

SQL VIGNETTES

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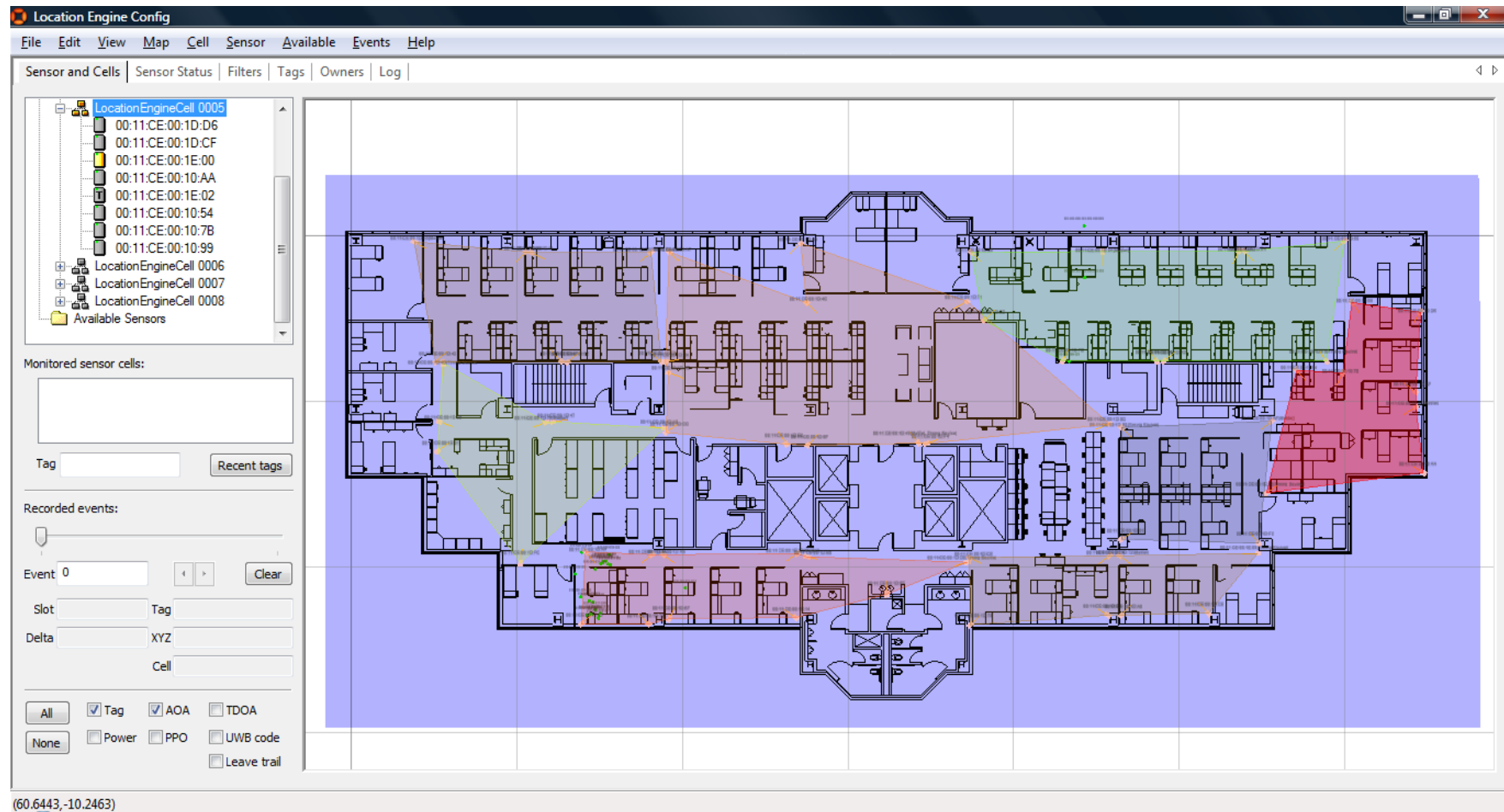


