



ΧΡΗΜΑΤΙΣΤΗΡΙΟ
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DSS API v.1.0

Access to the

Dematerialized Securities System (DSS)

Clearing & Registration Systems Development Department

Athens, 28 June 2013



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Access to the DSS

- Access to DSS via
 - ✓ Client Workstation (Oracle Forms)
 - ✓ ATHEX Gateway v.1.2

Client-Gateway communication is based on the same protocol used also by the Trading Systems (ODL API)

- ✓ File Transfers (SFTP)
- ✓ SWIFTNet (Future Release)



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DSS API: Terminology

- Protocol / Channels
 - ✓ ODL
 - ✓ SFTP (in the near future)
 - ✓ SWIFTNet (in the future)
- Messages format - payload
 - ✓ ISO 15022
 - ✓ FIXML
 - ✓ Proprietary XML
- Services (Business functions supported)
- Software
 - ✓ ATHEX GW v.1.2



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Old Vs New

Tuxedo DSS API

- Proprietary messages
- Solicited messages only
- One way of connecting
- Polling
- Shared resources

New DSS API

- Extra services
- Subscription services
- XML & ISO 15022 messages
- More than one ways of communicating with the DSS
- Notification interface on Athex Gateway
- Flexibility on configuring members



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API services

- Service Categories
 - ✓ Registry (account management, transfers)
 - ✓ Reporting (holdings and transaction reports, investor information)
 - ✓ **OTC settlement (instruction registration, amendment, cancellation)**
- Subscription services
 - ✓ Messages are sent due to DSS events
 - ✓ Instruction allegements, status update, confirmations



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API services

- Investor Registration
- Joint or Co-owner Investor Share and Securities Account registration
- Investor Share or Co-owner Share membership lookup
- DSS Operator Sub-account registration
- DSS Operator Sub-Account deactivation
- Direct Transfer of Securities
- Release of Securities
- Take-up of Securities
- Cancellation of a pending transfer
- Transfer from / to Joint Investor Share's Securities Account



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API services

- Queries
 - Investor Shares and Securities Account Information
 - Investor's Data Updates Information
 - Information on Balances
 - Transaction List
- OTC Transaction Management
 - **Settlement instruction registration**
 - **Settlement instruction hold/release**
 - **Settlement instruction cancellation**
- Subscription Services for OTC Management
 - **Settlement instruction allegation**
 - **Settlement instruction status update**
 - **Settlement instruction confirmation**



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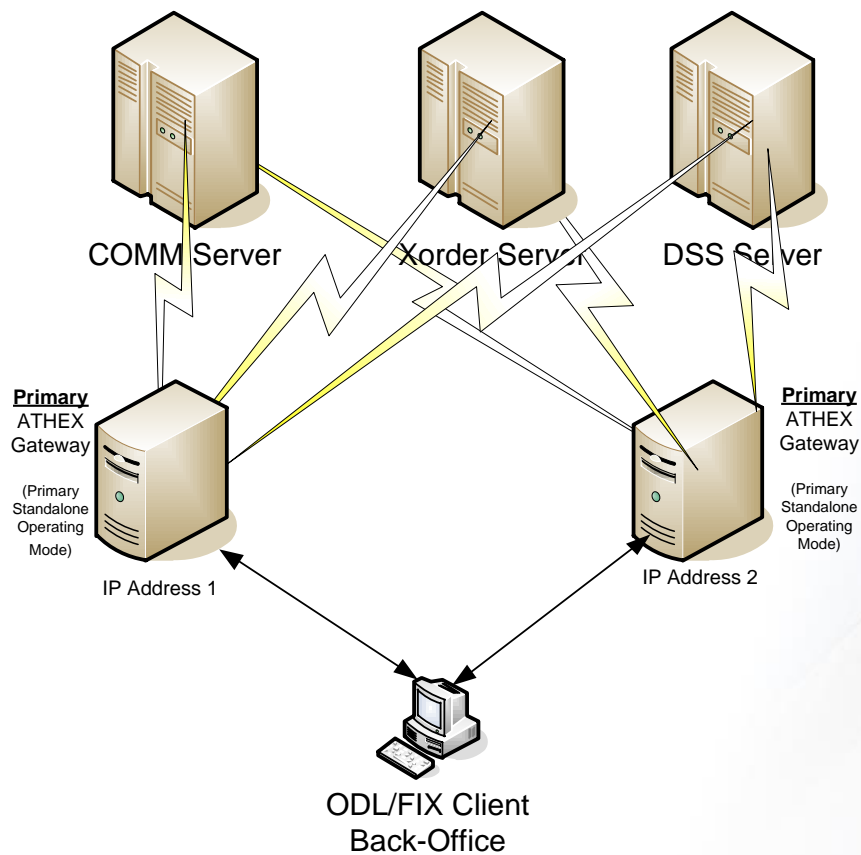
XML Messages for DSS

