



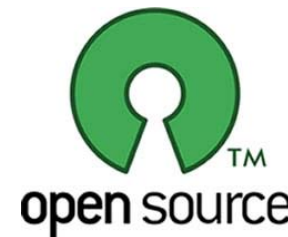
@InuendoData

*...Data's new direction*

Christopher F. Burns, Sr. 

cburns@inuendo.us

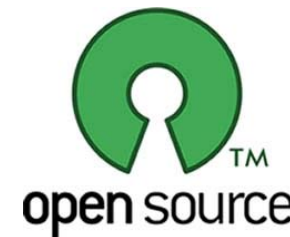




## Why are we here ?.....

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LABATT'S
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- To get a fresh perspective of the art of data architecture.
- To escape the provincial, monolithic data models rooted in the deep past.
- To shift responsibilities from the program stack to the database engine.
- To help data from other platforms and applications to coexist.
- Others ?



## On tap.....

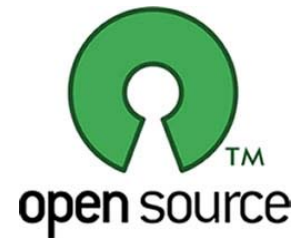
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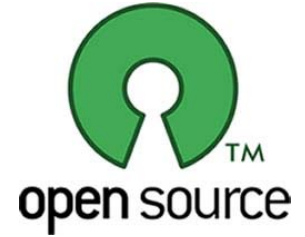
- Dirty little secrets about data
- Prism model of supply chain interaction
- The Inuendo concept
  - The model
  - The engine
  - Time travel technology
  - Oops !
- The Inuendo open source project
- Q & A



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Dirty little secrets about data

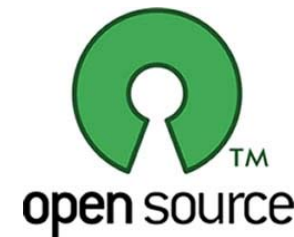




## Your database...

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- Efficient or deficient ?
- If asked what comprises your data, or more specifically, a typical database file, what would your response be ?
- Perhaps a breakdown like this ?



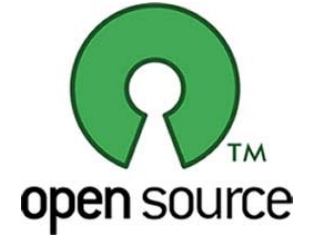
## Perception of our data files

■ Key Fields ■ Descriptors ■ Buckets ■ Flags/Codes ■ Misc.



**Virtually 100% productive, right ?**

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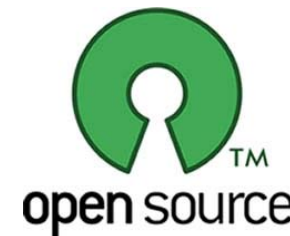
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Hardly !!! Here is the likely reality.

- Weak Data Types
- Clunky Keys
- Duplicity
- Repetitive
- Unused Space
- Truly Strategic



Not as productive as we thought ☹️

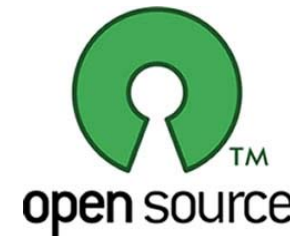


## Your legacy data is made up of.....

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- Weak, inflexible data types due to slow SQL adoption
  - Application code required to address shortcomings.
  - Doesn't play nicely in the sandbox with other platforms.
- Clunky complex keys due to piecemeal construction
  - Application coding required to facilitate.
  - Major root canal when corporate standards change.
- Fields available elsewhere due to price, performance concerns
  - Application code required to synchronize, in many places
  - But it still gets out of synch (then fix-it coding required).
- Repetitive fields
  - Requires application code to parse and assemble arrays.
  - Has hard limits, else major root canal to increase limits
- Unused space
  - Filler, obsolete fields, empty instances of repetitive fields
  - Descriptors sized to accommodate the oddballs
- Truly unique and productive fields
  - Differentiates the file from the rest of the application.
  - Mission critical to the business model.



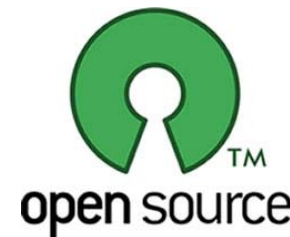


## In layman's terms.....

Chances are your home grown database will not support a significant seismic event:

- New business units
  - Different fiscal calendars
    - Apps often assume calendar year
  - Different security guidelines
    - Scripts with hardcoded user ID's. Yikes !
  - Different specialty data
- Consolidation or elimination of business units
- New product lines
- New enterprise level customers
- Shift in strategic vision and mission
- A change in platform. Yikes !

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## Then what happens ?.....

- Baby, bath water – you do the math.



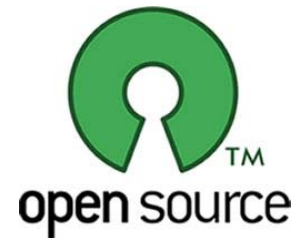
- Or major patching and add-on.
  - Only adds to the problem.
  - Usually leads to the baby thing.
- Or just leave it for the next guy.
  - Definitely leads to the baby thing.
- Or re-imagine your data relationships
  - Baby has her whole life ahead of her !!!

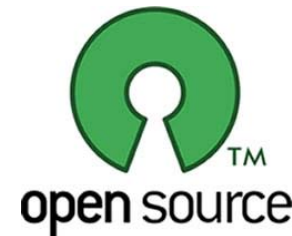
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*...Data's new direction*

Prism model of supply chain interaction



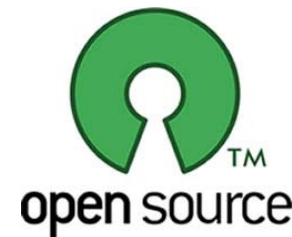


## Supply chain basics

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Your business is an ecosystem of relationships, all of which interact on a day to day basis.

