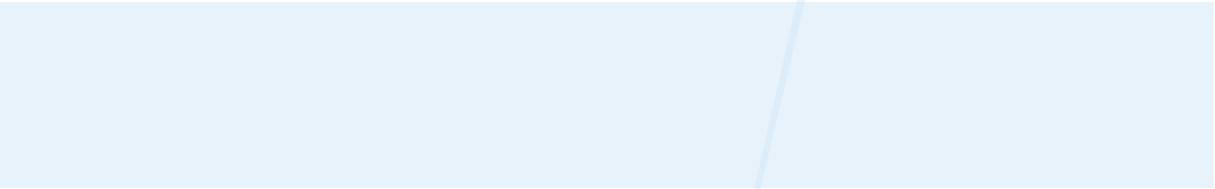




# Using SQL to get the Most out of your Maximo Data





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# Topics of Discussion

- What is SQL?
- Creating a SQL statement
- Maximo uses of SQL
- SQL Joins
- More SQL Abilities
- Performance
- Calculated Fields
- Custom WO Prioritization
- Review Completed Wos
- Other SQL Uses



# What is SQL?

SQL

- SQL stands for **S**tructured **Q**uery **L**anguage and is pronounced as Sequel
- Used to communicate with a database
- The standard language for relational database management systems



# Creating a SQL Statement?

SQL

```
SELECT * FROM table
```

```
SELECT * FROM workorder
```

# Creating a SQL Statement?

SQL

SELECT *attributes*

FROM *table*

WHERE *condition*

SELECT *wonum, description, status*

FROM *workorder*

WHERE *wopriority = 1*

# Maximo uses SQL Statements

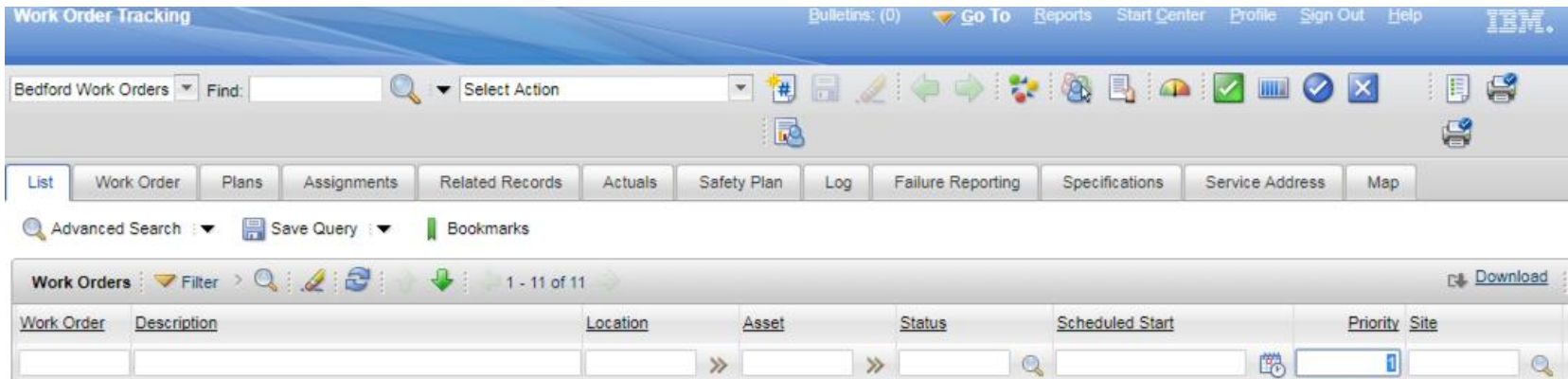
SQL

The screenshot displays the IBM Maximo Work Order Tracking interface. At the top, there is a navigation bar with options like 'Go To', 'Reports', 'Start Center', 'Profile', 'Sign Out', and 'Help'. Below this is a search bar with 'Bedford Work Orders' selected and a 'Find:' field. A toolbar with various icons is visible. The main area shows a table of work orders with columns: Work Order, Description, Location, Asset, Status, Scheduled Start, Priority, and Site. A 'Where Clause' dialog box is open, showing the current SQL query: `((woclass in (select value from synonymdomain where domainid = 'WOCLASS' and maxvalue in ('WORKORDER','WOACTIVITY')) and historyflag = 0 and istask = 0 and siteid = 'BEDFORD')) and ((wopriority = 1))`. The 'wopriority = 1' part is highlighted with a red box. Below the table, there is a 'Select Records' checkbox.

