example: JoinStream with LeftOuter Join Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the JoinStream element migrates to an output window with JOIN expressions.

The Aleri JoinStream "leftOuterJoindatatypes" has a left outer join between the input streams "alldatatypes" and "alldatatypes1", with One-Many mapping between these input streams. The SourceStream elements (alldatatypes and alldatatypes1) migrate to an input window in CCL.

AleriML:

```
<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1">
    <Column datatype="int32" key="true" name="id"/>
    <Column datatype="int64" key="true" name="a"/>
    <Column datatype="string" key="false" name="charData"/>
  </SourceStream>
  <SourceStream id="alldatatypes1" store="store1">
    <Column datatype="int32" key="true" name="id"/>
    <Column datatype="int64" key="false" name="a1"/>
    <Column datatype="string" key="false" name="charData1"/>
  </SourceStream>
  <JoinStream id="leftOuterJoindatatypes" istream="alldatatypes
alldatatypes1" store="store1">
    <Join constraints="id=id a=a1" table1="alldatatypes"
table2="alldatatypes1" type="leftouter"/>
    <ColumnExpression key="true" name="id">alldatatypes.id</
ColumnExpression>
    <ColumnExpression key="true" name="a">alldatatypes.a</
ColumnExpression>
```

```

    <ColumnExpression key="false"
name="chardata">alldatatypes.charData</ColumnExpression>
    <ColumnExpression key="false"
name="chardata1">alldatatypes1.charData1</ColumnExpression>
</JoinStream>

```

CCL:

```

CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id, a)
STORE store1;
CREATE INPUT WINDOW alldatatypes1
SCHEMA (id INTEGER, a1 LONG, charData1 STRING)
PRIMARY KEY (id)
STORE store1;
CREATE OUTPUT WINDOW leftOuterJoinDatatypes
SCHEMA (id INTEGER, a LONG, chardata STRING, chardata1 STRING)
PRIMARY KEY (id, a)
STORE store1
AS
SELECT alldatatypes.id AS id, alldatatypes.a AS a,
alldatatypes.charData AS chardata, alldatatypes1.charData1 AS
chardata1 FROM
alldatatypes
LEFT JOIN
alldatatypes1
ON alldatatypes.id = alldatatypes1.id AND alldatatypes.a =
alldatatypes1.a1;

```

### Example: JoinStream with FullOuter Join Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the JoinStream element migrates to an output window with JOIN expressions.

The Aleri JoinStream "FOuterJoinDatatypes" has a left outer join between input streams "alldatatypes" and "alldatatypes1", with One-One mapping between these input streams. In CCL, the Aleri SourceStream elements (alldatatypes and alldatatypes1) migrate to an input window.

However, the CCL may not get compiled because the Event Stream Processor compiler is more strict than the Aleri compiler, and therefore, there are some changes in the expressions used in the **SELECT** clause that cannot be handled by the migration tool. Perform these changes manually.

1. Ensure there is One-One mapping between participating streams and windows.
2. Add `firstnonnull()` for primary keys.

AleriML:

```

<Store file="store1" fullsize="64" id="store1" kind="memory"/>
  <SourceStream id="alldatatypes" store="store1">
    <Column datatype="int32" key="true" name="id"/>

```

## CHAPTER 3: Element Migration

```
<Column datatype="int64" key="false" name="a"/>
<Column datatype="string" key="false" name="charData"/>
</SourceStream>
  <SourceStream id="alldatatypes1" store="store1">
    <Column datatype="int32" key="true" name="id"/>
    <Column datatype="int64" key="false" name="a"/>
    <Column datatype="string" key="false" name="charData1"/>
  </SourceStream>
  <JoinStream id="FOuterJoindatatypes" istream="alldatatypes
alldatatypes1" store="store1">
  <Join constraints="id=id" table1="alldatatypes"
table2="alldatatypes1" type="fullouter"/>
  <ColumnExpression key="true" name="id">alldatatypes.id</
ColumnExpression>
  <ColumnExpression key="false" name="a">alldatatypes1.a</
ColumnExpression>
  <ColumnExpression key="false"
name="chardata">alldatatypes.charData</ColumnExpression>
  <ColumnExpression key="false"
name="chardata1">alldatatypes1.charData1</ColumnExpression>
</JoinStream>
```

### CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE='tree',
INDEXSIZEHINT=8;
CREATE INPUT WINDOW alldatatypes
SCHEMA (id INTEGER, a LONG, charData STRING)
PRIMARY KEY (id)
  STORE store1;
CREATE INPUT WINDOW alldatatypes1
SCHEMA (id INTEGER, a LONG, charData1 STRING)
PRIMARY KEY (id)
  STORE store1;
CREATE OUTPUT WINDOW FOuterJoindatatypes
SCHEMA (id INTEGER, a LONG, chardata STRING, chardata1 STRING)
PRIMARY KEY (id)
  STORE store1
  AS
SELECT firstnonnull(alldatatypes.id) AS id, alldatatypes1.a AS a,
alldatatypes.charData AS chardata, alldatatypes1.charData1 AS
chardata1 FROM
alldatatypes
  FULL JOIN
alldatatypes1
  ON alldatatypes.id = alldatatypes1.id;
```

## Global Migration

---

In CCL, the Aleri Global element migrates to a **DECLARE END** statement.

AleriML:



```
<Global>
int32 depth_of_book := 10;
double change_currency(double val) { return val * 1.57; }
</Global>
```

CCL:

```
DECLARE
INTEGER depth_of_book := 10;
FLOAT change_currency(FLOAT val) { return val * 1.57; }
END;
```

## FlexStream Migration

In CCL, the Aleri store element migrates to a **CREATE MEMORY STORE** statement, and the FlexStream "compute" migrates to Flex element "Ccl\_1\_compute", with OUT as the output window "compute" and with the schema previously defined in AleriML. The method element migrates to an **ON** clause.

AleriML:

```
<FlexStream id="compute" istream="alldatatypes" store="store1">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="int64" key="true" name="a1"/>
  <Column datatype="string" key="false" name="charData1"/>

  <Method name="inputMethod" stream="alldatatypes">{
    [int32 id; int64 a; | string charData ] record :=
alldatatypes;
    record.a := record.a + 9;
    record.charData := concat(record.charData,'aa');
    output record;
  }</Method>
</FlexStream>
```

CCL:

```
CREATE FLEX Ccl_1_compute
  IN alldatatypes
  OUT OUTPUT WINDOW compute SCHEMA (id INTEGER, a1 LONG, charData1
STRING)
  PRIMARY KEY (id, a1)
  STORE store1
  BEGIN
  ON alldatatypes {
  {
    [INTEGER id; LONG a; | STRING charData ] record :=
alldatatypes;
    record.a := record.a + 9;
    record.charData := concat(record.charData,'aa');
    output record;
  }
  };
END;
```

## PatternStream Migration

In CCL, the Aleri PatternStream "compute" migrates to output stream "Ccl\_1\_Pattern".

This output stream uses the **MATCHING** and **ON** clauses to define the pattern from AleriML. The Flex element "Ccl\_2\_compute" then takes input from the output stream "Ccl\_1\_Pattern" and outputs it to output window "compute". The SPLASH code for pattern matching migrates to the **ON** clause for the Flex element "Ccl\_2\_compute".

AleriML:

```
<PatternStream id="compute" istream="alldatatypes" store="store1">
  <Column datatype="int32" key="true" name="id"/>
  <Column datatype="string" key="true" name="charData1"/>
  <Column datatype="string" key="false" name="charData2"/>
  <Local>   int32 idloc := 0;   </Local>
  <Pattern>
    within 1 seconds
    from alldatatypes[charData='aaa'; a=p] as d1,
    alldatatypes[charData='bbb'; a=q] as d2
    on d1 fby d2
    {
      idloc := idloc + 1;
      output [id = idloc; | Symbol1='aaa'; Symbol2='bbb'];
    }
  </Pattern>
</PatternStream>
```

CCL:

```
CREATE OUTPUT STREAM Ccl_1_Pattern
SCHEMA (d1id INTEGER, d1a LONG, d1charData STRING, d2id INTEGER, d2a
LONG, d2charData STRING)
AS
SELECT d1.id AS d1id, d1.a AS d1a, d1.charData AS d1charData, d2.id
AS d2id, d2.a AS d2a, d2.charData AS d2charData FROM alldatatypes
d1, alldatatypes d2
MATCHING
[ 1 SECONDS : ( d1 , d2 ) ]
ON
d1.charData = 'aaa' AND d2.charData = 'bbb';

