Voyager Search Web Service API Technical Documentation

Yue Ji July 18, 2016

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Summary:

- This web service provides following Voyager APIs to search Voyager: Lookup Bib&Item(`GetBibItem`), Lookup Item (`GetItem`), lookup BIB MARC (`GetBibMarc`), lookup MFHD&ITEM (`GetMfhdItem`), lookup all MFHD&ITEM (`GetAllMfhdItem`).
- `GetBibItem` - Provide an item along with the brief bib data from Voyager database by searching the bib id, OCLC master number, ISBN or ISSN.
- `GetItem` - Provide the item data that are attached with the same mfhd record from Voyager database by searching the item barcode, item id, mfhd id.
- `GetBibMarc` - Provide bibliographic MARC data from Voyager database by searching the bib id.
- `GetMfhdItem` - Provide the first active item barcode related the holding, item data that are attached with the same bib record from Voyager database by searching the item barcode, item id, mfhd id.
- `GetAllMfhdItem` - Provide all holding, item data that are attached with the same bib record from Voyager database by searching the item barcode, item id, mfhd id, bib id.

- The programming structure is Java Servlet.
- The response data format is JSON or XML.
- All sample URLs are on TEST sever.
  Base url is: http://libapp-test.library.yale.edu/VoySearch
- After Voyager 10.0 upgrades at the end of 2017, the VoySearch will be available on PROD server. Base url for PROD is: http://libapp.library.yale.edu/VoySearch
  The query string will be the same on PROD, e.g /GetBibItem?bibid=2
- Explanation for the entire url.
  e.g.
  http://libapp.library.yale.edu/VoySearch/GetBibItem?oclcmrn=ocm00000030&isxn=0002-094X
  Base url is: http://libapp.library.yale.edu/VoySearch
  Query string is: /GetBibItem?oclcmrn=ocm00000030&isxn=0002-094X

User Guide:

1. Bib & Item Lookup API – *GetBibItem*

- The response data format is JSON.
- It retrieves bib, mfhd and item data by passing in these parameters*:*
  `bib id, OCLC master number (079), isbn/issn.`
- Returning data in bib, mfhd, item three levels. If any levels are not available, "NA" will state in its associated id field as:
  `"bibid":"NA", "mfhdid":"NA", "itemid":"NA".`
- Item format will state as SPM (single monograph), MPM (multiple monograph), Serial.
- If any fields do not have the value from the database, "NA" will be stated as the value.
- Any errors from the URL or the record doesn't exist in Voyager, it will response as:
  `{"record":[{ "bibid":"NA" }]}`
- Field explanation.
  `"title"` – Item bib title.
  `"author"` – Item bib author.
  `"pdescription"` – Item bib's 300 field - Physical Description, e.g. xv, 814 p. 25 cm.
  `"publisher"` – Item bib publisher.
  `"pubplace"` – Item bib publish place.
  `"pubdate"` – Item bib publish date.
  `"isxn"` – Item bib's either ISBN or ISSN.
  `"oclcmrn"` – Item bib OCLC master number.

"itemformat" – Item format. "SPM" is single monograph. "MPM" is multiple monograph. "Serial" is Serial.
"itemenum" – Item enumeration. It could be VOLUME NUMBER, MAP, CD, DVD, ANSWER, PORTFOLIO, PLAN, CARTE etc.
"itemchron" – Item chron data.
"mfhdid" – Item's mfhd id.
"itemid" – Item id.
"availdate" – Item charged due date. If the item has not been charged out, the value is "NA".
"callno" – Item call number.
"loccode" – Item temp location code. If there is no temp location, it will be item perm location code.
"locname" – Item temp location name. If there is no temp location, it will be item perm location name.
"itypecode" – Item temp type code. If there is no temp type, it will be item perm type code.
"itypename" – Item temp type name. If there is no temp type, it will be item perm type name.
"bibid" – Item's bib id.
"barcode" – Item barcode.
"barcodestatus" – Item barcode status, either Active or Inactive.
"itemstatus" – Item status, e.g. Not Charged, Missing.
"itemstat" – Item statistic category, e.g. RestrictedSpecColl, DGI Project Original.
"itemspinelabel" – Some further item location information is saved in the Item spine label.

- If the bib format in BIB_TEXT table is "as", the "itemformat" is Serial.
- If the bib format in BIB_TEXT table is "am", the "itemformat" is assigned in either SPM or MPM based on following criteria.
  Following charts shows the criteria.

Figure 1.

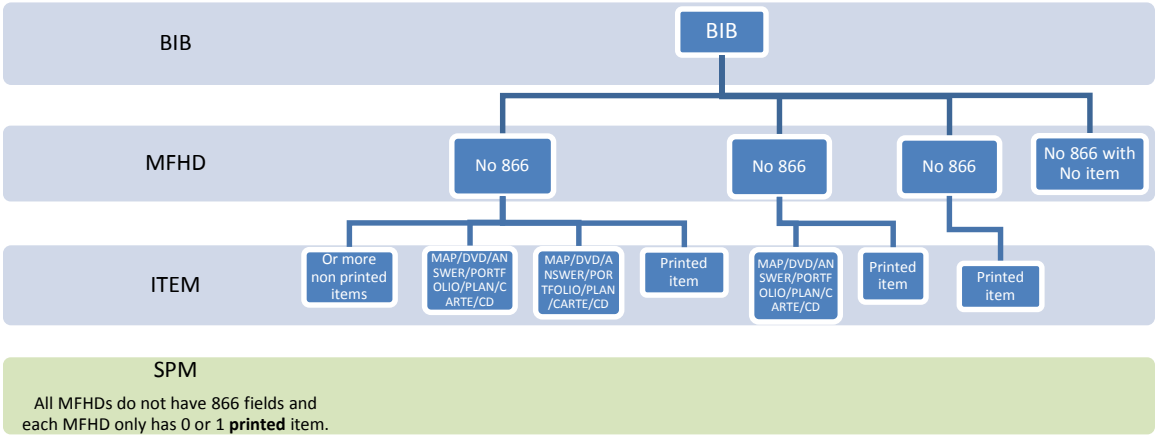


Figure 2.

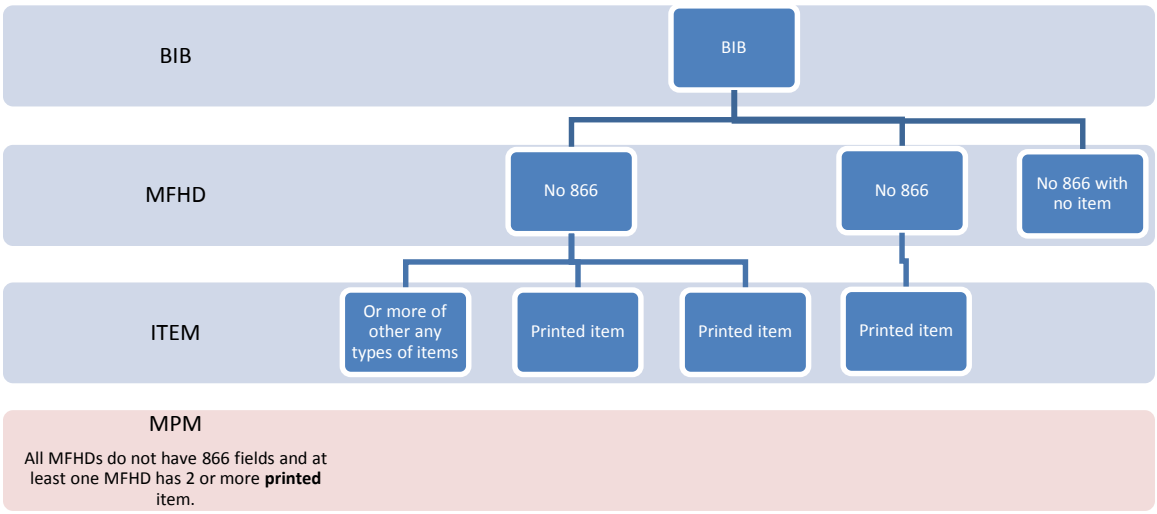
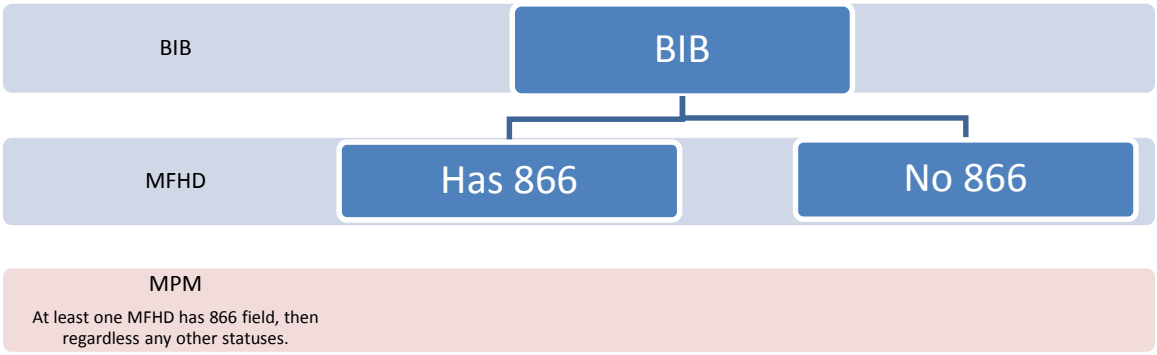