Work Order	Description	Location	Asset	Status	Scheduled Start	Priority	Site
1004	Generator Overhaul	BR230	11230	INPRG	7/5/17 4:00 AM	1	BEDFORD
1131	Water on floor	MOFLOOR2	1002	COMP	3/1/17 9:00 AM	1	BEDFORD
1231	<b>Where Clause</b>						
1247	Current Query: ((woclass in (select value from synonymdomain where domainid = 'WOCLASS' and maxvalue in ('WORKORDER','WOACTIVITY')) and historyflag = 0 and istask = 0 and siteid = 'BEDFORD')) and ((wopriority = 1))						
1251							
1256							
5002							
5003							
6003	Calibration	SHIPPING		APPR		1	BEDFORD
6008	Fire Door Cable Broken	BOILER		WAPPR		1	BEDFORD
91091	11450 BREAKDOWN	BR450	11450	APPR	10/12/01 3:45 PM	1	BEDFORD

# Maximo uses SQL Statements

SQL



Select wonum, description, location, assetnum, status, schedstart,  
wopriority, siteid

From workorder

Where wopriority = 1





# Typical Uses of SQL in Maximo

SQL

Saved Queries

Relationships

- Nested Relationships

KPIs

Reports

Conditional Expression Manager

More...



# Relationships

SQL

Relationships are based off of queries

- Do you find yourself bouncing between Maximo applications?
- Could potentially use relationships or nested relationships

Work Order -> Chart of Accounts ->  
GLComponents -> Custom Field



# Reports



SQL

## One report – multiple date ranges

- Entire Schedule
- Today
- Tomorrow
- This Week
- Custom Date Range

Craft Schedule	▶	Entire Schedule
Internal	▶	Today
Labor Schedule	▶	Tomorrow
Labor Weekly Calendar	▶	This Week
Schedule Break Audit	▶	Next Week
Work Plan	▶	Custom Date Range
Work Plan - Labor	▶	For Selected WOs
		For Selected WOs NEW

Today:  $\text{trunc}(\text{schedstart}) = \text{trunc}(\text{sysdate})$

Tomorrow:  $\text{trunc}(\text{schedstart}) = \text{trunc}(\text{sysdate})+1$



# SQL Joins



SQL

```
SELECT w.wonum, w.description, a.serialnum
FROM workorder w
LEFT JOIN asset a on w.siteid = a.siteid and
w.assetnum = a.assetnum
WHERE w.wopriority = 1
```

wonum	description	serialnum
1088	Install additional memory in users Laptop	NULL
1004	Generator Overhaul	32331-4
1254	Boiler Stopped	66392
3432	Condensate Return Pump Stopped	377-9A
2433	Pump Stopped Running	377-9B
2392	Burner Flame Problem	373-RH
1251	Pump leaking fluids	NULL



# More SQL Abilities

SQL

- Count
- Group by
- Sum
- Having
- Select all columns from one object, but some columns from another object
- Case Statements
- Substring



# More SQL Abilities – Count Example

```
select COUNT(*) / (select COUNT(*) from TrainingRooms)
from GOMaximoAttendees
Where YEAR = 2018
```





# More SQL Abilities - Example

```
select siteid, serialnum, COUNT(*)  
from asset  
  
group by siteid, serialnum  
  
having COUNT(*) > 1
```

siteid	serialnum	count(*)
BEDFORD	NULL	462
DENVER	NULL	4
FLEET	NULL	8
LAREDO	NULL	15
MCLEAN	NULL	20
TEXAS	NULL	18
BEDFORD	16RV80J	2
BEDFORD	2H659	2
BEDFORD	3749-9	3
BEDFORD	NB7V7	2



# More SQL Abilities – Case Statement



```
select l.laborcode, c.craft,  
case when c.craft = 'ELECT' then 1.2 else l.availfactor end as AvailFactor  
from labor l  
left join laborcraftrate c on l.laborcode = c.laborcode and l.orgid = c.orgid  
where c.defaultcraft = 1
```

laborcode	craft	availfactor
BALL	ELECT	1.2
SMITH	ELECT	1.2
BARRY	MECH	1
JOS	MECH	1
WINSTON	MECH	1
MILLER	ELECT	1.2
SMITH	ELECT	1.2
ROWLANDS	EMAIL	1
DOUGHTY	HARDWARE	1