- DSS messages encapsulate arbitrary length (up to 32k) XML messages
- XML format supported is a HELEX proprietary schema
- HELEX proprietary XML consists of three wrapper types
 - ✓ DSSRequest, DSSResponse, DSSEvent
- HELEX proprietary XML payload can be of type
 - ✓ ISO 15022 (MT540, MT541, MT542, MT543, MT544, MT545, MT546, MT547, MT548, MT578, MT599), or
 - ✓ XML (HELEX proprietary service message definitions)

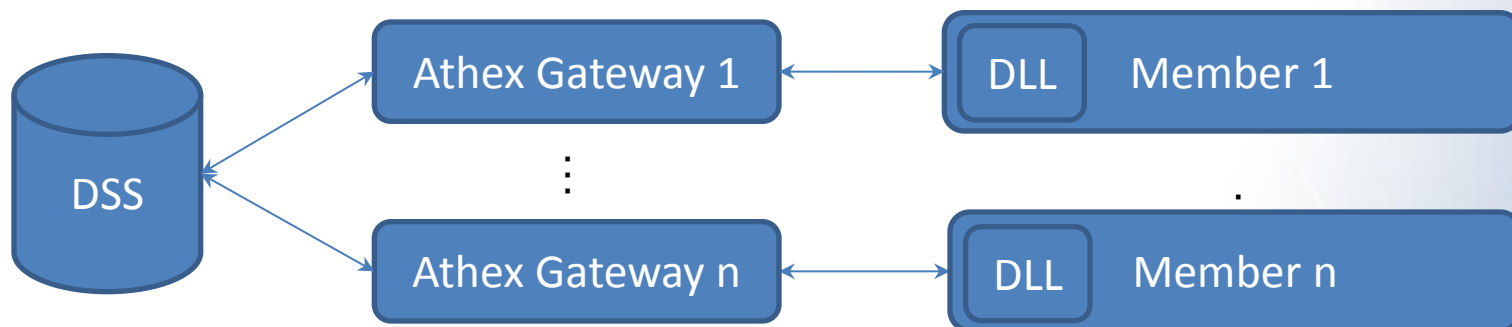


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ATHEX GW connections



Access via the Athex Gateway



- Client-Gateway API provided via ETS_Broker.dll
- Members access the DSS via dedicated channel
- DSS services provided by means of asynchronous message exchange
 - ✓ Request/Response
 - ✓ Events (based on subscriptions)



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ATHEX GW Messages for DSS

- To access DSS 4, new messages were added to ODL protocol
 - ✓ MS (DSS Entry Message)
 - ✓ TS (DSS Confirm Message)
 - ✓ TU (DSS Unsolicited Message)
 - ✓ CS (DSS Broadcast Message)



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ATHEX GW DSS Messages Purpose

•MS

Sent by the Client to the DSS. Each MS contains a single service request issued by the Client to the DSS.

•TS

Sent by the DSS to return ACK/NAK information related to the reception of a previous MS. Upon successful MS reception, it also returns a unique message identifier assigned (by the DSS) to the specific service request. Any subsequent DSS response related to the specific service request is bound to it via the message identifier.

•TU

Sent by the DSS and contains business information as a reply to a previous MS. Conveys unsolicited notification messages.