Figure 3.



- Four options of retrieving.
  1) Search by bib id.
     - The sample URL is http://libapp-test.library.yale.edu/VoySearch/GetBibItem?bibid=2
     - This is the core search. Other options all are in ending up to find the bib id first, then continuing to retrieve bib, mfhd, item data.
     - Bib data is retrieved from BIB_TEXT, and BLOB function query, e.g.
       `yaledb.GETBIBTAG(bib_id,'300'),`
       `yaledb.GETBIBTAG(bib_id,'079').`
     - Mfhd data includes mfhd id, call number. The item data could come from the same mfhd, or the different mfhds which are attached with the same bib record.

  2) Search by OCLC master number.
     - The sample URL:
       http://libapp-test.library.yale.edu/VoySearch/GetBibItem?oclcmrn=ocm00000030
     - Find bib id by OCLC master number:
       In the code, it uses following Java Regular Expression to extract digits to pass into the below sample query.

```
Pattern p = Pattern.compile("[0-9]+");
Matcher m = p.matcher(oclcmrn);
if (m.find())
      oclcmrn = m.group();
```

```
select * from bib_index
where index_code = '079A'
and normal_heading = '00000030'
```

3) Search by ISXN (either ISBNor ISSN)
   - ❖ The sample URL:
     http://libapp-test.library.yale.edu/VoySearch/GetBibItem?isxn=3327000409
     It will search by looking up the ISBN first, if no hits, then search by looking up the ISSN. Following is the sample queries.
   - ❖ Find bib id by ISXN:
     Tag 020A has the ISBN data:

```
select * from bib_index
where index_code='020A'
and upper(display_heading) = '3327000409'
```

     Tag 022A has the ISSN data:

```
select * from bib_index
where index_code='022A'
and upper(display_heading) = '0002-094X'
```

   This search takes a little longer time.

4) Search by OCLC MR number and ISXN.
   - ❖ It will search by looking up the OCLC MR number first. If no hits searched by OCLC MR number, then search by looking up the ISXN.
   - ❖ The sample URL: http://libapp-test.library.yale.edu/VoySearch/GetBibItem?oclcmrn=ocm00000030&isxn=0002-094X

➢ The sample returned response:

1) Search by bib id:
   http://libapp-test.library.yale.edu/VoySearch/GetBibItem?bibid=3941
   This bib has two mfhds. One mfhd has the item data, and the other mfhd does not have the item data.

{

"record": [{

"title": "American legislative process: Congress and the States",

"author": "Keefe, William J.",

"pdescription": "xxi, 521 p. illus. 25 cm.",

```
                "publisher": "Prentice-Hall",
                "pubplace": "Englewood Cliffs, N.J.,",
                "pubdate": "[1968]",
                "isxn": "NA",
                "oclcmrn": "ocm00332255",
                "bibid": "3941",
                "items": [{
                        "loccode": "sml",
                        "itemenum": "NA",
                        "itypename": "Circulating",
                        "callno": "JK1001 K44 1968 (LC)",
                        "itemchron": "NA",
                        "itemstatus": "Not Charged",
                        "barcodestatus": "Active",
                        "itemid": "6433",
                        "itemformat": "SPM",
                        "itypecode": "circ",
                        "itemspinelabel": "NA",
                        "itemstat": "NA",
                        "locname": "SML, Stacks, LC Classification",
                        "barcode": "39002008332646",
                        "mfhdid": "7329",
                        "availdate": "NA"
                }, {
                        "itemid": "NA",
                        "itemformat": "NA",
                        "callno": "JK1001 K44 1968 (LC)",
                        "mfhdid": "7330"
                }]
        }]
}
```


2) This record has the diacritics characters.
http://libapp-test.library.yale.edu/VoySearch/GetBibItem?bibid=2


```
{
    "record": [{
            "title": "StreitkraÃŒÂˆfte der NATO auf dem Territorium der BRD /",
            "author": "NA",
```

```
        "pdescription": "552 p. : ill. (some col.) ; 24 cm.",
        "publisher": "Militärverlag der Deutschen Demokratischen Republik,",
        "pubplace": "Berlin :",
        "pubdate": "1986.",
        "isxn": "3327000409",
        "oclcmrn": "ocn702408255",
        "bibid": "2",
        "items": [{
                "loccode": "lsf",
                "itemenum": "NA",
                "itypename": "LSF Circ",
                "callno": "UA646.5 G4 S77 1986 (LC)",
                "itemchron": "NA",
                "itemstatus": "Not Charged",
                "barcodestatus": "Active",
                "itemid": "2",
                "itemformat": "SPM",
                "itypecode": "lsfc",
                "itemspinelabel": "NA",
                "itemstat": "NA",
                "locname": "LSF - Request for delivery to any Yale Library",
                "barcode": "39002045573301",
                "mfhdid": "2",
                "availdate": "NA"
        }]
    }]
}
```


2. Lookup Item API – *GetItem*

- The response data format is JSON.
- Retrieve Item records, including active and inactive barcode items.
- Field explanation.

  `"availdate"` – Item charged due date. If the item has not been charged out, the value is “NA”.

  `"callno"` – Item call number.

  `"loccode"` – Item temp location code. If there is no temp location, it will be item perm location code.

"locname" – Item temp location name. If there is no temp location, it will be item perm location name.
"itypecode" – Item temp type code. If there is no temp type, it will be item perm type code.
"itypename" – Item temp type name. If there is no temp type, it will be item perm type name.
"bibId" – Item bib id.
"mfhdid" – Item mfhd id.
"itemid" – Item itemid.
"barcode" – Item barcode.
"barcodestatus" – Item barcode status, either Active or Inactive.
"itemstatus" – Item status, e.g. Not Charged, Missing.
"itemstat" – Item statistic category, e.g. RestrictedSpecColl, DGI Project Original.
"itemspinelabel" – Some further item location information is saved in the Item spine label field.
"itemenum" – Item enumeration. It could be VOLUME NUMBER, MAP, CD, DVD, ANSWER, PORTFOLIO, PLAN, CARTE etc.
"itemchron" – Item chron data.

- Sample URLs.