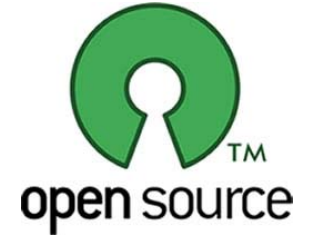


## Supply chain basics

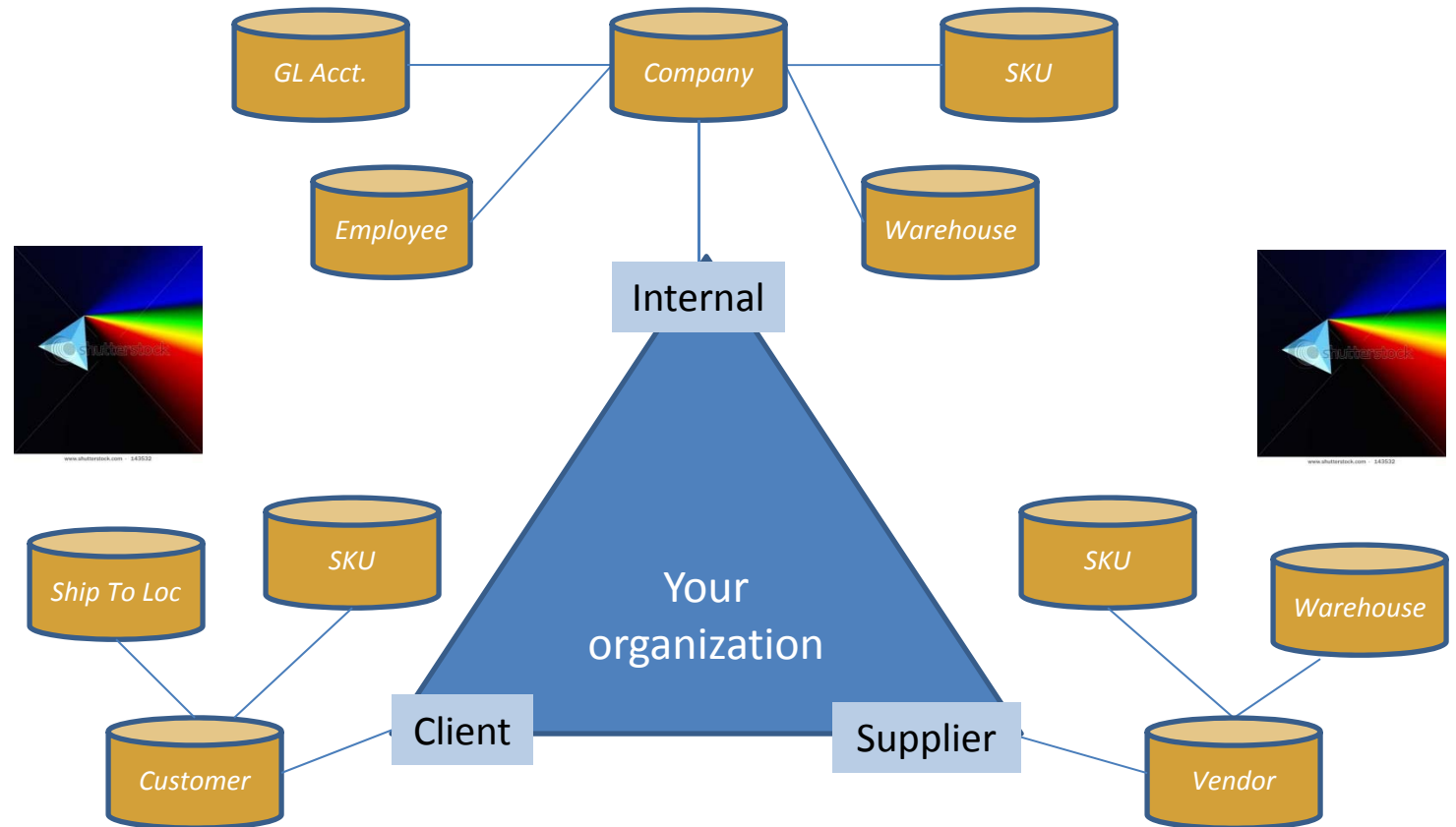


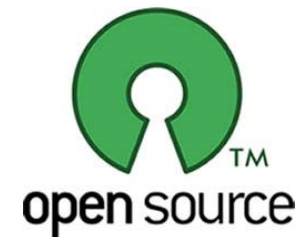
In a nutshell, the supply chain is simply the limitless cascade of these linked ecosystems.