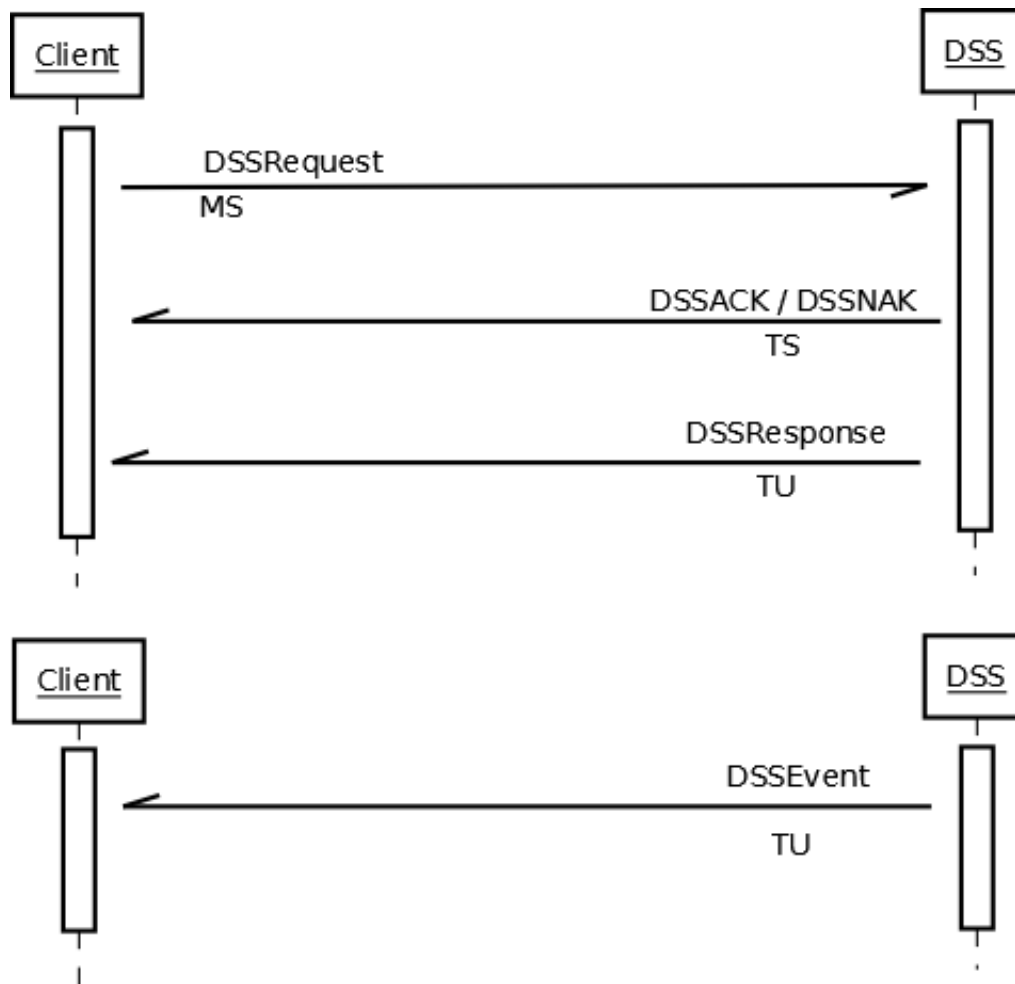
•CS

Broadcast message that contains information for all applications accessing the DSS through the ATHEX Gateway.



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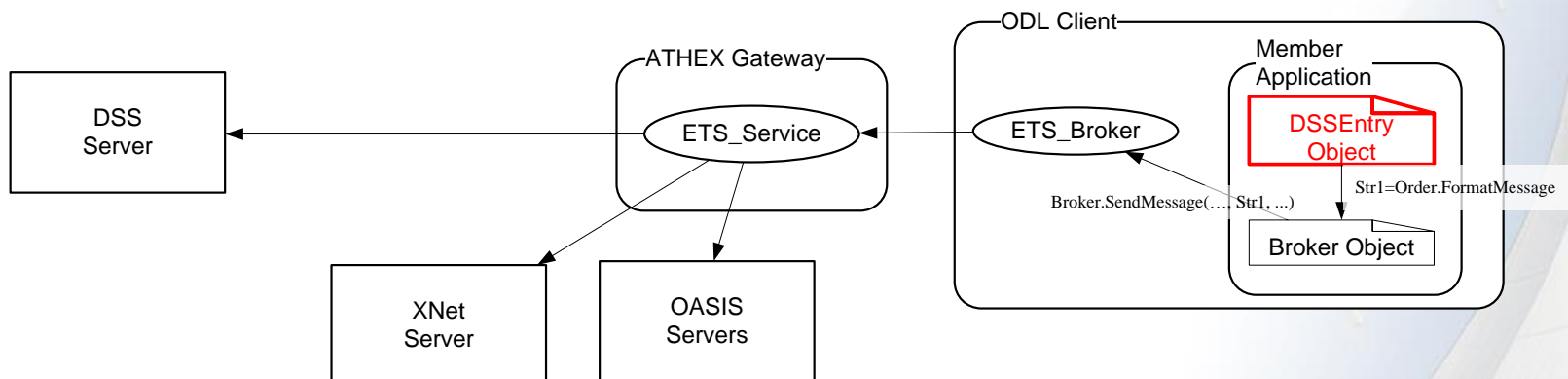
ODL DSS - Message flows