1) Search by item barcode.
http://libapp-test.library.yale.edu/VoySearch/GetItem?barcode=39002003201317
Returned items that have the same mfhd id.


```
{
    "items": [{
        "bibid": "4330",
        "loccode": "smly",
        "itemenum": "25",
        "itypename": "Circulating",
        "callno": "Bg7 022h 22, 24-25",
        "itemstatus": "Not Charged,Cataloging Review",
        "barcodestatus": "Active",
        "itemchron": "NA",
        "itemid": "7084",
        "itypecode": "circ",
        "itemspinelabel": "3",
```

```
        "itemstat": "NA",
        "locname": "SML, Stacks, Yale Classification",
        "barcode": "39002003201317",
        "mfhdid": "8034",
        "availdate": "NA"
    }, {
        "bibid": "4330",
        "loccode": "lsfr",
        "itemenum": "24",
        "itypename": "LSF Restricted",
        "callno": "Bg7 022h 22, 24-25",
        "itemstatus": "Charged",
        "barcodestatus": "Active",
        "itemchron": "NA",
        "itemid": "7083",
        "itypecode": "lsfr",
        "itemspinelabel": "2",
        "itemstat": "NA",
        "locname": "LSF-Use in SML, Manuscripts and Archives only (Non-Circ)",
        "barcode": "39002004868205",
        "mfhdid": "8034",
        "availdate": "05-28-20 23:59:00"
    }, {
        "bibid": "4330",
        "loccode": "lsf",
        "itemenum": "22",
        "itypename": "LSF Circ",
        "callno": "Bg7 022h 22, 24-25",
        "itemstatus": "Not Charged",
        "barcodestatus": "Active",
        "itemchron": "NA",
        "itemid": "7082",
        "itypecode": "lsfc",
        "itemspinelabel": "1",
        "itemstat": "NA",
        "locname": "LSF - Request for delivery to any Yale Library",
        "barcode": "39002004868197",
        "mfhdid": "8034",
```

```
            "availdate": "NA"
        }]
}
```


2) Search by item id.
   http://libapp-test.library.yale.edu/VoySearch/GetItem?itemid=10915
   Returned items that have the same item id.


```
{
    "items": [{
        "bibid": "6834",
        "loccode": "ksl",
        "itemenum": "NA",
        "itypename": "Circulating",
        "callno": "QC178 M57 1973+ Oversize",
        "itemstatus": "Not Charged",
        "barcodestatus": "Active",
        "itemchron": "NA",
        "itemid": "10915",
        "itypecode": "circ",
        "itemspinelabel": "NA",
        "itemstat": "NA",
        "locname": "Ctr for Sci & Soc Sci Info",
        "barcode": "39002068543116",
        "mfhdid": "12698",
        "availdate": "NA"
    }, {
        "bibid": "6834",
        "loccode": "ksl",
        "itemenum": "NA",
        "itypename": "Circulating",
        "callno": "QC178 M57 1973+ Oversize",
        "itemstatus": "Not Charged",
        "barcodestatus": "Inactive",
        "itemchron": "NA",
        "itemid": "10915",
        "itypecode": "circ",
        "itemspinelabel": "NA",
```

```
            "itemstat": "NA",
            "locname": "Ctr for Sci & Soc Sci Info",
            "barcode": "39002011994994",
            "mfhdid": "12698",
            "availdate": "NA"
        }]
}
```


3) Search by item mfhd id.

   The sample URL:

   http://libapp-test.library.yale.edu/VoySearch/GetItem?mfhdid=8106

   Returned items that have the same mfhd id.


```
{
    "items": [{
            "bibid": "4362",
            "loccode": "ssl",
            "itemenum": "v.1 c.2",
            "itypename": "Circulating",
            "callno": "B3216 C33 P4513 (LC)",
            "itemstatus": "Renewed",
            "barcodestatus": "Active",
            "itemchron": "NA",
            "itemid": "11056745",
            "itypecode": "circ",
            "itemspinelabel": "NA",
            "itemstat": "NA",
            "locname": "Ctr for Sci & Soc Sci Info",
            "barcode": "39002083866369",
            "mfhdid": "8106",
            "availdate": "09-14-17 23:59:00"
        }, {
            "bibid": "4362",
            "loccode": "csssiannex",
            "itemenum": "vol.2",
            "itypename": "NA",
            "callno": "B3216 C33 P4513 (LC)",
            "itemstatus": "In Transit On Hold",
            "barcodestatus": "Active",
```

```
            "itemchron": "NA",
            "itemid": "7142",
            "itypecode": "NA",
            "itemspinelabel": "NA",
            "itemstat": "NA",
            "locname": "Ctr for Sci & Soc Sci Info, Annex",
            "barcode": "39002021068607",
            "mfhdid": "8106",
            "availdate": "NA"
        }, {
            "bibid": "4362",
            "loccode": "csssiannex",
            "itemenum": "1",
            "itypename": "NA",
            "callno": "B3216 C33 P4513 (LC)",
            "itemstatus": "Not Charged",
            "barcodestatus": "Active",
            "itemchron": "NA",
            "itemid": "7141",
            "itypecode": "NA",
            "itemspinelabel": "NA",
            "itemstat": "NA",
            "locname": "Ctr for Sci & Soc Sci Info, Annex",
            "barcode": "39002018793324",
            "mfhdid": "8106",
            "availdate": "NA"
        }]
}
```


4) Inactive item barcode with its replaced active or inactive barcodes that are attached with the same mfhd record are all returned:
http://libapp-test.library.yale.edu/VoySearch/GetItem?barcode=39002011994994


```
{
"items": [{
        "bibid": "6834",
        "loccode": "ksl",
        "itemenum": "NA",
        "itypename": "Circulating",
```

```
            "callno": "QC178 M57 1973+ Oversize",
            "itemstatus": "Not Charged",
            "barcodestatus": "Active",
            "itemchron": "NA",
            "itemid": "10915",
            "itypecode": "circ",
            "itemspinelabel": "NA",
            "itemstat": "NA",
            "locname": "Ctr for Sci & Soc Sci Info",
            "barcode": "39002068543116",
            "mfhdid": "12698",
            "availdate": "NA"
        }, {
            "bibid": "6834",
            "loccode": "ksl",
            "itemenum": "NA",
            "itypename": "Circulating",
            "callno": "QC178 M57 1973+ Oversize",
            "itemstatus": "Not Charged",
            "barcodestatus": "Inactive",
            "itemchron": "NA",
            "itemid": "10915",
            "itypecode": "circ",
            "itemspinelabel": "NA",
            "itemstat": "NA",
            "locname": "Ctr for Sci & Soc Sci Info",
            "barcode": "39002011994994",
            "mfhdid": "12698",
            "availdate": "NA"
        }]
}
```


3. Lookup Bib Marc API – *GetBibMarc*

- The response data format is XML.
- Retrieve bibliographic record.
- Return standard MARCXML format of the Library of Congress.
  For more details, please read: http://www.loc.gov/standards/marcxml/