# Performance - HistoryFlag

Not in ('COMP','CAN','CLOSE')

versus

Historyflag = 0 and status <> 'COMP'

HistoryFlag	Count
1	10,000,000
0	800,000

HistoryFlag	Status	Count
1	CLOSE	9,800,000
1	CAN	199,950
1	HISTEDIT	50
0	APPR	15,000
0	COMP	761,000
0	INPRG	12,000
0	WAPPR	10,000
0	WMATL	900
0	WPCOND	800
0	WSCH	300



# Calculated Fields

SQL

## Days Old

```
Select w.wonum, w.description,  
datediff("d",w.reportdate ,getdate()) as  
DaysOld
```

```
From Workorder w
```

# Calculated Fields – Days Old

SQL

**Scheduler Module - Demo - Floating**

General Info | Data Selection | **Gantt** | Calendar | Daily Work Sheet

Layout: Work - Craft | Filter: [Icons]

Work - Standard | 173 rows

Drag a column header here to group by that column.

	DAYSOLD	DateTime	Work Order #	Description	Jan 18							Feb 18								
					Fri 19	Sat 20	Sun 21	Mon 22	Tue 23	Wed 24	Thu 25	Fri 26	Sat 27	Sun 28	Mon 29	Tue 30	Wed 31	Thu 01	Fri 02	
1	6972	1/19/2018 7:31 PM	3005	Forklift #1 Quarterly Inspection and Ce	ELECT(1 x 1.5); MECH(1 x 1)															
2	6969	1/30/2018 2:00 AM	1002	Rebuild Feedwater Pump	ELECT(1 x 2, 2 x 8)															
3	6969	2/8/2018 12:00 AM	1000	Relocate Guard Rails Around Compres																
4	6969	2/7/2018 12:00 PM	1005	Electric Cart Tune-Up																
5	6969	2/7/2018 1:00 AM	1001	12 Month Service on Shipping Dept #1																
6	6969	1/31/2018 2:00 PM	1004	Generator Overhaul	ELECT(2 x 7,															
7	5197	1/29/2018 11:00 PM	51036	PM Service - 6 Month	ELECT(2 x 2)															
8	4865	2/3/2018 3:06 AM	1114	Create Security Badge																
9	4865	1/25/2018 12:00 AM	1115	Create IT Accounts	SATTLER - ELECT(1 x 2)															
10	4865	2/3/2018 3:06 AM	1116	Issue PC																
11	4865	2/3/2018 3:06 AM	1117	Issue Cell Phone																
12	4865	2/3/2018 3:14 AM	1118	Secure Room for Required Number Ath																
13	4865	1/30/2018 1:00 AM	1119	Arrange for Required Audio/Visual Equ	ELECT(1 x 2)															
14	4865	2/3/2018 3:14 AM	1120	Arrange For Appropriate Meals for Alter																
15	4865	1/29/2018 10:30 PM	1121	Pre-Meeting Clean Check	ELECT(2 x 2)															
16	4865	1/26/2018 10:00 AM	1127	Return Building Access Badge	ELECT(1 x 2)															
17	4865	1/29/2018 10:30 PM	1129	Return Cell Phone and Cancel Service	ELECT(2 x 2)															

Craft - Resource Availability | 10 rows

	Craft	Description	Jan 18							Feb 18							
			Fri 19	Sat 20	Sun 21	Mon 22	Tue 23	Wed 24	Thu 25	Fri 26	Sat 27	Sun 28	Mon 29	Tue 30	Wed 31	Thu 01	Fri 02
1	CARP	Carpenter	6			8	8	2	8	8	27	28	29	8	0	8	8
2	CONSTR	Construction Worker	6			-14	-10	4	8	8			8	8	6	8	8
3	ELECT	Electrician	31	-4.5		59	45.5	9	60	42	-5		51.5	35.5	10	29	29
4	I&E	I&E	8			8	8	8	8	8			8	8	8	8	8
5	MACH	Machinist	8			8	8	-3	7	8			8	8	8	8	8
6	MECH	Mechanic	36			40	32	13	31	-5.5			32.5	29	7	25	30