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Message Transmission (1)



(Pseudocode)

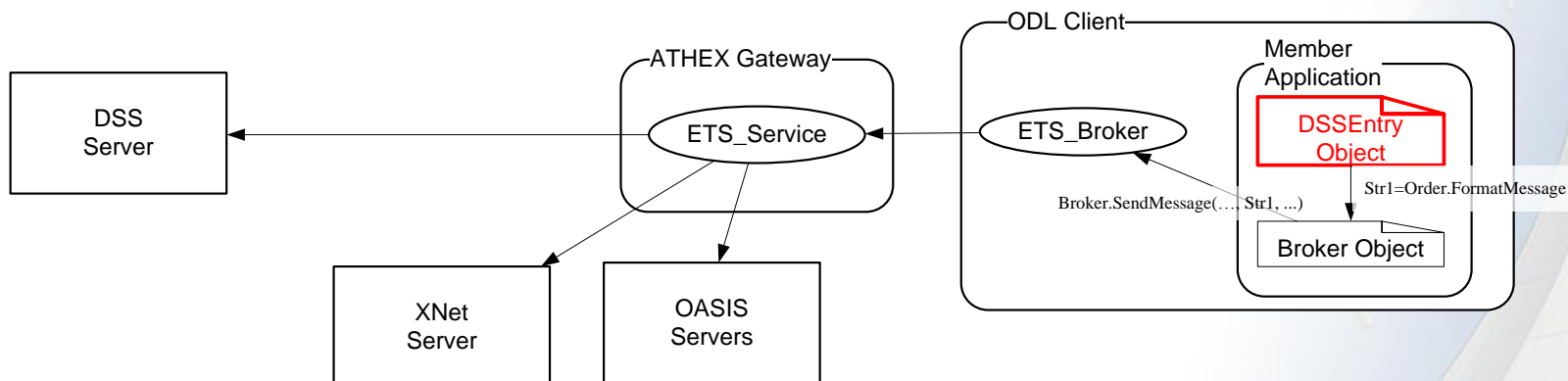
1. Create a `DSSEntry` object instance .
This instance is used to gather the information based on which the MS message string will be constructed

```
DSSEntry Entry;
```




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Message Transmission (2)



(Pseudocode)

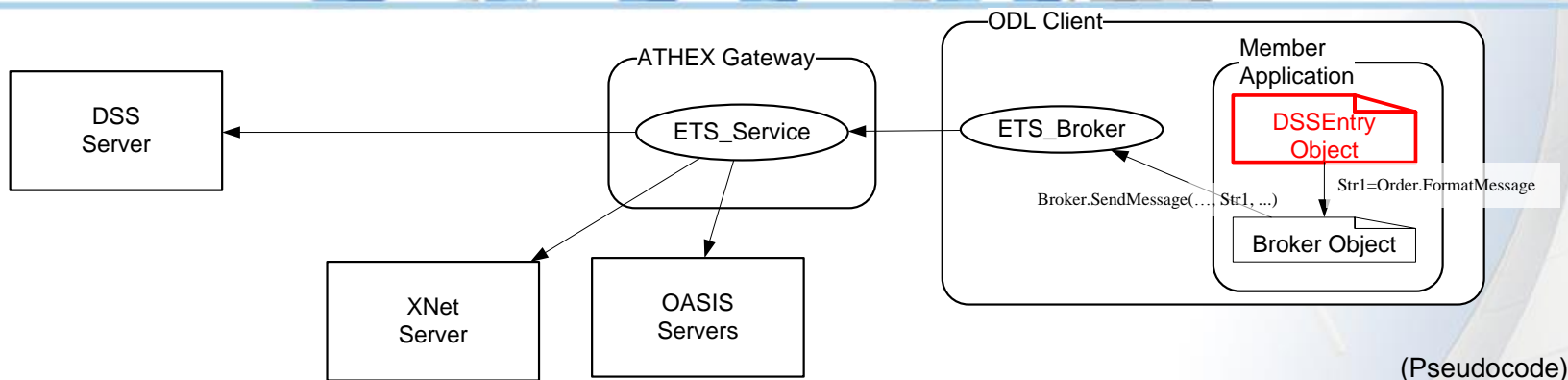
1. Create an `DSSEntry` object instance.
2. Fill in `Entry` object members that correspond to the required MS header fields.

```
DSSEntry Entry;
Entry.MessageSource = Asc("C")
Entry.DSSType = Asc("E")
Entry.ClientOrderID =
"1234567890123456"
...
```