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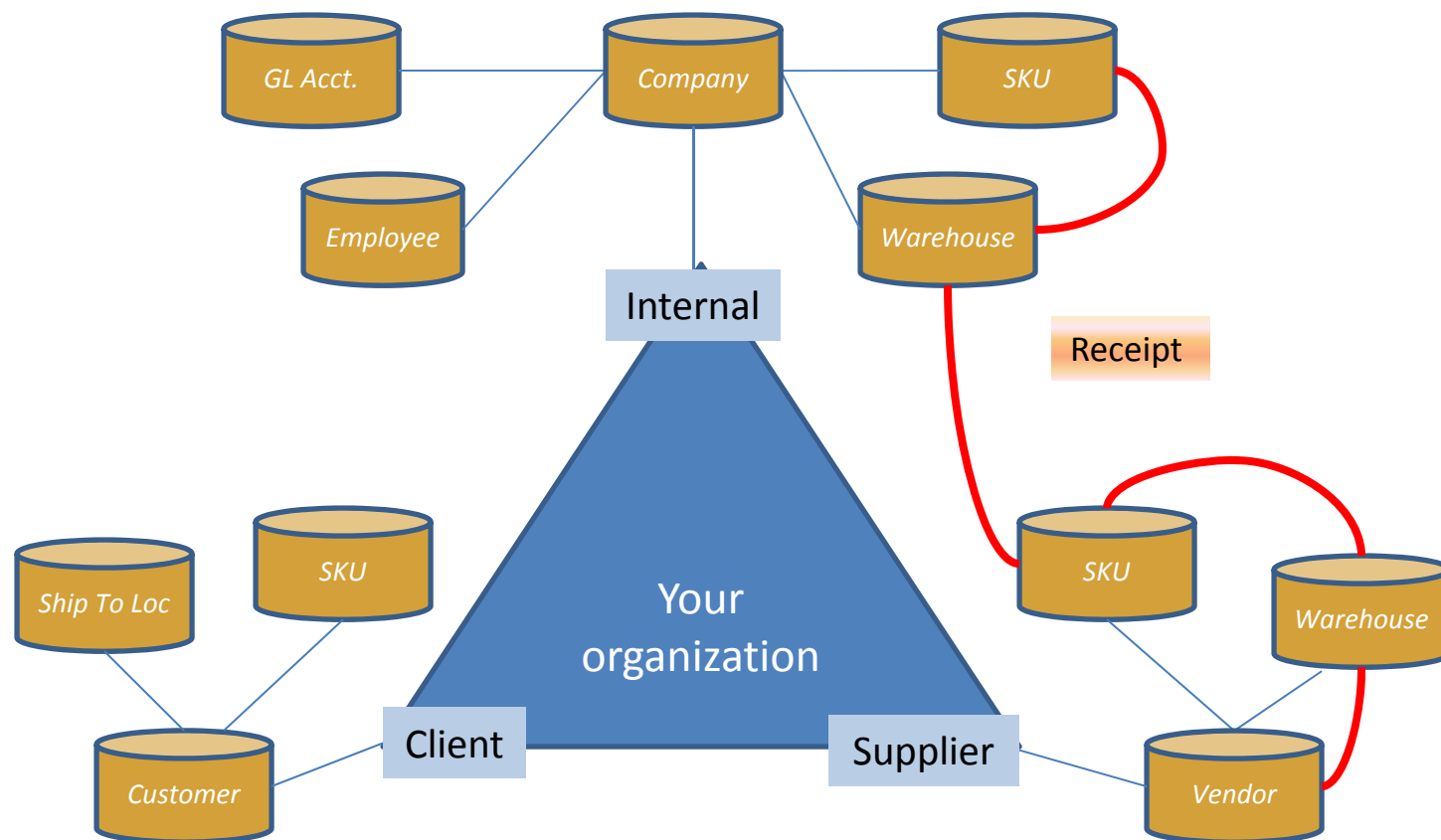


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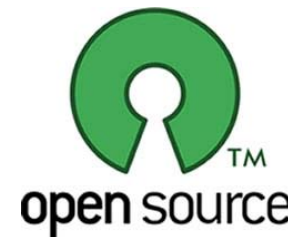




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Everything we do is merely a conversation between two or more of these objects. Example – a receipt.



## Simple enough.....

But how did it get so convoluted ?

- Most home grown systems were assembled little by little, by multiple individuals using multiple approaches over multiple years.
- Design decisions based on the concept of IT being purely cost, not an investment.
- Useful life of the application underestimated.
- “If it ain’t broke, don’t fix it” is NOT a strategic mission statement, but was treated like one.
- A less constrained approach is warranted.

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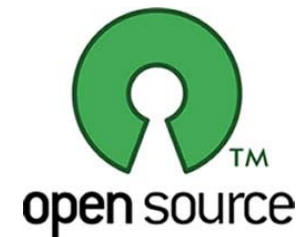




*...Data's new direction*

The Inuendo concept





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In - u - en - do

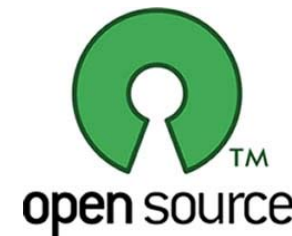
*(also see innuendo)*

*-noun, plural*

1. An indirect intimation about a person or thing.
2. An ideology that bucks the traditional accepted norms for data design.

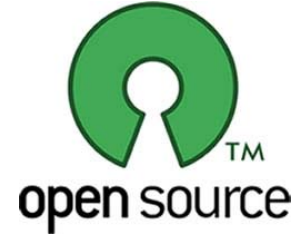
*-synonyms:* insinuation, imputation.

*-origin:* Years of research and experience associated with modernizing home grown business applications constrained by tired data.



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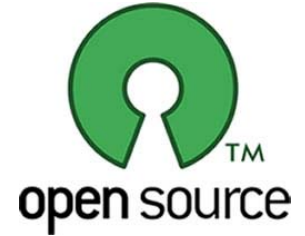
- First concepts developed in 2007 during System/36 application modernization.
- Full model white boarded in 2009.
  - Refined on an ongoing basis
- Multiple implementations since 2010, new ones currently underway, others planned.
- Open source GA April, 2012.



## What is meant by Inuendo ?.....

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- An Italian suppository ? Not quite.
- Rather, it is a database model designed to treat all components of the supply chain equally, regardless of their role.
- Not platform or DB engine specific.
- Provides unlimited growth and flexibility.
- Provides comprehensive audit trail.
- Lessens dependency on IT personnel for ordinary requests.