CREATE FLEX Ccl_2_compute
IN Ccl_1_Pattern, alldatatypes
OUT OUTPUT WINDOW compute SCHEMA (id INTEGER, charData1 STRING,
charData2 STRING)
PRIMARY KEY (id, charData1)
STORE store1
BEGIN
DECLARE
  INTEGER idloc := 0;
END;
```

```
ON Ccl_1_Pattern
{
    {
        idloc := idloc + 1;
        output [id = idloc; | Symbol1='aaa'; Symbol2='bbb'];
    }
};
ON alldatatypes
{
};
END;
```



# User-Defined Functions Migration

See how foreign and foreignJava user-defined functions migrate from AleriML to CCL.

---

**Note:** In Aleri, external functions permitted variable numbers of parameters for a function, but Event Stream Processor does not.

---

## Example: Foreign Function Migration

---

In CCL, the Aleri ComputeStream "foreignStream" migrates to an **CREATE OUTPUT WINDOW** statement, and the Store element migrates to a **CREATE MEMORY STORE** statement.

In this example, the Aleri ComputeStream element has a foreign function that it calls as ColumnExpression. The Aleri foreign function migrates to a **CREATE LIBRARY** statement, and the foreign function references in the ColumnExpression migrate to Lib\_0.intfun( ).

```
<Store file="store1" id="store1" kind="memory"/>
<ComputeStream id="foreignStream" istream="eqInput" store="store1">
  <ColumnExpression key="true" name="a">eqInput.a</
ColumnExpression>
  <ColumnExpression key="false" name="intData">foreign("/opt/
aleriTests/lib/unit/foreign1.so",intfun,int32)</ColumnExpression>
  <ColumnExpression key="false" name="charData">foreign("/opt/
aleriTests/lib/unit/foreign1.so",stringfun,string)</
ColumnExpression>
</ComputeStream>
```

**CCL:**

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE LIBRARY Lib_0 LANGUAGE C FROM '/opt/aleriTests/lib/unit/
foreign1.so' (
INTEGER intfun ( );
);
CREATE LIBRARY Lib_1 LANGUAGE C FROM '/opt/aleriTests/lib/unit/
foreign1.so' (
STRING stringfun ( );
);
CREATE OUTPUT WINDOW foreignStream
SCHEMA (a INTEGER, intData INTEGER, charData STRING)
PRIMARY KEY (a)
STORE store1
AS
SELECT eqInput.a AS a, Lib_0.intfun( ) AS intData, Lib_1.stringfun( )
```

```
AS charData
FROM eqInput;
```

## Example: ForeignJava Function Migration

In CCL, the ComputeStream "foreignStream" migrates to an **CREATE OUTPUT WINDOW** statement, and the Store element migrates to a **CREATE MEMORY STORE** statement.

In this example, the ComputeStream calls a foreignJava function as ColumnExpression. The foreignJava function migrates to a **CREATE LIBRARY** statement, and its references in the ColumnExpression migrate to Lib\_0.intFunction0( ).

AleriML:

```
<Store file="store1" id="store1" kind="memory"/>
  <ComputeStream id="foreignStream" istream="eqInput"
store="store1">
  <ColumnExpression key="true" name="a">eqInput.a</
ColumnExpression>
  <ColumnExpression key="true" name="b">eqInput.b</
ColumnExpression>
  <ColumnExpression key="false"
name="intData0">foreignJava(Functions,intFunction0,'()I')</
ColumnExpression>
  <ColumnExpression key="false"
name="intData1">foreignJava(Functions,intFunction1,'(II)I', 1, 2)</
ColumnExpression>
  </ComputeStream>
```

CCL:

```
CREATE MEMORY STORE store1 PROPERTIES INDEXTYPE ='tree',
INDEXSIZEHINT =8;
CREATE LIBRARY Lib_0 LANGUAGE Java FROM 'Functions' (
INTEGER intFunction0 ( );
);
CREATE LIBRARY Lib_1 LANGUAGE Java FROM 'Functions' (
INTEGER intFunction1 ( INTEGER , INTEGER );
CREATE OUTPUT WINDOW foreignStream
SCHEMA (a INTEGER, b STRING, intData0 INTEGER, intData1 INTEGER)
PRIMARY KEY (a, b)
STORE store1
AS
SELECT eqInput.a AS a, eqInput.b AS b, Lib_0.intFunction0( ) AS
intData0, Lib_1.intFunction1 ( 1, 2) AS intData1
FROM eqInput;
```

## CHAPTER 5 Terminology Changes

There are several changes in terminology from Aleri Streaming Platform 3.x to Sybase Event Stream Processor.