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Message Transmission (3)



1. Create an `DSSEntry` object instance.
2. Fill in Entry object members that correspond to the required MS header fields.
3. Fill-in the `Entry.DSSMessage` property with a string that is the MS payload message. This string is the actual DSS service request and contains all the necessary data for the service invocation

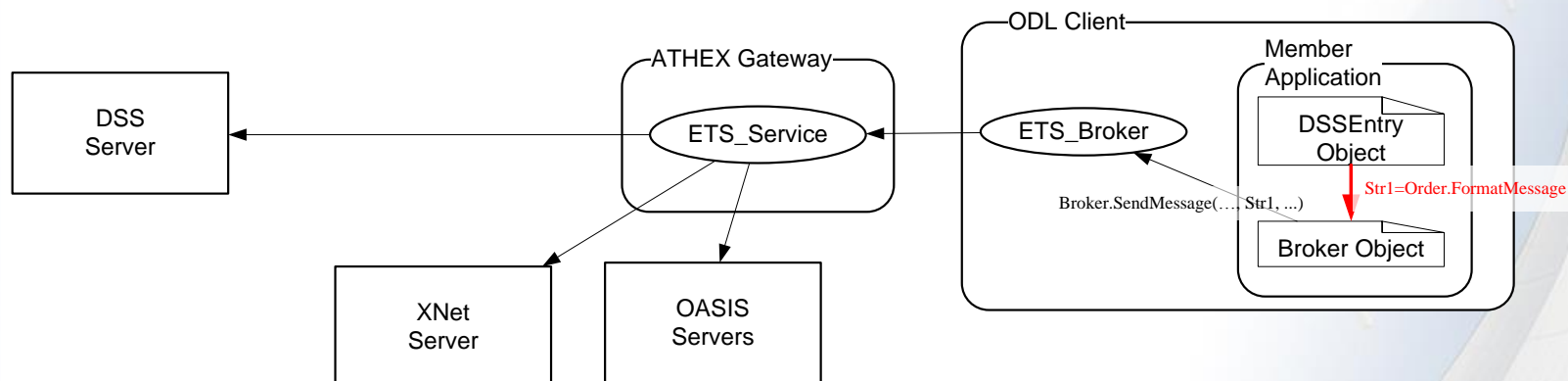
```
DSSEntry Entry;  
Entry.MessageSource = Asc("C")  
Entry.DSSType = Asc("E")  
Entry.ClientOrderID =  
"1234567890123456"  
...  
Entry.DSSMessage = buildDSSRequest  
...
```

It is assumed that there exists a `buildDSSRequest` method, which generates an XML document and serializes it to a String



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Message Transmission (4)