## Inuendo's secret ingredients...

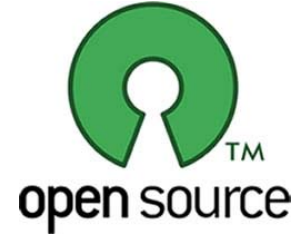


- Principles
  - How the data is conceptualized
- Data model
  - How the data is organized
- Standard I/O Functions
  - How the data is created & retrieved

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Inuendo.us



## Inuendo principles.....



- Every piece of information on the planet, no matter how critical, no matter how trivial:
  - Has an equally important story to tell.
  - Shall be created equal, with the same Constitutional rights and its own unique identity.
- Data shall exist once and only once.
- Data shall be organized vertically by data type and accessed in an associative manner by nickname.
- Data shall be created and accessed using centralized functions.
- Data shall exist indefinitely and not be exiled.

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## Inuendo principles (cont.)...

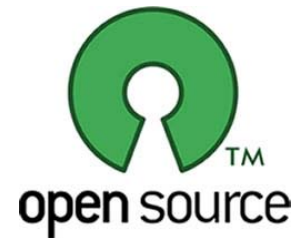
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- No aggregates shall exist, only the detail that supports them.
  - Why introduce the risk of disjointedness ?
- Should be able to recapture the value of any property at any moment in time.
  - More comprehensive than journaling
- Should leverage the power of the database engine first before creating any application code.

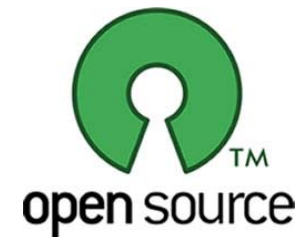


*...Data's new direction*

The model



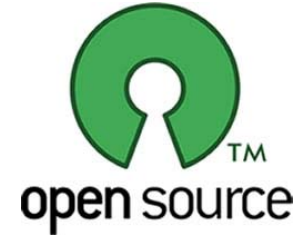




## Inuendo data model

RUNDOWN
COVER GIRL ...
STUFF HAPPENS
CANNED TUNA
GEAR UP
GET SOME
PUT OUT
McFLY
OOPS
OPEN WIDE
BETTY CROCKER
MORE...

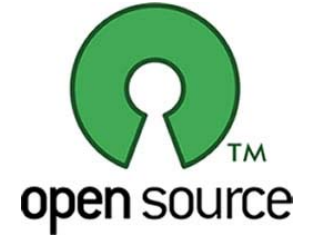




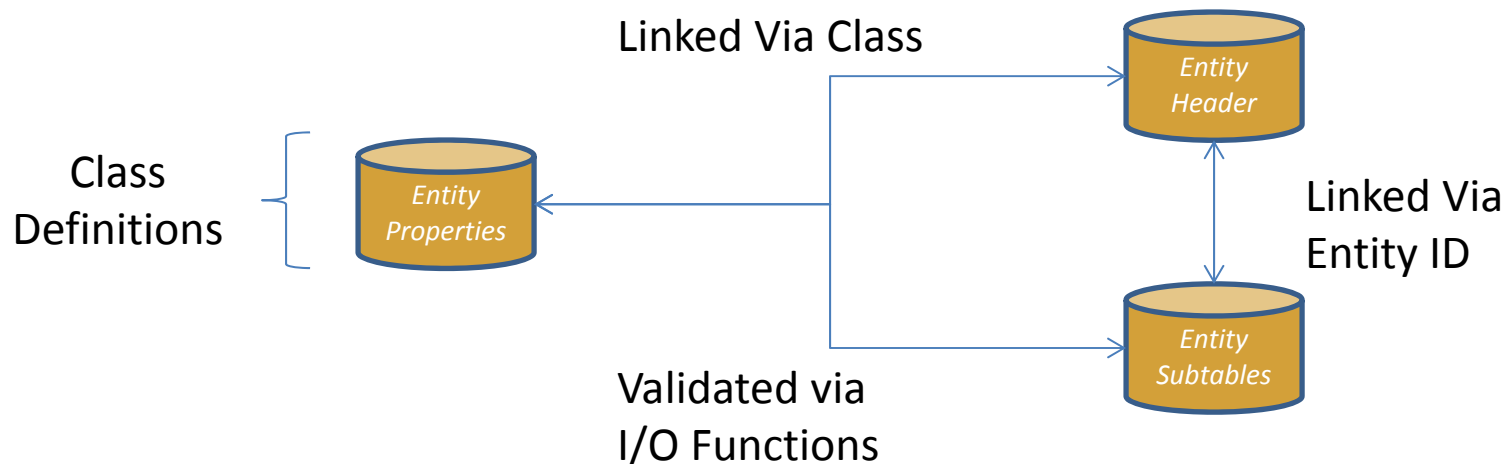
## The Inuendo data model...

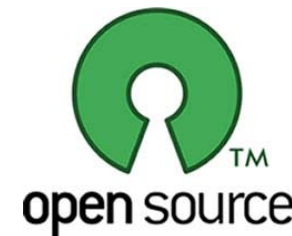
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- Table ENTPROP (Entity Properties)
  - Defines valid classes and the valid properties for each class. Obviously, analogous to Java classes.
  - Appended and occasionally updated.
- Table ENTHEAD (Entity Header)
  - Defines an instance of a class with standard ID and metadata. Analogous to Java objects.
  - Appended and occasionally updated.
- Sub tables beginning with “ENT”
  - Holds the values of the properties by entity.
  - One for each desired data type.
  - Appended only.