- The sample URL: http://libapp-test.library.yale.edu/VoySearch/GetBibMarc?bibid=3694053
- The input parameter is one bib id in the URL.
  The response data is the completed bibliographic MARC data of one Voyager BIB record.
- The call number in the field 050 and/or 090 in the bibliographic record will be used in ICE. The call number in the MFHD (holding) will not be used in ICE.
- A sample MARCXML record: (Note: there are UTF-8 characters in the bib data)

```
<?xml version="1.0" encoding="UTF-8"?><collection xmlns="http://www.loc.gov/MARC21/slim">
 <record>
  <leader>00988cam a2200277 a 4500</leader>
  <controlfield tag="001">2</controlfield>
  <controlfield tag="005">20110512113741.0</controlfield>
  <controlfield tag="008">870727s1986    ge a          00100 ger d</controlfield>
  <datafield tag="020" ind1=" " ind2=" ">
   <subfield code="a">3327000409</subfield>
  </datafield>
  <datafield tag="035" ind1=" " ind2=" ">
   <subfield code="a">(OCoLC)ocn702828115</subfield>
  </datafield>
  <datafield tag="035" ind1=" " ind2=" ">
   <subfield code="a">(CStRLIN)CTYGDCLC-B</subfield>
  </datafield>
  <datafield tag="035" ind1=" " ind2=" ">
   <subfield code="9">AAA0000YL</subfield>
  </datafield>
  <datafield tag="035" ind1=" " ind2=" ">
   <subfield code="a">2</subfield>
  </datafield>
  <datafield tag="040" ind1=" " ind2=" ">
   <subfield code="a">CtY</subfield>
   <subfield code="c">CtY</subfield>
  </datafield>
  <datafield tag="043" ind1=" " ind2=" ">
   <subfield code="a">e------</subfield>
   <subfield code="a">n------</subfield>
   <subfield code="a">e-gw---</subfield>
  </datafield>
  <datafield tag="079" ind1=" " ind2=" ">
   <subfield code="a">ocn702408255</subfield>
  </datafield>
  <datafield tag="090" ind1=" " ind2=" ">
   <subfield code="a">UA646.5.G4</subfield>
   <subfield code="b">S77 1986 (LC)</subfield>
```

```
  </datafield>
  <datafield tag="245" ind1="0" ind2="4">
   <subfield code="a">Die Streitkräfte der NATO auf dem Territorium der BRD /</subfield>
   <subfield code="c">herausgegeben von Wolfgang Weber ; [Autorenkollektiv, Wolfgang Weber ... et
al.].</subfield>
  </datafield>
  <datafield tag="250" ind1=" " ind2=" ">
   <subfield code="a">2., aktualisierte Aufl.</subfield>
  </datafield>
  <datafield tag="260" ind1="0" ind2=" ">
   <subfield code="a">Berlin :</subfield>
   <subfield code="b">Militärverlag der Deutschen Demokratischen Republik,</subfield>
   <subfield code="c">1986.</subfield>
  </datafield>
  <datafield tag="300" ind1=" " ind2=" ">
   <subfield code="a">552 p. :</subfield>
   <subfield code="b">ill. (some col.) ;</subfield>
   <subfield code="c">24 cm.</subfield>
  </datafield>
  <datafield tag="500" ind1=" " ind2=" ">
   <subfield code="a">Includes index.</subfield>
  </datafield>
  <datafield tag="610" ind1="2" ind2="0">
   <subfield code="a">North Atlantic Treaty Organization</subfield>
   <subfield code="z">Germany (West)</subfield>
  </datafield>
  <datafield tag="610" ind1="2" ind2="0">
   <subfield code="a">North Atlantic Treaty Organization</subfield>
   <subfield code="x">Armed Forces</subfield>
   <subfield code="z">Germany (West)</subfield>
  </datafield>
  <datafield tag="700" ind1="1" ind2=" ">
   <subfield code="a">Weber, Wolfgang,</subfield>
   <subfield code="c">Dr. sc.</subfield>
  </datafield>
  <datafield tag="928" ind1=" " ind2=" ">
   <subfield code="a">AC031297</subfield>
  </datafield>
 </record>
</collection>
```

- Any errors from the URL or the record doesn't exist in Voyager, it will response as:

```
<?xml version="1.0" encoding="UTF-8"?>
<collection xmlns="http://www.loc.gov/MARC21/slim"/>
```

4. Lookup Mfhd and Item API – *GetMfhdItem*

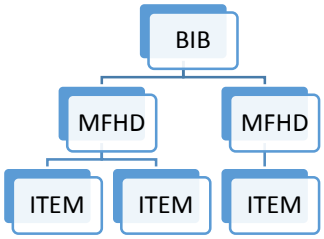
- The response data format is XML.
- Retrieve MFHD (holding) & Item records.
- The sample URL. The parameter in the URL has three options:

1) item barcode:
   http://libapp-test.library.yale.edu/VoySearch/GetMfhdItem?barcode=39002008332646

2) item id:
   http://libapp-test.library.yale.edu/VoySearch/GetMfhdItem?itemid=2

3) mfhd id:
   http://libapp-test.library.yale.edu/VoySearch/GetMfhdItem?mfhdid=88

- In Voyager, the data has 3 levels: bibliography, holding (mfhd), and item. Each level has its unique id: bib id, mfhd id, and item id. The hierarchy is this:



- The returning data structure of GetMfhdItem web service:
  - Bib id is in the tag <bibid> as the "parent" level. Tag <bibid> is not repeatable.
  - Contents in the tag <items> are mfhd & item data as the "children" of BIB data. Tag <items> can be repeatable.
  - MFHD and item are flat into one level. That means if one mfhd has multiple items, it will have the repeatable <items> tags with the same mfhd data.
  - If any levels are not available, "NA" will state in the associated id field: i.e. Bibid -> NA, mfhdid -> NA, itemid -> NA.
- If any fields do not have the value from Voyager, "NA" will be placed as the value.
- Data from BIB:

  <bibid> – bib id.
  <bib_action_type> – return a number. See below "Action type mapping list" for the meaning of the action type.
  <bib_action_date> – most current bib action date. The format is MM-DD-YY [time].
  <bib_operator_id> – bib action operator id which includes net ids, and other ids that used by system automatically batch load, modify etc.

Action type mapping list	
1	CREATE
2	UPDATE
3	MERGE
4	REPLACE
5	RELINK
6	OVERLAY

- Data from MFHD:

  <mfhdid> – mfhd id.
  <mfhd_action_type> – return a number. See below "Action type mapping list" for the meaning of the action type.
  <mfhd_action_date> – most current mfhd action date. The format is MM-DD-YY [time].
  <mfhd_operator_id> – mfhd action operator id which includes net ids, and other ids that used by system automatically batch load, modify etc.
  <mfhd_callno> – mfhd call number.
  <mfhd_loc_code> – mfhd location code.
  <mfhd_loc_name> – mfhd location display name.
  <mfhd_583_field> – mfhd 583 marc field for the note.
  <mfhd_856_field> – mfhd 856 marc field for the link.

Action type mapping list	
1	CREATE
2	UPDATE
3	MERGE
4	REPLACE
5	RELINK
6	OVERLAY

- Data from ITEM:

  <itemid> – item id.
  <item_barcode> – item barcode.
  <item_loc_code> – item perm location code.
  <item_loc_name> – item perm location display name.
  <item_type_code> – item perm type code.
  <item_type_name> – item perm type display name.
  <item_enum> – item enum.
  <item_chron> – item chron.
  <item_status> - The most current item status. If there is more than one item status, all the item statuses will be concatenated by a comma. For example: Not Charged, Missing.
  <item_spine_label> – some further item location information is saved in the Item spine label field.

- For one scanned barcode, all other mfhd & item records associated with the first active item barcode that are attached to the same bib record will be returned.
- The cataloging policy about the relationships between mfhd and item:
    - For single monograph, each copy has its own mfhd regardless if the copies are in the same locations or not.
      For example, even two copies are in the SML stack next to each other, they still have two different mfhds for each item. In another word, each mfhd only has one item attached to.
    - However, there are mistakes made by people. For example, when the on-the-fly item gets checked out, it supposes to have a new mfhd created with this item attached; but it appeared that a new mfhd record wasn't created, instead this item was attached to the existing mfhd as another copy.
    - For serials (e.g encyclopedia), each volume, such as volume 1, volume 2 will be attached to the same mfhd. This also applies on the multiple monograph, e.g. if the one book has the part 1, part 2, etc.
- Sample response records:

1). Any errors from the URL or the record doesn't exist in Voyager, it will response as:

```
<?xml version="1.0" encoding="UTF-8" ?>
<record_list>
    <bibid>NA</bibid>
</record_list>
```

2). Item barcode = 39002045573301, Bibid = 2. Bib record has 1 mfhd attached with 1 item.

```
<?xml version="1.0" encoding="UTF-8" ?>
<record_list>
    <bibid>2</bibid>
    <bib_action_type>4</bib_action_type>
    <bib_action_date>05-12-11 00:00:00</bib_action_date>
    <bib_operator_id>OCLCREC</bib_operator_id>
    <items>
        <mfhdid>2</mfhdid>
        <mfhd_action_type>1</mfhd_action_type>
        <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
        <mfhd_operator_id>load</mfhd_operator_id>
        <mfhd_callno>UA646.5 G4 S77 1986 (LC)</mfhd_callno>
        <mfhd_loc_code>lsf</mfhd_loc_code>
        <mfhd_loc_name>LSF - Request for delivery to any Yale Library</mfhd_loc_name>
        <mfhd_583_field>NA</mfhd_583_field>
```

```
        <mfhd_856_field>NA</mfhd_856_field>
            <itemid>2</itemid>
            <item_barcode>39002045573301</item_barcode>
            <item_loc_code>lsf</item_loc_code>
            <item_loc_name>
                    LSF - Request for delivery to any Yale Library
            </item_loc_name>
            <item_type_code>lsfc</item_type_code>
            <item_type_name>LSF Circ</item_type_name>
            <item_spine_label>NA</item_spine_label>
            <item_enum>NA</item_enum>
            <item_chron>NA</item_chron>
            <item_status>Not Charged</item_status>
    </items>
</record_list>
```


3). Item barcode = 39002008332646, Bibid = 3941. Bib record has 2 mfhds.