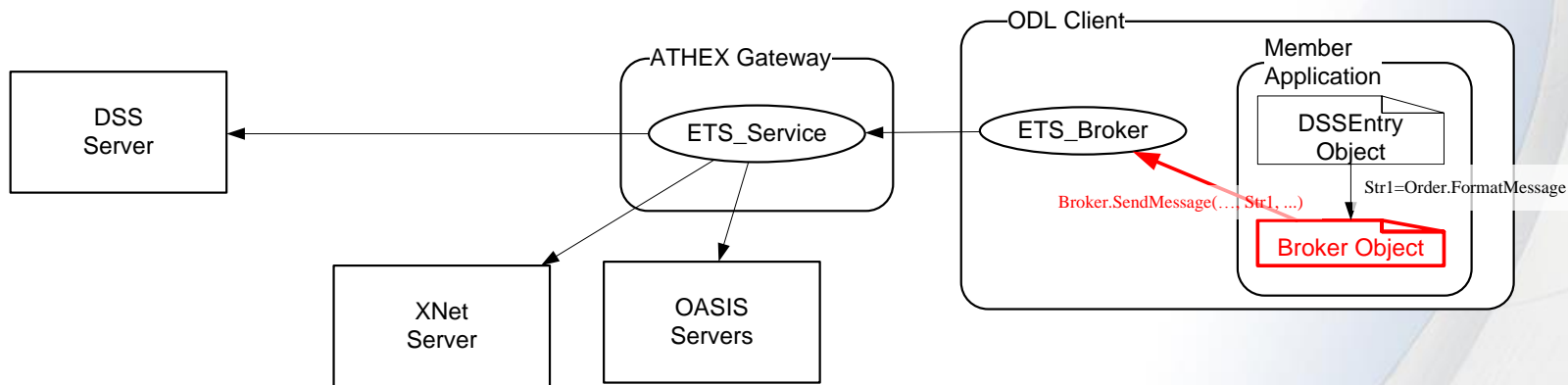


(Pseudocode)

1. Create an `DSSEntry` object instance.
2. Fill in Entry object members that correspond to the required MS header fields.
3. Fill-in the `Entry.DSSMessage` property with a string that is the MS payload message.
4. Serialize the information gathered in the Entry object to a string that is the actual MS message.

```
DSSEntry Entry;
Entry.MessageSource = Asc("C")
Entry.DSSType = Asc("E")
Entry.ClientOrderID =
"1234567890123456"
...
Entry.DSSMessage = buildDSSRequest
...
String Message;
Message = Entry.FormatMessage();
```

Message Transmission (4)



(Pseudocode)

1. Create an `DSSEntry` object instance.
2. Fill in Entry object members that correspond to the required MS header fields.
3. Fill-in the `Entry.DSSMessage` property with a string that is the MS payload message.
4. Serialize the information gathered in the Entry object to a string that is the actual MS message.
5. Send the MS message string by calling the appropriate API function (**`Broker.SendMessage`**)

```

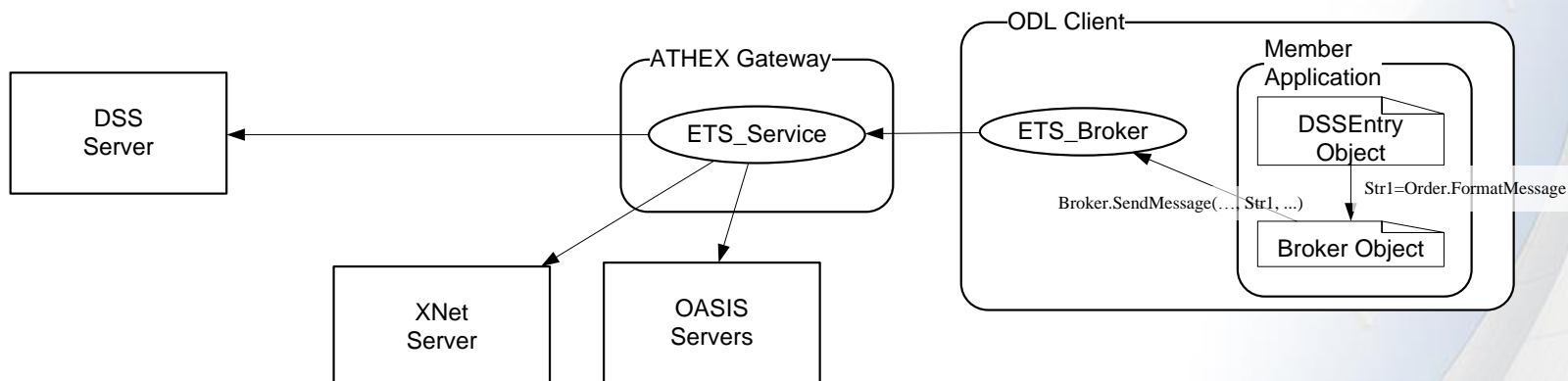
DSSEntry Entry;
Entry.MessageSource = Asc("C")
Entry.DSSType = Asc("E")
Entry.ClientOrderID =
"1234567890123456"
...
Entry.DSSMessage = buildDSSRequest
...
String Message;
Message = Entry.FormatMessage();

Broker.SendMessage(..., Message, ...);
    
```



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Message Transmission (5)



1. Create an `DSSEntry` instance.
2. Fill in `Entry` object members.
3. Build message string through auxiliary object.
4. Send `Entry` through `Broker`.
5. Check return codes and finish.
 - Return codes indicate *transmission* outcome.
 - The actual exchange response is **asynchronous**.