ANATOMY OF AN ENTITY CLASS (TABLE ENTPROP)	
Class	The type of Entity. Analogous to a Java class.
Property	Also known as Nickname. If blank, the record simply describes the Class.
Data Type	Identifies which of the subtables will hold its data.
Descriptor	Freeform text displayed during maintenance or inquiry
Sequencer	Order of the properties displayed during maintenance or inquiry



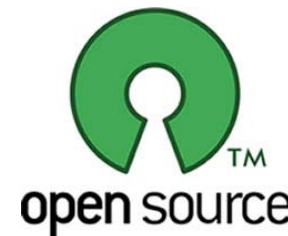


SAMPLE ENTITY CLASS (TABLE ENTPROP)				
Class	Property	Data Type	Descriptor	Seq.
SALESREP			Sales Representative	
SALESREP	EMPLOYEE	LINK	Employee Profile	100
SALESREP	CERTIFIED	FLAG	Achieved IBM Sales Certification	120
SALESREP	COMMISSION	NUMBER	Commission Percentage	140
SALESREP	PERDIEM	NUMBER	Per Diem Rate	160
SALESREP	VEHICLE	LINK	Assigned Company Vehicle	180

### Assumptions:

- An EMPLOYEE class exists, with an ENTHEAD record for every employee.
- A VEHICLE class exists, with an ENTHEAD record for every company vehicle.
- We'll discuss the data types shortly.

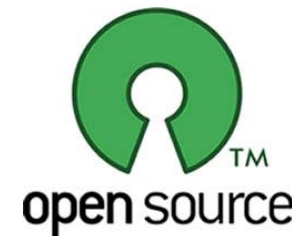
But where's all his important stuff ?



## That IS all his important stuff.....

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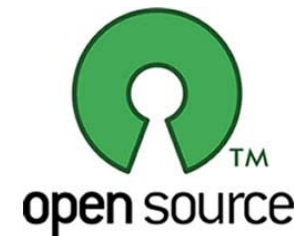
- At least with regards to his role as a sales rep.
  - He is also an employee like everyone else.
- Brand name and legacy sales rep number would be part of his metadata in ENTHEAD.
- No cumulative fields like YTD Sales because that would violate Inuendo principle.
  - Use transaction entities instead.
- Address, phone, etc. would probably be associated with his role as an employee.
  - Because all employees have these.
  - ADDRESS could be its own class too since it has multiple properties.
- The SALESREP class only had properties associated with sales reps.
  - A data type of LINK allows us to create a connection to another entity.



ANATOMY OF AN ENTITY HEADER (IDENTIFICATION & METADATA)		
Entity ID	System generated, database wide	True identity
Parent ID	Entity from which this was spawned or initiated	Used for identity resolution
Class	Type of Entity. Used to link to the Entity Properties table.	
Legacy ID (Alpha)	Optional, friendly well known identifier in character form.	
Legacy ID (Numeric)	Optional, friendly well known identifier in numeric form. Normally either the alpha or numeric is used, but not both.	
Descriptor	Optional free form description	Search & selection
Status	Optional single byte flag. Can be used to hide/retire entities.	
Creation Stamp	Date/Time, User, Program	Audit trail support

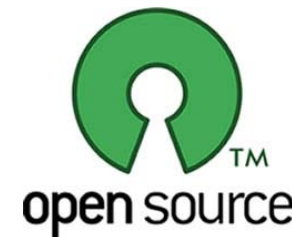
M  
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T  
A  
D  
A  
T  
A

Table ENTHEAD contains information common to all or most entities. Each record in this table is analogous to a Java object.



SAMPLE ENTITY HEADERS (TABLE ENTHEAD)					
Entity ID	1	153	5045	404480	3298102
Parent ID	1	1	153	153	5045
Class	FOUNDER	COMPANY	EMPLOYEE	SALESREP	ADDRESS
Legacy ID (Alpha)		ABC			
Legacy ID (Numeric)			42057	265	
Descriptor		ABC Foods	Doe, John	Doe To Go !	
Status	A	A	A	A	A
Creation Stamp	2012-03-01 QSECOFR INSINUDBC	2012-03-02 JONESR STDENTMNT	2012-03-04 SMITHKJR HR101	2012-03-08 JOHNSONV SA250	2012-03-04 SMITHKJR HR102

Of course, an EMPLOYEE could be subordinate to a DEPARTMENT, or link to it through a property of type LINK. Depends on your needs. That is why you draw your prism. 😊



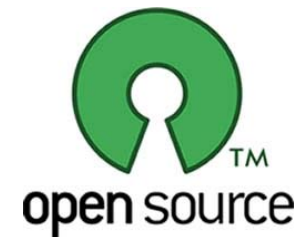
## ANATOMY OF AN ENTITY SUBTABLE

Entity ID	The true database wide identity. Links to ENTHEAD via constraint.
Property	Also known as Nickname. Validated against ENTPROP by Class.
Value	Actual value of the property for this entity.
Stamp	Date/Time, User, Program. For audit trail support.