# Calculated Fields



SQL

## WO Aging Category

select w.wonum,

CASE

WHEN datediff("d",w.reportdate,getdate()) between 0 and 30 THEN '0 - 30'

WHEN datediff("d",w.reportdate,getdate()) between 31 and 60 THEN '31 - 60'

WHEN datediff("d",w.reportdate,getdate()) between 61 and 90 THEN '61 - 90'

WHEN datediff("d",w.reportdate,getdate()) between 91 and 120 THEN '91 - 120'

ELSE '>120'

END as WOAggingCat

from workorder w

	WO Aging Cat	DateTime	Work Order #	Description
1	61 - 90	1/29/2018 12:00 PM	1613	Network Access needed for user G.
2	>120	1/31/2018 12:51 AM	T1022	Take Server Offline
3	>120	1/31/2018 1:48 AM	T1001	Replace Display
4	>120	2/2/2018 6:00 AM	T1002	Replace Motherboard in my laptop



# Custom WO Prioritization

SQL

- SQL function to generate a “smart code” priority to facilitate WO Scheduling (e.g. assists with Auto Scheduling)
- Scenario:
  - WO Priority: E, 1, 2
  - Asset / Location Criticality: 1 – 25 (25 = most critical)
  - Custom Rules for Scheduling Priority
- SQL Function to evaluate WO condition
- Output Smart Code: #-#[-#] (sortable)

# Custom WO Prioritization

SQL

```
--1. SCHED and INPRG (work carried over from last week, use hold status if work won't follow immediately)
  IF ( pStatus = 'SCHED' OR pStatus = 'INPRG' ) THEN
    txtgrp := '1';
--2. Compliance PMs with target start date in weekly schedule range (pre-loaded on schedule)
  ELSIF ( pComp = 1 AND pWorkType = 'PM' ) THEN
    txtgrp := '2';
--3. PM / PdM work with target start date in weekly scheduled range (includes past due PMs)
  ELSIF ( pWorkType = 'PM' OR pWorkType = 'PDM' ) THEN
    txtgrp := '3';
--4. WO P1 --> sorted by equipment criticality
  ELSIF ( pTPCPrio = '1' ) THEN
    txtgrp := '4';
--5. Schedule date (picks up past WOs that did not make previous week's cut)
  ELSIF ( pSchedStart IS NOT NULL AND pSchedStart < sysdate+7 ) THEN
    txtgrp := '5';
--6. WO "Target Start Date" date in weekly schedule range (populated by Operations - not mandatory by
  ELSIF ( pTargStart IS NOT NULL AND pTargStart < sysdate+7 ) THEN
    txtgrp := '6';
--7. WO "Need By" date in weekly schedule range (WO.TARGFINISH)
  ELSIF ( pTargFinish IS NOT NULL AND pTargFinish < sysdate+7 ) THEN
    txtgrp := '7';
--8. Classification (sort order) = 1. Safety-related work, 2. Environmental concern, 3. Regulatory wo
  ELSE
    txtgrp := '8';
    txtTopClass := Get_TPC_TopClass(pClass);
    IF (txtTopClass = 'SAF') THEN
      txtLC := txtsub;
      txtsub := '01';
    ELSIF (txtTopClass = 'ENV') THEN
      txtLC := txtsub;
      txtsub := '02';
    ELSIF (txtTopClass = 'REGCOMP') THEN
      txtLC := txtsub;
      txtsub := '03';
    ELSE
      txtsub := '04';
--9. WO P2 --> sorted by equipment criticality
    txtgrp := '9';
  END IF;
END IF;
```

Status	CalcPriority
INPRG	1-21-05
SCHED	1-22-04
SCHED	1-22-04
INPRG	1-22-04
SCHED	1-22-04
SCHED	1-22-04
APPR	2-21-05
APPR	2-21-05
APPR	2-21-05
WMATL	2-21-05
WMATL	2-21-05



# Review Completed WOs

SQL

Scenario: Completed WOs should have:

- A Work Log
- Actuals entered
- Failure Reporting
  - At least the Problem Code
  - Ideally: Cause and Remedy too
- Other possible checks:
  - Materials entered (if they were initially planned)
  - Custom fields populated?