Typical error codes are:

`E_FAIL` (0x80004005) Application is not registered.
`E_POINTER` (0x80004003) Invalid (null) parameter.
`ETS_E_INVALIDVALUE` (0x80042518) Invalid Message type
`ETS_E_PENDING_MESSAGES` (0x80042515) Pending Messages. The function can not be called before the arrival of the expected messages.

...
...



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ODL API Call Example

Dim conid As String,
Dim msgId As Integer, refNo As Integer
Dim dat As Date
Dim obj As ETS_BROKERLib.DSSEntry

conid = "DSS"

obj = New ETS_BROKERLib.DSSEntry

obj.MessageSource = Asc("C")

obj.DSSType = Asc("E")

obj.ClientOrderID = "1234567890123456"

obj.DSSMessage = " <DSSRequest xmlns="http://www.helex.gr/dss/services" Service="query" PayloadFormat="XML">

<QueryRequest>

<RequestId>51</RequestId>

<ParticipantId>0000000101</ParticipantId>

<QueryType>0008</QueryType>

<OutputFormat>0</OutputFormat>

<OutputDestination>0</OutputDestination>

<QueryCriteria>

<Query0008Criteria>

<InvestorCode>0002224134</InvestorCode>

<SafekeepingAccount>0467732236</SafekeepingAccount>

<RegistrationDate>%</RegistrationDate>

<ValidityStatus>%</ValidityStatus>

</Query0008Criteria>

</QueryCriteria>

</QueryRequest>

</DSSRequest>"

refNo = brk.**SendMessage**(conid, obj.FormatMessage(), msgId, dat)



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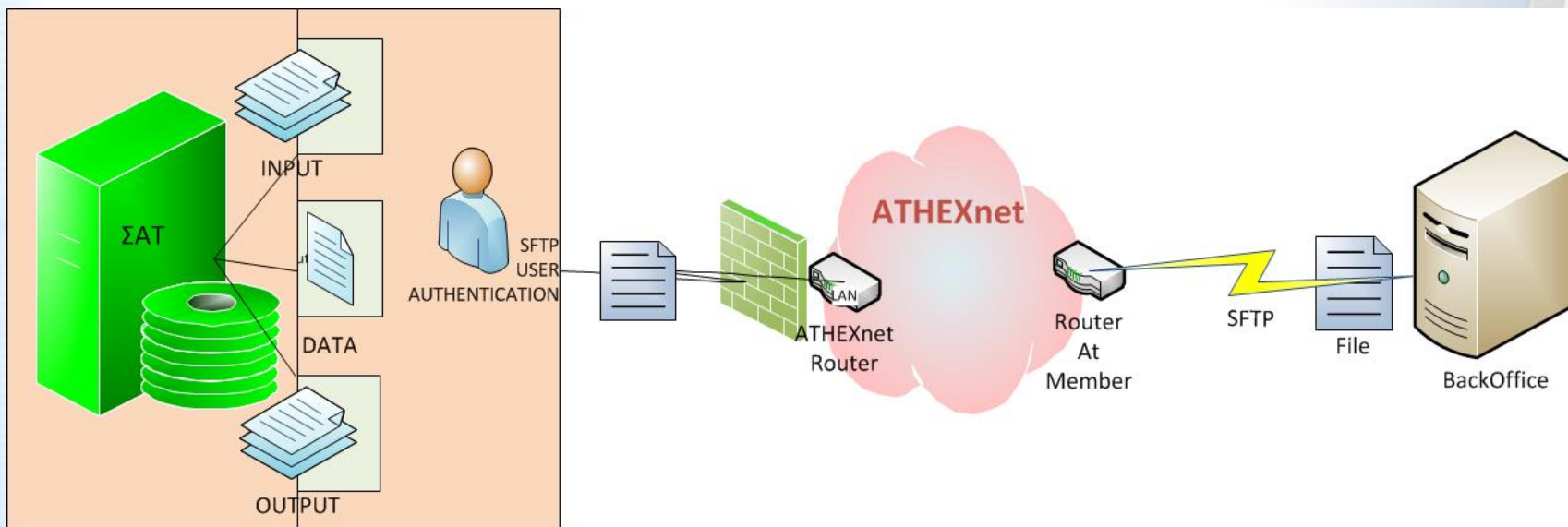
Access via the ATHEX SFTP Server