## FAVORITE SUBTABLES

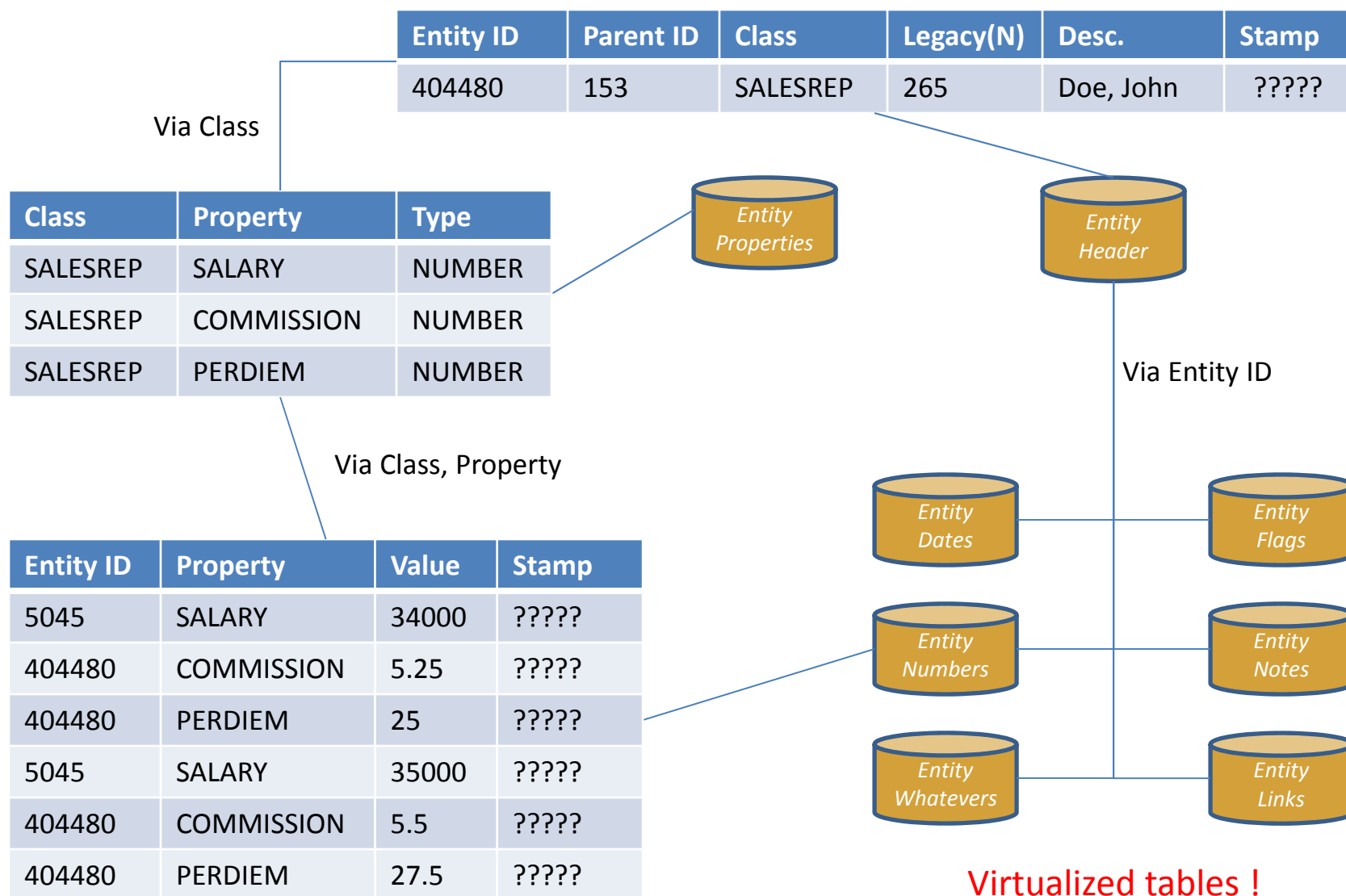
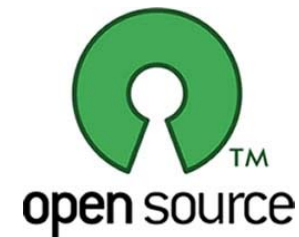
ENTDATE	Native ISO date type.
ENTFLAG	One byte flag for switches or codes.
ENTNOTE	254 byte VARCHAR for descriptive or general character values.
ENTNUMB	25.7 decimal – sufficient for most monetary, statistical & geographical values.
ENTLINK	Big Integer – represents database wide ID of another Entity.
ENT????	Add your own to suit needs, but don't get carried away. 😊

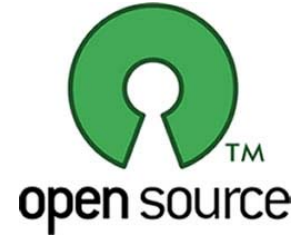




SAMPLE ENTITY SUBTABLE (ENTNUMB)					
Entity ID	Property	Value	Time Stamp	User ID	Program
5045	SALARY	34000	2012-03-08 10:16:04.485439	BROWNZ	HR101
404480	COMMISSION	5.25	2012-03-08 11:23:55.060713	JOHNSONV	SA250
404480	PERDIEM	25	2012-03-08 11:23:55.098838	JOHNSONV	SA250
5045	SALARY	35000	2012-03-09 09:11:46.506140	BROWNZ	HR101
404480	COMMISSION	5.5	2012-03-31 16:05:14.253341	WILLIAMSC	SA250
404480	PERDIEM	27.5	2012-03-31 16:05:14.298838	WILLIAMSC	SA250

The subtables record every change to every property for every entity, along with information about the change. This can be a **HUGE** help when troubleshooting.





## Isn't that a lot of data ?.....

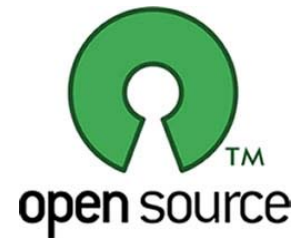
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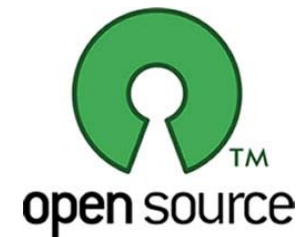
- Not as much as you'd think !
- Most highly volatile DB fields tend to be aggregates, which are prohibited by Inuendo.
- Descriptive and strategic data tends to be static for long periods of time.
- Subtable rows are narrow.
- Indexes are simple and uniform
- Apps will only retrieve the info they need.
  - Hence, overhead is light.



*...Data's new direction*

The engine

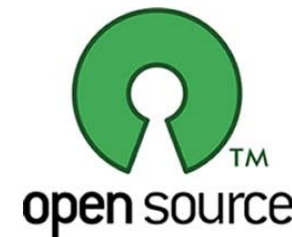




# Standard I/O Functions

RUNDOWN
COVER GIRL
STUFF HAPPENS
CANNED TUNA
GEAR UP.
GET SOME
PUT OUT
McFLY
OOPS
OPEN WIDE
BETTY CROCKER
MORE...