Mfhdid = 7329 has 1 item attached.
Mfhdid = 7330 has no item attached which can be recognized by "itemid":"NA".


```
<?xml version="1.0" encoding="UTF-8" ?>
<record_list>
   <bibid>3941</bibid>
    <bib_action_type>4</bib_action_type>
    <bib_action_date>03-24-11 00:00:00</bib_action_date>
   <bib_operator_id>OCLCREC</bib_operator_id>
   <items>
     <mfhdid>7329</mfhdid>
     <mfhd_action_type>1</mfhd_action_type>
     <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
     <mfhd_operator_id>load</mfhd_operator_id>
     <mfhd_callno>JK1001 K44 1968 (LC)</mfhd_callno>
     <mfhd_loc_code>sml</mfhd_loc_code>
     <mfhd_loc_name>SML, Stacks, LC Classification</mfhd_loc_name>
     <mfhd_583_field>NA</mfhd_583_field>
     <mfhd_856_field>NA</mfhd_856_field>
     <itemid>6433</itemid>
     <item_barcode>39002008332646</item_barcode>
```

```
      <item_loc_code>sml</item_loc_code>
      <item_loc_name>SML, Stacks, LC Classification</item_loc_name>
      <item_type_code>circ</item_type_code>
      <item_type_name>Circulating</item_type_name>
      <item_spine_label>NA</item_spine_label>
      <item_enum>NA</item_enum>
      <item_chron>NA</item_chron>
      <item_status>Call Slip Request</item_status>
    </items>
    <items>
      <mfhdid>7330</mfhdid>
      <mfhd_action_type>1</mfhd_action_type>
      <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
      <mfhd_operator_id>load</mfhd_operator_id>
      <mfhd_callno>JK1001 K44 1968 (LC)</mfhd_callno>
      <mfhd_loc_code>ssl</mfhd_loc_code>
      <mfhd_loc_name>Ctr for Sci & Soc Sci Info</mfhd_loc_name>
      <mfhd_583_field>NA</mfhd_583_field>
      <mfhd_856_field>NA</mfhd_856_field>
      <itemid>NA</itemid>
    </items>
  </record_list>
```


4). Item barcode = 39002018793324, bibid = 4362. Bib record has 4 mfhds.
mfhdid = 8106 has 2 item attached.
mfhdid = 8107 has 2 item attached.
mfhdid = 8108 has 2 item attached.
mfhdid = 8109 has no item attached which can be recognized by "itemid":"NA".


```
<?xml version="1.0" encoding="UTF-8" ?>
<record_list>
    <bibid>4362</bibid>
    <bib_action_type>4</bib_action_type>
    <bib_action_date>03-24-11 00:00:00</bib_action_date>
    <bib_operator_id>OCLCREC</bib_operator_id>
    <items>
      <mfhdid>8106</mfhdid>
      <mfhd_action_type>2</mfhd_action_type>
      <mfhd_action_date>05-31-07 00:00:00</mfhd_action_date>
```

<mfhd_operator_id>baradie</mfhd_operator_id>
<mfhd_callno>B3216 C33 P4513 (LC)</mfhd_callno>
<mfhd_loc_code>ssl</mfhd_loc_code>
<mfhd_loc_name>Ctr for Sci & Soc Sci Info</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>7141</itemid>
<item_barcode>39002018793324</item_barcode>
<item_loc_code>ssl</item_loc_code>
<item_loc_name>Ctr for Sci & Soc Sci Info</item_loc_name>
<item_type_code>circ</item_type_code>
<item_type_name>Circulating</item_type_name>
<item_spine_label>NA</item_spine_label>
<item_enum>1</item_enum>
<item_chron>NA</item_chron>
<item_status>Not Charged</item_status>
</items>
<items>
<mfhdid>8106</mfhdid>
<mfhd_action_type>2</mfhd_action_type>
<mfhd_action_date>05-31-07 00:00:00</mfhd_action_date>
<mfhd_operator_id>baradie</mfhd_operator_id>
<mfhd_callno>B3216 C33 P4513 (LC)</mfhd_callno>
<mfhd_loc_code>ssl</mfhd_loc_code>
<mfhd_loc_name>Ctr for Sci & Soc Sci Info</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>7142</itemid>
<item_barcode>39002021068607</item_barcode>
<item_loc_code>ssl</item_loc_code>
<item_loc_name>Ctr for Sci & Soc Sci Info</item_loc_name>
<item_type_code>circ</item_type_code>
<item_type_name>Circulating</item_type_name>
<item_spine_label>NA</item_spine_label>
<item_enum>vol.2</item_enum>
<item_chron>NA</item_chron>
<item_status>Renewed</item_status>
</items>
<items>

<mfhdid>8107</mfhdid>
<mfhd_action_type>1</mfhd_action_type>
<mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>B3216 C33 P513 (LC)</mfhd_callno>
<mfhd_loc_code>div</mfhd_loc_code>
<mfhd_loc_name>DIVINITY, Stacks</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>7143</itemid>
<item_barcode>39002021133088</item_barcode>
<item_loc_code>div</item_loc_code>
<item_loc_name>DIVINITY, Stacks</item_loc_name>
<item_type_code>circ</item_type_code>
<item_type_name>Circulating</item_type_name>
<item_spine_label>NA</item_spine_label>
<item_enum>v.3</item_enum>
<item_chron>NA</item_chron>
<item_status>Renewed</item_status>
</items>
<items>
<mfhdid>8107</mfhdid>
<mfhd_action_type>1</mfhd_action_type>
<mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>B3216 C33 P513 (LC)</mfhd_callno>
<mfhd_loc_code>div</mfhd_loc_code>
<mfhd_loc_name>DIVINITY, Stacks</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>7144</itemid>
<item_barcode>39002043779249</item_barcode>
<item_loc_code>div</item_loc_code>
<item_loc_name>DIVINITY, Stacks</item_loc_name>
<item_type_code>circ</item_type_code>
<item_type_name>Circulating</item_type_name>
<item_spine_label>cop.2</item_spine_label>
<item_enum>v.1</item_enum>
<item_chron>NA</item_chron>

<item_status>Renewed</item_status>
</items>
<items>
<mfhdid>8108</mfhdid>
<mfhd_action_type>1</mfhd_action_type>
<mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>B3216 C33 P513 (LC)</mfhd_callno>
<mfhd_loc_code>div</mfhd_loc_code>
<mfhd_loc_name>DIVINITY, Stacks</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>7145</itemid>
<item_barcode>39002021157988</item_barcode>
<item_loc_code>div</item_loc_code>
<item_loc_name>DIVINITY, Stacks</item_loc_name>
<item_type_code>circ</item_type_code>
<item_type_name>Circulating</item_type_name>
<item_spine_label>NA</item_spine_label>
<item_enum>v.1</item_enum>
<item_chron>NA</item_chron>
<item_status>Renewed </item_status>
</items>
<items>
<mfhdid>8108</mfhdid>
<mfhd_action_type>1</mfhd_action_type>
<mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>B3216 C33 P513 (LC)</mfhd_callno>
<mfhd_loc_code>div</mfhd_loc_code>
<mfhd_loc_name>DIVINITY, Stacks</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>7146</itemid>
<item_barcode>39002021157996</item_barcode>
<item_loc_code>div</item_loc_code>
<item_loc_name>DIVINITY, Stacks</item_loc_name>
<item_type_code>circ</item_type_code>
<item_type_name>Circulating</item_type_name>