<b>Aleri Streaming Platform Term</b>	<b>Event Stream Processor Term</b>	<b>Comments</b>
Data Model	Project	A project can be composed of a number of different elements.
Flex Stream	Flex Operator	A Flex Operator can behave like a stream or a window.
Expiry	Aging	Records don't actually expire but are flagged after a defined time period.
Row Definition	Schema	New name.
int32 (datatype)	int	New name.
int64(datatype)	long	New name.
double (datatype)	float	New name.





Utility migration from the Aleri Streaming Platform to the Sybase Event Stream Processor.

<b>Aleri Utility</b>	<b>Event Stream Processor Utility</b>
sp	esp_server
sp_archive	esp_iqloader
sp_cli	esp_client
sp_cnc	esp_cnc
sp_convert	esp_convert
sp_encmodel	esp_encproject
sp_kdbin	esp_kdbin
sp_kdbout	esp_kdbout
sp_playback	esp_playback
sp_query	esp_query
sp_sql2xml	esp_compiler
sp_studio	esp_studio
sp_subscribe	esp_subscribe
sp_upgrade	esp_upgrade
sp_upload	esp_upload
sp_monitor	esp_monitor
sp_ld	Deprecated
sp_clustermgr	Deprecated
sp_clustermon	Deprecated
sp_histexport	Deprecated
sp_stream2olap	Deprecated
sp_server	Deprecated



## CHAPTER 7      **Datatype Mapping**

AleriML datatypes map to Event Stream Processor (CCL) datatypes.

<b>AleriML datatypes</b>	<b>Event Stream Processor datatypes</b>
<code>int32</code>	<code>integer</code>
<code>int64</code>	<code>long</code>
<code>double</code>	<code>float</code>
<code>string</code>	<code>string</code>
<code>money</code>	<code>money(1)...money(15)</code>
<code>date (second precision)</code>	<code>date (second precision)</code>
<code>timestamp (millisecond precision)</code>	<code>timestamp (millisecond precision)</code>



Migration limitations of the `esp_aml2ccl` utility.

- **AleriML with module and cluster elements** – AleriML with module and cluster elements is not migrated to CCL because it is represented by infrastructure elements instead.

```
<Cluster id="name of cluster">(Node)*</Cluster>
  <Module id="name of module" >{Module | DataLocation | Store
  | Stream}*</Module>
```

- **Restrict access elements** – The AleriML `restrictAccess` attribute and `Stream` element are not migrated to CCL because they are represented by infrastructure elements instead.
- **JoinStream migration** – The Event Stream Processor compiler is more strict with joins than the Aleri compiler. Some cases may migrate but may not get compiled on the ESP Server. To successfully compile in such cases, manually configure the CCL for:
  - JoinStream with FullOuter join.
    1. Ensure One-One mapping between participating streams and windows.
    2. Add `firstnonnull()` for primary keys.
  - JoinStream with LeftOuter join with Many-Many cardinality.
    - Ensure One-One or Many-One mapping between participating streams and windows.
  - JoinStream with InnerJoin with no One-One cardinality.
    - Ensure One-One mapping between participating streams and windows.
- **Aleri element attributes that do not migrate to CCL** –
  - Stream – type, oldid, convdst, ofile, expiryTimeField
  - Store – oldid
  - SourceStream – convsrc
  - Union stream – mergeKeys
- **Duplicate columns** – AleriML allowed SPLASH code duplicate columns records with duplicate columns are not allowed in CCL. The `esp_aml2ccl` migration tool migrates SPLASH code to CCL SPLASH code as is. You may need to update the CCL manually if duplicate columns are present in the SPLASH record.

### See also

- *Chapter 2, Migrating AleriML Models to CCL Projects* on page 3
- *JoinStream Element* on page 16



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