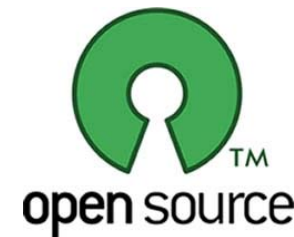


## Standard I/O Functions....



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MORE...

- Abstraction layer between apps & data.
  - No direct access to data by HLL programs, except for SQL cursors, stored procedures on ENTHEAD.
  - SQL driven, embedded in RPG for System i installs.
  - Purely SQL for other platforms (not etched in stone).
- GET functions retrieve data.
  - One for entity ID resolution.
  - One for each piece of metadata in ENTHEAD.
  - One for each data type sub table.
- PUT functions create or update data.
  - One to instantiate a new entity of a specified class.
  - One for each piece of metadata in ENTHEAD.
  - One for each data type sub table.
- Helper functions & rules for structural integrity.
  - Navigation, validation, etc.



## GET Functions...

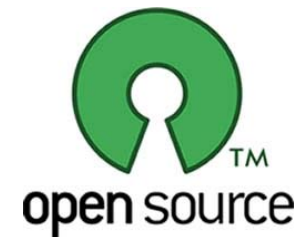
- **getEntityID (ParentID, Class, LegacyA, LegacyN)**
  - Implies entity ID or 0 (if not found). Used in expression.
  - Resolves either the alpha or numeric legacy identifier to the Inuendo entity ID based on parent and class.
  - Used by synch process or friendly user interfaces.
  - Can be disqualified by the status flag in ENTHEAD.

Entity ID	Parent ID	Class	Legacy(N)	Desc.	Status	Stamp
404480	153	SALESREP	265	Doe, John	A	?????

- **SalesmanID = getEntityID(153 : 'SALESREP' : ' ' : 265);**
  - Note the SALESREP class uses the numeric legacy ID.
  - Variable SalesmanID would receive a value of 404480.
  - STATUS field could be a condition to disable or soft delete

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## GET Functions (cont.)...

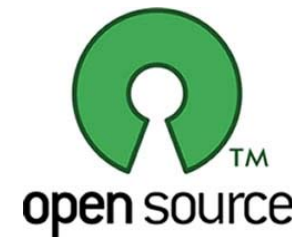
- **getNumb (EntityID, Property)**
  - Also getDate, getFlag, getLink, getNote. In other words, one for each data type.
  - Implies the most recent value assigned to the combination of Entity ID and Property/Nickname in the associated subtable.
  - Implies a zero, blank or \*LOVAL date depending on data type if no combination is found. Analogous to RPG initialization.

Entity ID	Property	Value	Time Stamp
404480	COMMISSION	5.25	2012-03-08-11:23:55.060713
404480	COMMISSION	5.5	2012-03-31-16:05:14.253341

- **MyRate = getNumb(404480 : 'COMMISSION');**
  - Variable MyRate would receive a value of 5.5 because that is the most recently assigned value for this entity/property.

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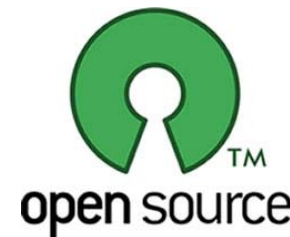
## GET Functions (cont.)....

- **getParentID(EntityID)**
  - Also getClass, getDescriptor, getLegacyN, getLegacyA, getStatus. In other words, one for each piece of metadata in ENTHEAD.

Entity ID	Parent ID	Class	Legacy(N)	Desc.	Status	Stamp
404480	153	SALESREP	265	Doe, John	A	?????

- **MyParent = getParentID(404480);**
  - Variable MyParent would receive a value of 153.
- **IF getStatus(EntityID) = 'D';**
  - DSPLY 'Yikes, I've been disabled';
  - ENDIF;

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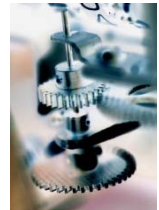


## A quick sine/cosine.....



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- Entity ID resolution with **getEntityID** might seem awkward, but consider:
- We strive to keep information in exactly one place for a reason.
- Suppose your company decides on a new product number scheme.
- No problem if your legacy item number is in only one place (ENTHEAD).
- BIG problem if your legacy item number is in 200 different files. 'Nuff said.



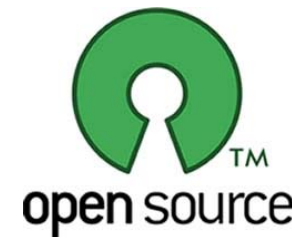
## Put Functions...

- **newEntity (ParentID, Class, LegacyA, LegacyN)**
  - Implies a brand spankin' new Entity ID with the specified metadata, plus an optional description.
  - Comes in handy when getEntityID yields a zero. 😊
  - In fact, it uses getEntityID under the covers to prevent duplicates. Three cheers for reusability.

Entity ID	Parent ID	Class	Legacy(N)	Desc.	Status	Stamp
404480	153	SALESREP	265	Doe, John	A	?????

- **SalesmanID =**  
**newEntity(153 : 'SALESREP' : ' ' : 265 : 'Doe, John');**
  - Would have created the entity as shown.

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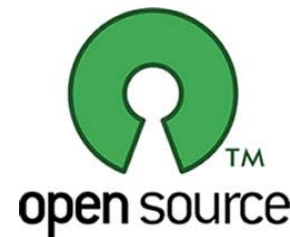
## PUT Functions (cont.)...

- **putNumb (EntityID, Property, NewValue)**
  - Also putDate, putFlag, putLink, putNote. In other words, one for each data type.
  - Checks the current value first with GET. If new value is different, appends the associated subtable with a new entry for the entity/property combo, stamped with time/user/program.
  - Implies a true/false indicating success or failure (rare).