- Each member has its own set of directories
 - ✓ Input directory
 - ✓ Output directory
 - ✓ Data directory
- Communication using files
 - ✓ Full functionality
 - ✓ Multiple messages can be sent or received on a single file
 - ✓ As is ISO15022 message files supported (RJE format)
 - ✓ DSS proprietary data files accessible through Data directory



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DSS SFTP Server Access Diagram



XML Message samples (1/3)

Example: HELEX proprietary XML with embedded MT541 ISO 15022 message

```
<DSSRequest xmlns="http://www.helex.gr/dss/services" PayloadFormat="FIN">
  <FIN>
    <![CDATA[{1:F01YOURBICXXXXX0000100001}{2:I541HCSDGRAAXXXN}{4:
      :16R:GENL
      :20C::SEME//00001
      :23G:NEWM
      :16S:GENL
      :16R:TRADDET
      :98A::SETT//20130604
      :98A::TRAD//20130607
      :35B:ISIN GRXXXXXXXXXX
      :16S:TRADDET
      :16R:FIAC
      :36B::SETT//UNIT/3067,
      :97A::SAFE//1000000000
      :16S:FIAC
      :16R:SETDET
      :22F::SETR//TRAD
      :16R:SETPRTY
      :95R::DEAG/HCSD/0000000001
      :16S:SETPRTY
      :16R:SETPRTY
      :95P::PSET//HCSDGRAAXXX
      :16S:SETPRTY
      :16R:SETPRTY
      :95R::REAG/HCSD/0000000002
      :16S:SETPRTY
      :16R:AMT
      :19A::SETT//EUR40068,79
      :16S:AMT
      :16S:SETDET
    -}]11>
  </FIN>
</DSSRequest>
```



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XML Message samples (2/3)

Example: HELEX proprietary XML with DSS report query service message

```
<DSSRequest xmlns="http://www.helex.gr/dss/services" Service="query" PayloadFormat="XML">
  <QueryRequest>
    <RequestId>51</RequestId>
    <ParticipantId>0000000101</ParticipantId>
    <QueryType>0008</QueryType>
    <OutputFormat>0</OutputFormat>
    <OutputDestination>0</OutputDestination>
    <QueryCriteria>
      <Query0008Criteria>
        <InvestorCode>0002224134</InvestorCode>
        <SafekeepingAccount>0467732236</SafekeepingAccount>
        <RegistrationDate>%</RegistrationDate>
        <ValidityStatus>%</ValidityStatus>
      </Query0008Criteria>
    </QueryCriteria>
  </QueryRequest>
</DSSRequest>
```



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XML Message samples (3/3)

Example: HELEX proprietary XML with DSS report query service message

```
<<?xml version="1.0" encoding="iso-8859-7"?>
<DSSResponse xmlns="http://www.helex.gr/dss/services" MessageID="393477" Service="query"
  DateCreated="04/04/2013 14:52:31" PayloadFormat="XML">
  <QueryResponse>
  <RequestId>51</RequestId>
  <ParticipantId>0000000101</ParticipantId>
  <ErrorCode>SUCCESS</ErrorCode>
  <ResponseEnvelopIdentifier>
  qry0008_101_348_20130404020431.lgc
  </ResponseEnvelopIdentifier>
  </QueryResponse>
</DSSResponse>
```




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Timeline

Availability of DSS
API V1.0 Test
System



July
2013

August
2013

September
2013

October
2013



Publication of DSS
API V2.0
Specifications

DSS API V1.0
Production



Availability of DSS
API V2.0 Test
System



Decommission of
Tuxedo DSS API



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Development Support

- Test System Availability:
Every business day from 10:00 to 18:00
- Technical Support Contact:
Email DSSAPI@helex.gr
- Support Notices



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References

Available documentation at

http://www.ase.gr/oasis/oasis_ann.asp?annid=169160

consists of

- Development specifications for DSS API V1.0
[Κείμενο ανάπτυξης για την έκδοση 1.0 του νέου ΣΑΤ API](#) (Greek Version)
- Development Guidelines for ATHEX Gateway
[Κείμενο ανάπτυξης \(ATHEHX Gateway Architecture and Development Guidelines\) - έκδοση 1.2 / Version 1.2 - Architecture & Application Development Guidelines](#)
(English Version)

DSS API V1.0 Service XSD's are available at

http://www.ase.gr/oasis/Files/DSS_API_V1.0_Service_xsds.zip