<item_spine_label>NA</item_spine_label>
<item_enum>v.2</item_enum>
<item_chron>NA</item_chron>
<item_status>Not Charged</item_status>
</items>
<items>
<mfhdid>8109</mfhdid>
<mfhd_action_type>2</mfhd_action_type>
<mfhd_action_date>04-04-08 00:00:00</mfhd_action_date>
<mfhd_operator_id>bevlett</mfhd_operator_id>
<mfhd_callno>B3216 C33 P4513 (LC)</mfhd_callno>
<mfhd_loc_code>muddart</mfhd_loc_code>
<mfhd_loc_name>
Unavailable--Try Borrow Direct or Interlibrary Loan
</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<itemid>NA</itemid>
</items>
</record_list>

5. Lookup All Mfhd and Item API - *GetAllMfhdItem*

- The response data format is XML.
- Retrieve all MFHD (holding) & Item records, including active and inactive barcode items.
- The sample URLs.

  The input parameter has four options:

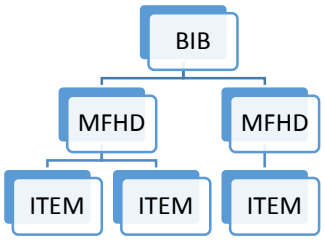
  1) by item barcode:
  http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?barcode=39002068543116

  2) by item id:
  http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?itemid=10915

  3) by mfhd id:
  http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?mfhdid=12698

  4) by bib id:
  http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?bibid=6834

- In Voyager, the data has 3 levels: bibliography, holding (mfhd), and item. Each level has its unique id: bib id, mfhd id, and item id. The hierarchy is this:



- The returning data structure of `GetAllMfhdItem` web service:
  - Bib id is in the tag <bib_id> as the "parent" level. Tag <bib_id> is not repeatable.
    If bib level is not available, it will response *<bib_id>NA</bib_id>*
  - Contents in the tag <holding> are mfhd data as the "children" of BIB data, and item data as the "grandchildren" of bib.
    Tag <holding> can be repeatable.
    If holding level is not available, it will response *<holding>NA</holding>*
  - Contents in the tag <item> are the "children" of <holding>.
    Tag <item> can be repeatable.
    If item level is not available, it will response *<item>NA</item>*
  - Contents in <item_barcode> are the "children" of <item>.
  - Tag <item_barcode> can be repeatable.
    If there is no item barcode, it will response *<item_barcode>NA</item_barcode>*
- If any fields do not have the value from Voyager, "NA" will be placed as the value.
  e.g. *<item_stat>NA</item_stat>, <item_enum>NA</item_enum>, <item_chron>NA</item_chron>, <item_spine_label>NA</item_spine_label>*
- Data from BIB:
  <bib_id> – bib id.
  <bib_action_type> – return a number. See below "Action type mapping list" for the meaning of the action type.
  <bib_action_date> – most current bib action date. The format is MM-DD-YY [time].
  <bib_operator_id> – bib action operator id which includes net ids, and other ids that used by system automatically batch load, modify etc.

Action type mapping list	
1	CREATE
2	UPDATE
3	MERGE
4	REPLACE
5	RELINK

6	OVERLAY

- Data from MFHD:

  <mfhd_id> – mfhd id.
  <mfhd_action_type> – return a number. See below "Action type mapping list" for the meaning of the action type.
  <mfhd_action_date> – most current mfhd action date. The format is MM-DD-YY [time].
  <mfhd_operator_id> – mfhd action operator id which includes net ids, and other ids that used by system automatically batch load, modify etc.
  <mfhd_callno> – mfhd call number.
  <mfhd_loc_code> – mfhd location code.
  <mfhd_loc_name> – mfhd location display name.
  <mfhd_583_field> – mfhd 583 marc field for the note.
  <mfhd_856_field> – mfhd 856 marc field for the link.

Action type mapping list	
1	CREATE
2	UPDATE
3	MERGE
4	REPLACE
5	RELINK
6	OVERLAY

- Data from ITEM:

  <item_id> – Item id.
  <barcode> – Item barcode.
  <barcode_status> – Item barcode status, either Active or Inactive.
  <item_loc_code> – Item perm location code.
  <item_loc_name> – Item perm location display name.
  <item_type_code> – Item perm type code.
  <item_type_name> – Item perm type display name.
  <item_enum> – Item enum.
  <item_chron> – Item chron.
  <item_status> –The most current item status. If there is more than one item status, all the item statuses will be concatenated by a comma. E.g. Not Charged, Missing.
  <item_stat> – Item statistic category. If there is more than one item stat, all the item stat will be concatenated by a comma. E.g. RestrictedSpecColl, DGI Project Original.
  <item_spine_label> – Some further item location information is saved in the Item spine label field.

- For any one of four options input from URL, i.e, scanned barcode, item id, mfhd id, bib id, all mfhd & item records that are attached to the same bib record will be returned.

- The cataloging policy about the relationships between mfhd and item:
  - For single monograph, each copy has its own mfhd regardless if the copies are in the same locations or not.

    For example, even two copies are in the SML stack next to each other, they still have two different mfhds for each item. In another word, each mfhd only has one item attached to.
  - However, there are mistakes made by people. For example, when the on-the-fly item gets checked out, it supposes to have a new mfhd created with this item attached; but it appeared that a new mfhd record wasn't created, instead this item was attached to the existing mfhd as another copy.
  - For serials (e.g encyclopedia), each volume, such as volume 1, volume 2 will be attached to the same mfhd. This also applies on the multiple monograph, e.g. if the one book has the part 1, part 2, etc.
- Sample response records:

1). If any errors from the URL or the record doesn't exist in Voyager, it will response as:

```
<?xml version="1.0" encoding="UTF-8" ?>
<record_list>
    <bib_id>NA</bib_id>
</record_list>
```

2). Item barcode = 39002045573301. Bib record has 1 holding attached with 1 item.

http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?barcode=39002045573301

```
<?xml version="1.0" encoding="UTF-8"?>
<record_list>
  <bib_id>2</bib_id>
  <bib_action_type>4</bib_action_type>
  <bib_action_date>05-12-11 00:00:00</bib_action_date>
  <bib_operator_id>OCLCREC</bib_operator_id>
  <holding>
    <mfhd_id>2</mfhd_id>
    <mfhd_action_type>1</mfhd_action_type>
    <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
    <mfhd_operator_id>load</mfhd_operator_id>
    <mfhd_callno>UA646.5 G4 S77 1986 (LC)</mfhd_callno>
    <mfhd_loc_code>lsf</mfhd_loc_code>
    <mfhd_loc_name>LSF - Request for delivery to any Yale Library</mfhd_loc_name>
```

```
        <mfhd_583_field>NA</mfhd_583_field>
        <mfhd_856_field>NA</mfhd_856_field>
        <item>
            <item_id>2</item_id>
            <item_loc_code>lsf</item_loc_code>
            <item_loc_name>LSF - Request for delivery to any Yale Library</item_loc_name>
            <item_type_code>lsfc</item_type_code>
            <item_type_name>LSF Circ</item_type_name>
            <item_spine_label>NA</item_spine_label>
            <item_enum>NA</item_enum>
            <item_chron>NA</item_chron>
            <item_status>Not Charged</item_status>
            <item_stat>NA</item_stat>
            <item_barcode>
                <barcode>39002045573301</barcode>
                <barcode_status>Active</barcode_status>
            </item_barcode>
        </item>
    </holding>
</record_list>
```


3). Item barcode = 39002008332646, Bibid = 3941. Bib record has 2 holdings.