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LOCATION TRACKING

- Real-time data were collected using ultrawide-band (UWB) location-tracking technology
- Study conducted at BRX, subunit of large global manufacturing enterprise in the Midwest of the U.S.
- Over 35 million rows of data (location tracking points) for study period
- Kabo, F. W. (2016). "A Model of Potential Encounters in the Workplace: The Relationships of Homophily, Spatial Distance, Organizational Structure, and Perceived Networks." *Environment & Behavior*.





| tag | eventdatetime | x | y | z |
|----------|--------------------|-------|--------|------|
| TID78082 | 9/16/2009 15:28:53 | 13.58 | -21.02 | 1.27 |
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| TID78082 | 9/16/2009 15:28:53 | 13.58 | -21.02 | 1.27 |
| TID78082 | 9/16/2009 15:28:53 | 13.58 | -21.02 | 1.27 |
| TID78084 | 9/24/2009 14:55:53 | 19.36 | -21.01 | 0.73 |
| TID78084 | 9/24/2009 14:55:53 | 19.39 | -21.08 | 0.78 |
| TID78084 | 9/24/2009 14:55:54 | 19.41 | -21.13 | 0.82 |
| TID78084 | 9/24/2009 14:55:54 | 19.43 | -21.22 | 0.86 |
| TID78084 | 9/24/2009 14:55:54 | 19.43 | -21.32 | 0.9 |
| TID78084 | 9/24/2009 14:55:54 | 19.44 | -21.4 | 0.94 |
| TID78084 | 9/24/2009 14:55:55 | 19.44 | -21.47 | 0.97 |
| TID78084 | 9/24/2009 14:55:51 | 19.35 | -20.89 | 0.67 |
| TID78084 | 9/24/2009 14:55:51 | 19.36 | -20.91 | 0.69 |
| TID78084 | 9/24/2009 14:55:51 | 19.36 | -20.93 | 0.69 |
| TID78084 | 9/24/2009 14:55:51 | 19.35 | -20.95 | 0.7 |
| TID78084 | 9/24/2009 14:55:52 | 19.33 | -20.95 | 0.69 |
| TID78084 | 9/24/2009 14:55:52 | 19.33 | -20.94 | 0.69 |
| TID78084 | 9/24/2009 14:56:08 | 19.45 | -21.64 | 1.12 |
| TID78084 | 9/24/2009 14:56:08 | 19.45 | -21.58 | 1.09 |

WHICH WAS THE BUSIEST DAY?

```
use Location_Tracking;
go

select * from data_formatted;
go
--35,027,838 rows

--get/construct parts of date from "datetime"
select datetimename(dy, eventdatetime) as day_of_year,
datetimename(month, eventdatetime) as month_of_event,
datetimename(day, eventdatetime) as day_of_event,
count(eventdatetime) as num_events
from data_formatted
group by datetimename(dy, eventdatetime), datetimename(month, eventdatetime),
datetimename(day, eventdatetime)
order by count(eventdatetime) desc;←-----
go
--71 rows
```

| | day_of_year | month_of_event | day_of_event | num_events |
|--------|--------------------|-----------------------|---------------------|-------------------|
| -----> | 285 | October | 12 | 1,425,544 |
| | 274 | October | 1 | 1,212,382 |
| | 299 | October | 26 | 1,203,120 |
| | 278 | October | 5 | 1,200,886 |
| | 281 | October | 8 | 1,191,689 |
| | 271 | September | 28 | 1,190,308 |
| | 308 | November | 4 | 1,151,409 |
| | 279 | October | 6 | 1,130,660 |
| | 287 | October | 14 | 1,111,939 |
| | 306 | November | 2 | 1,090,669 |
| | 282 | October | 9 | 1,087,659 |
| | 280 | October | 7 | 1,082,942 |
| | 289 | October | 16 | 1,053,833 |
| | 286 | October | 13 | 1,047,012 |
| | 272 | September | 29 | 1,044,482 |
| | 307 | November | 3 | 1,041,883 |
| | 292 | October | 19 | 1,027,397 |
| | 303 | October | 30 | 1,013,813 |
| | 268 | September | 25 | 998,798 |
| | 313 | November | 9 | 984,123 |

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RULE-BREAKING & POSITIVE REWARDS

“Cartesian Products usually don't provide useful information and often result in mistakes that can hurt your database developer career. Learn to spot Cartesian Joins and banish them from your SELECT queries **forever**.”