# Review Completed WOs

SQL

Scheduler Module - Review Completed WOs

General Info | Data Selection | Gantt | Calendar | Work Order Closure | Daily Work Sheet

Layout: Review Completed WOs | Filter:

Work - Standard | 30 rows

Drag a column header here to group by that column.

	DateTime	Work Order #	Description	Status	Work Type	HasWorkLog	HasLabTrans	Failure Code	Problem	Cause	Remedy
1	1/19/2002 12:00 AM	6011	Maintenance of WINS and DHCP Server	COMP	PM	N	N				
2	7/15/2015 8:00 AM	1029	Crane Quarterly Inspection and Certification	COMP	PM	Y	Y				
3	9/1/2015 6:29 PM	1237	Add Memory to Desktop	COMP	CP	N	N				
4	9/1/2015 6:29 PM	1238	Add Memory to Desktop	COMP	CP	N	N				
5	9/28/2015 10:00 AM	1293	HVAC Quarterly Inspections & Certification	COMP	PM	N	N	BLDGS			
6	11/19/2015 9:16 AM	1202	Maintenance of WINS and DHCP Server	COMP	PM	Y	N	NETWORK	NETWACC		
7	11/30/2015 12:00 PM	1252	Burner Quarterly Inspection and Certification	COMP	PM	N	N	BURNERS			
8	12/2/2015 7:00 PM	1253	Burner Quarterly Inspection and Certification	COMP	PM	N	N	BURNERS			
9	12/2/2015 7:00 PM	1255	Burner Quarterly Inspection and Certification	COMP	PM	N	N	BURNERS			
10	12/3/2015 8:00 AM	1330	Forklift light no longer working	COMP	CM	N	N	PROD			
11	12/3/2015 9:00 AM	1342	Fix flat tire on Bucket Truck 2184	COMP		N	N				
12	12/4/2015 3:48 PM	1346	Apply OS Patch to remedy vulnerability	COMP	CM	N	Y				
13	3/30/2016 2:00 AM	1355	Inspect PC	COMP		N	N				
14	4/5/2016 6:00 AM	1354	PC Inspection	COMP		N	N				
15	9/13/2016 9:00 PM	1220	Calibration 103	COMP	CAL	N	N				
16	9/26/2016 12:00 PM	1128	Return Laptop Computer	COMP		N	N				
17	11/16/2016 11:36 AM	1382	JP Test W/O	COMP		N	Y				
18	1/12/2017 1:25 PM	1135	Please Provide Accudraw	COMP		Y	N				
19	2/14/2017 9:00 PM	T1473	Monitor database size	COMP	PM	N	Y				
20	2/21/2017 5:42 PM	1130	Conduct Exit Interview	COMP		N	N				
21	2/21/2017 7:00 PM	1122	Disable IT Accounts	COMP		N	Y				
22	2/21/2017 7:51 PM	T1621	Turbine Task 10	COMP	EM	N	N				
23	3/1/2017 9:00 AM	1131	Water on floor	COMP		N	N	BLDGS			
24	3/1/2017 10:00 AM	1028	Burner Quarterly Inspection and Certification	COMP	PM	N	Y	BURNERS			
25	3/2/2017 9:00 AM	1189	Bi-Weekly Walking Inspection	COMP		N	N				
26	3/2/2017 2:00 PM	T1047	Remove all loose material	COMP		Y	N				
27	3/2/2017 3:00 PM	1361	PC Inspection	COMP		N	N				
28	3/8/2017 8:00 AM	51077	Daily Ops 2	COMP	PM	Y	Y				
29	4/20/2017 6:00 PM	1281	Bi-Weekly Walking Inspection	COMP		N	Y				





# Other SQL Uses

SQL

Schedule Compliance

Availability – Gross vs. Net

Break-In / Break-Out WOs

- Not only counts, but why!

Backlog

- # of WOs
- # of Man Hours or Man Weeks
- Does your backlog have craft requirements?

Infinite number of uses



# Closing

SQL

Writing SQL – take it one step at a time

If the data's there (and modeled correctly) you should be able to make use of it

Make sure you're SQL is adding value

Need Help? Ask a colleague, Google, Consultants

Using SQL can have a huge ROI



Using SQL to get the Most out of your  
Maximo Data

Questions/Comments?