http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?barcode=39002008332646

mfhd id = 7329 has 1 item attached.

mfhd id = 7330 has no item attached which is recognized by *<item>NA</item>*.


```
<?xml version="1.0" encoding="UTF-8"?>
<record_list>
    <bib_id>3941</bib_id>
    <bib_action_type>4</bib_action_type>
    <bib_action_date>03-24-11 00:00:00</bib_action_date>
    <bib_operator_id>OCLCREC</bib_operator_id>
    <holding>
        <mfhd_id>7329</mfhd_id>
        <mfhd_action_type>1</mfhd_action_type>
        <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
```

```
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>JK1001 K44 1968 (LC)</mfhd_callno>
<mfhd_loc_code>sml</mfhd_loc_code>
<mfhd_loc_name>SML, Stacks, LC Classification</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<item>
    <item_id>6433</item_id>
    <item_loc_code>sml</item_loc_code>
    <item_loc_name>SML, Stacks, LC Classification</item_loc_name>
    <item_type_code>circ</item_type_code>
    <item_type_name>Circulating</item_type_name>
    <item_spine_label>NA</item_spine_label>
    <item_enum>NA</item_enum>
    <item_chron>NA</item_chron>
    <item_status>Not Charged</item_status>
    <item_stat>NA</item_stat>
    <item_barcode>
        <barcode>39002008332646</barcode>
        <barcode_status>Active</barcode_status>
    </item_barcode>
</item>
</holding>
<holding>
    <mfhd_id>7330</mfhd_id>
    <mfhd_action_type>1</mfhd_action_type>
    <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
    <mfhd_operator_id>load</mfhd_operator_id>
    <mfhd_callno>JK1001 K44 1968 (LC)</mfhd_callno>
    <mfhd_loc_code>ssl</mfhd_loc_code>
    <mfhd_loc_name>Ctr for Sci & Soc Sci Info</mfhd_loc_name>
    <mfhd_583_field>NA</mfhd_583_field>
    <mfhd_856_field>NA</mfhd_856_field>
    <item>NA</item>
</holding>
</record_list>
```


4). Item barcode = 39002068543116. Bib record has 6 mfhds.

http://libapp-test.library.yale.edu/VoySearch/GetAllMfhdItem?barcode=39002068543116

mfhd id = 12694 has 1 item attached.
mfhd id = 12695 has 1 item attached.
mfhd id = 12696 has 1 item attached.
mfhd id = 12697 has 1 item attached.
mfhd id = 12698 has 1 item attached which has two barcodes:
39002011994994 is Inactive, and 39002068543116 is Active.
mfhd id = 12699 has no item attached which is recognized by *<item>NA</item>*.

```
<?xml version="1.0" encoding="UTF-8"?>
<record_list>
    <bib_id>6834</bib_id>
    <bib_action_type>4</bib_action_type>
    <bib_action_date>03-24-11 00:00:00</bib_action_date>
    <bib_operator_id>OCLCREC</bib_operator_id>
    <holding>...</holding>
    <holding>...</holding>
    <holding>...</holding>
    <holding>...</holding>
    <holding>
        <mfhd_id>12698</mfhd_id>
        <mfhd_action_type>1</mfhd_action_type>
        <mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
        <mfhd_operator_id>load</mfhd_operator_id>
        <mfhd_callno>QC178 M57 1973+ Oversize</mfhd_callno>
        <mfhd_loc_code>ksl</mfhd_loc_code>
        <mfhd_loc_name>Ctr for Sci & Soc Sci Info</mfhd_loc_name>
        <mfhd_583_field>NA</mfhd_583_field>
        <mfhd_856_field>NA</mfhd_856_field>
        <item>
            <item_id>10915</item_id>
            <item_loc_code>ksl</item_loc_code>
            <item_loc_name>Ctr for Sci & Soc Sci Info</item_loc_name>
            <item_type_code>circ</item_type_code>
            <item_type_name>Circulating</item_type_name>
            <item_spine_label>NA</item_spine_label>
            <item_enum>NA</item_enum>
            <item_chron>NA</item_chron>
            <item_status>Not Charged</item_status>
```

<item_stat>NA</item_stat>
<item_barcode>
<barcode>39002011994994</barcode>
<barcode_status>Inactive</barcode_status>
</item_barcode>
<item_barcode>
<barcode>39002068543116</barcode>
<barcode_status>Active</barcode_status>
</item_barcode>
</item>
</holding>
<holding>
<mfhd_id>12699</mfhd_id>
<mfhd_action_type>2</mfhd_action_type>
<mfhd_action_date>01-14-16 00:00:00</mfhd_action_date>
<mfhd_operator_id>ar286</mfhd_operator_id>
<mfhd_callno>QC178 M57 (LC)</mfhd_callno>
<mfhd_loc_code>ast</mfhd_loc_code>
<mfhd_loc_name>ASTRONOMY (Non-Circulating)</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<item>NA</item>
</holding>
</record_list>

5). Item barcode = 39002018793324. Bib record has 4 holdings.
mfhd id = 8106 has 3 item attached.
mfhd id = 8107 has 2 item attached.
mfhd id = 8108 has 2 item attached.
mfhd id = 8109 has no item attached which is recognized by `<item>NA</item>`

<record_list>
<bib_id>4362</bib_id>
<bib_action_type>4</bib_action_type>
<bib_action_date>03-24-11 00:00:00</bib_action_date>
<bib_operator_id>OCLCREC</bib_operator_id>
<holding>
<mfhd_id>8106</mfhd_id>
<mfhd_action_type>2</mfhd_action_type>

<mfhd_action_date>05-31-07 00:00:00</mfhd_action_date>
<mfhd_operator_id>baradie</mfhd_operator_id>
<mfhd_callno>B3216 C33 P4513 (LC)</mfhd_callno>
<mfhd_loc_code>ssl</mfhd_loc_code>
<mfhd_loc_name>Ctr for Sci & Soc Sci Info</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<item>...</item>
<item>...</item>
<item>...</item>
</holding>
<holding>
<mfhd_id>8107</mfhd_id>
<mfhd_action_type>1</mfhd_action_type>
<mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>B3216 C33 P513 (LC)</mfhd_callno>
<mfhd_loc_code>div</mfhd_loc_code>
<mfhd_loc_name>DIVINITY, Stacks</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<item>...</item>
<item>...</item>
</holding>
<holding>
<mfhd_id>8108</mfhd_id>
<mfhd_action_type>1</mfhd_action_type>
<mfhd_action_date>06-02-02 00:00:00</mfhd_action_date>
<mfhd_operator_id>load</mfhd_operator_id>
<mfhd_callno>B3216 C33 P513 (LC)</mfhd_callno>
<mfhd_loc_code>div</mfhd_loc_code>
<mfhd_loc_name>DIVINITY, Stacks</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<item>...</item>
<item>...</item>
</holding>
<holding>
<mfhd_id>8109</mfhd_id>

<mfhd_action_type>2</mfhd_action_type>
<mfhd_action_date>04-04-08 00:00:00</mfhd_action_date>
<mfhd_operator_id>bevlett</mfhd_operator_id>
<mfhd_callno>B3216 C33 P4513 (LC)</mfhd_callno>
<mfhd_loc_code>muddart</mfhd_loc_code>
<mfhd_loc_name>
Unavailable--Try Borrow Direct or Interlibrary Loan
</mfhd_loc_name>
<mfhd_583_field>NA</mfhd_583_field>
<mfhd_856_field>NA</mfhd_856_field>
<item>NA</item>
</holding>
</record_list>

Technical Details:

- **How to set Java Servlet?**

  Here use an example to demonstrate:

  1) The Java Servlet source code is located at VoySearch/WEB-INF/classes/src/GetItem.java
  2) Declared in web.xml:

```
<servlet>
   <servlet-name>GetItem</servlet-name>
   <servlet-class>src.GetItem</servlet-class>
      </servlet>
      <servlet-mapping>
               <servlet-name>GetItem</servlet-name>
               <url-pattern>/getitem</url-pattern>
      </servlet-mapping>
   ……
```

  3) Here is the example URL to invoke this Java Servlet on libapp-test server:
     http://libapp-test.library.yale.edu/VoySearch/GetItem?barcode=39002075042144
     The response data is JSON format.