<http://www.databasejournal.com/features/mysql/article.php/3901221/Identifying-and-Eliminating-the-Dreaded-Cartesian-Product.htm>

BEHOLD...THE CROSS-JOIN

Cross-join is the combination of each row from the first table with each row from the second table...all possible combinations!!

Would you ever need to do this?

DISTANCE FROM PERSON A TO PERSON B



An office layout that has been converted into a convex spatial network (dark interior areas are circulation or service spaces).

| Unique space ID | SID | Location's x-axis position CX | Location's y-axis position CY |
|--------------------|-----|-------------------------------------|--|
| | 1 | 613.1547 | 413.551 |
| | 2 | 929.4974 | 321.6746 |
| | 3 | 2057.336 | 472.7538 |
| | 4 | 1959.742 | 474.1885 |
| | 5 | 1862.356 | 473.5032 |
| | 6 | 2056.697 | 340.9108 |
| | 7 | 1959.21 | 341.0388 |
| | 8 | 1862.01 | 340.6568 |
| | 9 | 1487.656 | 482.2147 |
| | 10 | 1031.356 | 484.4595 |
| | 11 | 940.3399 | 476.7395 |
| | 12 | 937.2448 | 399.1614 |
| | 13 | 1761.064 | 649.6322 |
| | 14 | 1847.033 | 658.3473 |
| | 15 | 2300.016 | 676.8975 |
| | 16 | 2202.929 | 677.1323 |
| | 17 | 2298.736 | 769.4445 |
| | 18 | 2201.979 | 769.4445 |
| | 19 | 2105.701 | 769.4445 |
| | 20 | 2008.001 | 769.4445 |
| | 21 | 1910.543 | 769.4445 |
| | 22 | 1813.805 | 769.4445 |
| | 23 | 1716.172 | 769.4445 |
| | 24 | 1618.524 | 735.4723 |
| | 25 | 1651.926 | 653.4827 |

CREATE THE TABLE

```
use icos2017;  
go  
  
create table locations(  
sid int not null,  
cx float null,  
cy float null  
);  
go  
  
bulk insert locations  
from 'H:\ICOS 2017\Locations 06072017.txt'  
with (firstrow=2);  
--50 rows
```


COMBINATION SELF- & CROSS-JOIN

```
--Combination of self- & cross-joins
--use aliases
select * from locations a
cross join locations b
-----> where a.sid <> b.sid;
go
--2,450 rows

select a.sid as from_id, a.cx as from_x, a.cy
as from_y, b.sid as to_id, b.cx as to_x, b.cy
as to_y
-----> into edgelist
from locations a
cross join locations b
where a.sid <> b.sid;
go
--2,450 rows
```

COMPUTE THE DISTANCE

```
alter table edgelist  
add distance float;  
go
```

```
update edgelist  
set distance = sqrt((square(from_x-to_x) +  
square(from_y-to_y)));  
go  
--2,450 rows
```

```
select from_id, to_id, distance  
from edgelist  
order by from_id, to_id;  
go  
--2,450 rows
```

DONE!

| from_id | to_id | distance |
|---------|-------|----------|
| 1 | 2 | 329.41 |
| 1 | 3 | 1445.39 |
| 1 | 4 | 1347.95 |
| 1 | 5 | 1250.64 |
| 1 | 6 | 1445.37 |
| 1 | 7 | 1348.01 |
| 1 | 8 | 1250.98 |
| 1 | 9 | 877.19 |
| 1 | 10 | 424.17 |
| 1 | 11 | 333.23 |
| 1 | 12 | 324.41 |
| 1 | 13 | 1171.93 |
| 1 | 14 | 1257.93 |
| 1 | 15 | 1707.29 |
| 1 | 16 | 1611.48 |
| 1 | 17 | 1722.74 |
| 1 | 18 | 1628.20 |
| 1 | 19 | 1534.39 |
| 1 | 20 | 1439.53 |
| 1 | 21 | 1345.32 |