- **JSON introduction**

  1) JSON format example:

```
{
   "msg":"OK",
   "arr":[5, 3, 1],
```

```
   "map":{
      "key1":"val1",
      "key2":"val2"
   },
   "status":200
}
```

2) The code to generate above JSON example:

```
// With this type, the browser tries to open as a file. For the
web service, please comment out.
import org.json.JSONObject;
JSONObject json = new JSONObject();
response.setContentType("application/json");
response.setHeader("Cache-Control", "nocache");
 response.setCharacterEncoding("utf-8");
 out = response.getWriter();
 JSONObject json = new JSONObject();

// put some value pairs into the JSON object as into a Map.
json.put("status", 200);
json.put("msg", "OK");

// put a "map"
JSONObject map = new JSONObject();
map.put("key1", "val1");
map.put("key2", "val2");
json.put("map", map);

// put an "array"
JSONArray arr = new JSONArray();
arr.put(5);
arr.put(3);
arr.put(1);
json.put("arr", arr);

// finally output the json string
out.print(json.toString());
```

3) JSONObject processes UTF-8 character as Hex-Unicode, instead of the visible character. For example:

```
JSONObject json = new JSONObject();
json.put("From JSON put", "Müller");
out.println("Not from JSON put: Müller");
out.println(json.toString());
```

This code output:

```
Not from JSON put: Müller
{"From JSON put":"M\u00fcller"}
```

4) If the data has the UTF-8 characters, do not use JSONObject, output directly with JSON syntax.

Like this:

```
out.println("{\"record\":[{");
if  (rsText.getString("title_brief") != null)
String buff = new String (rsText.getString("title_brief").getBytes
("UTF-8"));
 else
      buff = "NA";
 out.println("\"title\":" + "\"" + buff.trim() + "\",");
 out.println("}]}");
```

This code output the title with UTF-8 charater:

```
Militärverlag der Deutschen Demokratischen Republik
```

5) Syntax of GetItem.java responding the data back on browser in JSON format:

```
protected void doGet(HttpServletRequest request,
HttpServletResponse response)
    throws ServletException, java.io.IOException {
        processRequest(request, response);
}

protected void doPost(HttpServletRequest request,
HttpServletResponse response)
    throws ServletException, java.io.IOException {
        processRequest(request, response);
}

protected void processRequest(HttpServletRequest request,
HttpServletResponse response)
 throws ServletException, IOException {…
     JSONObject json = new JSONObject();
      response.setHeader("Cache-Control", "nocache");
     response.setCharacterEncoding("utf-8");
      PrintWriter out = response.getWriter();
      ……
      json.put("bibID", rs.getString("bib_id"));
      out.println(json.toString());
      out.println("{\"items\":[");
      out.println(…);
```

```
}
```

6) Download json-rpc-1.0.jar into Catalina home's common lib directory:

   On PC:
   `C:\Program Files\netbeans-5.5.1\enterprise3\apache-tomcat-5.5.17\common\lib\json-rpc-1.0.jar`
   On libapp-test: `/usr/local/Tomcat80/common/lib/json-rpc-1.0.jar`

7) The Catalina home or base can be found by

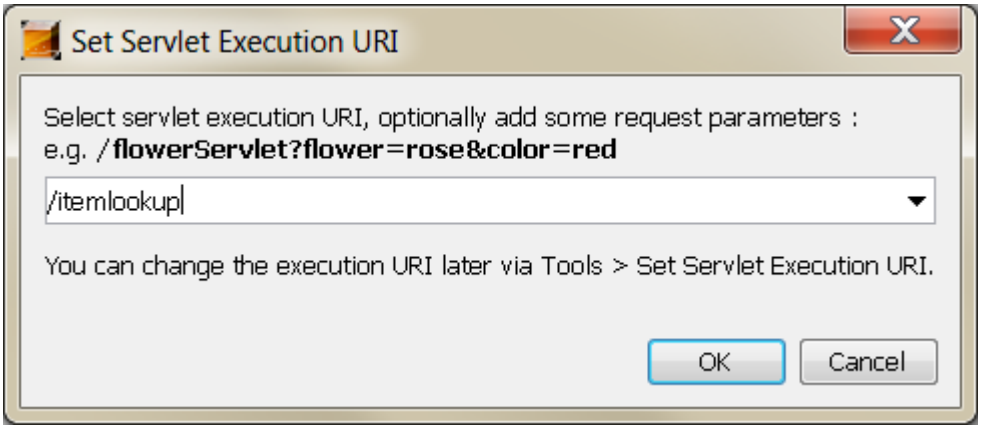
```
System.out.println(System.getProperty("catalina.home"))
System.out.println(System.getProperty("catalina.base"))
```

CATALINA_BASE on PC: *C:\Users\yj33\.netbeans\5.5.1\apache-tomcat-5.5.17_base*
CATALINA_HOME on PC: *C:\Program Files\netbeans-5.5.1\enterprise3\apache-tomcat-5.5.17*
CATALINA_TMPDIR on PC: *C:\Users\yj33\.netbeans\5.5.1\apache-tomcat-5.5.17_base\temp*
JRE_HOME on PC: *C:\Program Files\Java\jdk1.5.0_22*

Both CATALINA_BASE and CATALINA_HOME on libapp-test are: */usr/local/Tomcat80*

- **How to run Java Servlet in NetBeans?**

  Right click "GetItem.java", then type in key pair value like below screen shot:



- **How to set up Java Servlet init() method?**

1) The method name is the keyword "init". It can't be other name.

2) init() is guaranteed to be called before the servlet handles its first request.
   The init() method is typically used to perform servlet initialization--creating or loading objects that are used by the servlet in the handling of its requests.

```
package Precompile;
```

……

```
public void init(ServletConfig config) throws ServletException {...}
```

This init() method is accessed only once every time when this application gets first time started on the server.

This method can be resided in any java source code.

In this application, it is resided in InitPrecompile.java.

The path is `VoySearch/WEB-INF/classes/Precompile/InitPrecompile.java`

3) In this application init() is used to initialize Voyager API, connect database, or generate other preloading value. It is declared inside the Java Servlet InitPrecompile.java.

- One of function in the init() method is loading the external properties file Init.properties:

```
public static Properties initProp = new java.util.Properties();
initProp.load(new FileInputStream((new
FileInputStream(getServletContext().getRealPath("/")) + "WEB-INF" +
System.getProperty("file.separator") + "classes" +
System.getProperty("file.separator") + "Precompile" +
System.getProperty("file.separator") + "Init.properties"));
```

- The Init.properties should be placed in the path:
  `VoySearch/WEB-INF/classes/Precompile/Init.properties`

Other program can get the values from Init.properties file like this:

```
String email =
Precompile.InitPrecompile.initProp.getProperty("From_email");
```

4) Other programs can get variable values that are assigned in init() method by using Package_name.JavaServlet_name.Variable_name.

e.g. `String name = Precompile.InitPrecompile.moduleName`

moduleName is the variable name in init() method,

such as `String moduleName = "CIRC"`

5) init() method needs to be declared in web.xml:

```
<servlet>
     <servlet-name>InitPrecompile</servlet-name>
     <display-name>Servlet Precompile Init</display-name>
     <description>
            Initialize Voyager API and connection to database
      </description>
     <servlet-class>Precompile.InitPrecompile</servlet-class>
     <load-on-startup>1</load-on-startup>
</servlet>
<servlet-mapping>
```

```
        <servlet-name>InitPrecompile</servlet-name>
        <url-pattern>/servlet/InitPrecompile</url-pattern>
    </servlet-mapping>
```

Related documentations

1. Linux_VoySearch_deployment.txt
2. Proposal for Improved Atlas Voyager Integration.docx