Entity ID	Property	Value	Time Stamp
404480	COMMISSION	5.25	2012-03-08-11:23:55.060713
404480	COMMISSION	5.5	2012-03-31-16:05:14.253341

- **MyIndicator = putNumb(404480 : 'COMMISSION' : 5.5);**
  - Would have created the table entry above.
  - Subsequent getNumb would imply a value of 5.5.

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## PUT Functions (cont.)...

- **putStatus(EntityID, NewValue)**
  - Also putParentID, putClass, putDescriptor, putLegacyN, putLegacyA. In other words, one for each piece of metadata in ENTHEAD.
  - Implies a true/false indicating success or failure (rare).
  - Writes a covert entry to the subtables to reflect the change. Uses the noun (i.e. STATUS) as the nickname. This is done for consistent audit trail purposes.

Entity ID	Parent ID	Class	Legacy(N)	Desc.	Status	Stamp
404480	153	SALESREP	265	Doe, John	A	?????

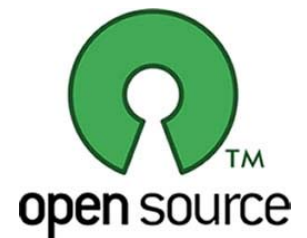
- **MyIndicator = putStatus(404480 : 'A');**
  - Would have set the status of the entity to 'A'.
  - Of course, RPG can run these standalone as well.

RUNDOWN
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*...Data's new direction*

Time travel technology



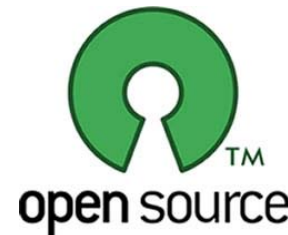


## Time travel technology.....

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BETTY CROCKER
MORE...

There are probably things we'd like to do in the past:

- Go back and put big money on Butler to make the 2010 NCAA finals.
- Unsend that mean spirited e-mail you sent to your boss 5 months ago.
- Or perhaps, more realistically, see what an agitated end user really saw on their screen when they swear it was broken.
  - That one we can help you with.
- **Let's make a small tweak to the GET functions.**



## GET Functions revisited...

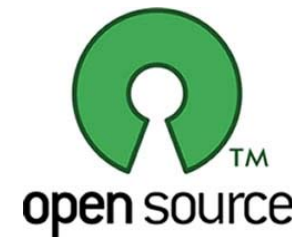
RUNDOWN
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MORE...

- **getEntityID (ParentID, Class, LegacyA, LegacyN, Moment)**
  - MOMENT is an optional argument of type TIMESTAMP.
  - Creation timestamp in ENTHEAD must be less than or equal to the Moment in order for the entity to be recognized.
  - Otherwise function implies a zero value, meaning the entity didn't exist yet.
  - If Moment not specified, system time stamp is assumed.

Entity ID	Parent ID	Class	Legacy(N)	Creation Stamp
404480	153	SALESREP	265	2012-03-02-11.45.09.123456

- **SalesmanID =**  
**getEntityID(153 : 'SALESREP' : '' : 265 : MyMoment);**
  - If MyMoment was sometime on March 8th, 2012, implies the value 404480, because he existed at that moment in time.
  - If MyMoment was sometime on March 1st, 2012, implies the value 0, because he didn't exist at that moment in time.





## GET Functions revisited...

- **getNumb (EntityID, Property, Moment)**
  - MOMENT is an optional argument of type TIMESTAMP.
  - Searches the subtable for the matching entry with the latest time stamp that is less than or equal to the Moment .
  - Implies the value of that entry.
  - If Moment not specified, system time stamp is assumed.

Entity ID	Property	Value	Time Stamp
404480	COMMISSION	5.25	2012-03-08-11:23:55.060713
404480	COMMISSION	5.5	2012-03-31-16:05:14.253341

- **MyRate = getNumb(404480 : 'COMMISSION' : MyMoment);**
  - If MyMoment was sometime on 03/09/2012, implies 5.25.
  - If MyMoment not specified, implies 5.5 (most recent).
  - If MyMoment was prior to 03/08/2012, implies 0.

RUNDOWN
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## What could we do with this ?.....

By changing our system time or session time (depending on your operating system):

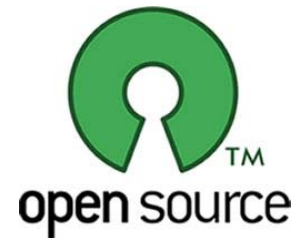
- See an inquiry screen the way a user would have seen it back on February 28<sup>th</sup>, before month end.
- Generate a missing year end report for the auditors.
- Reprint an order acknowledgment for a customer when your application no longer lets you do it because the order has since been shipped and invoiced.
- Help a user figure out where they took a wrong turn during last week's A/P check run.
- Getting the picture now ?

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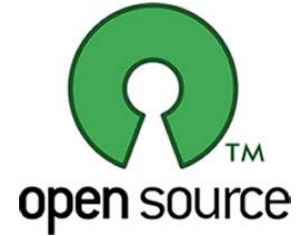
*...Data's new direction*

Oops !





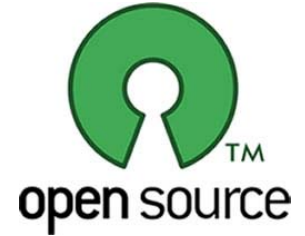
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## Quote for the ages (maybe)...

- “Hey, you’re OOPing data !”
  - Michael Szczepanik, GEMKO Information Group, 2010.
- A funny thing happened on the way to Inuendo
  - Inheritance
  - Encapsulation
  - Polymorphism
- The building blocks of **O**bject **O**riented **P**rogramming.

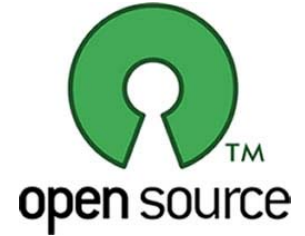
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## Inheritance....

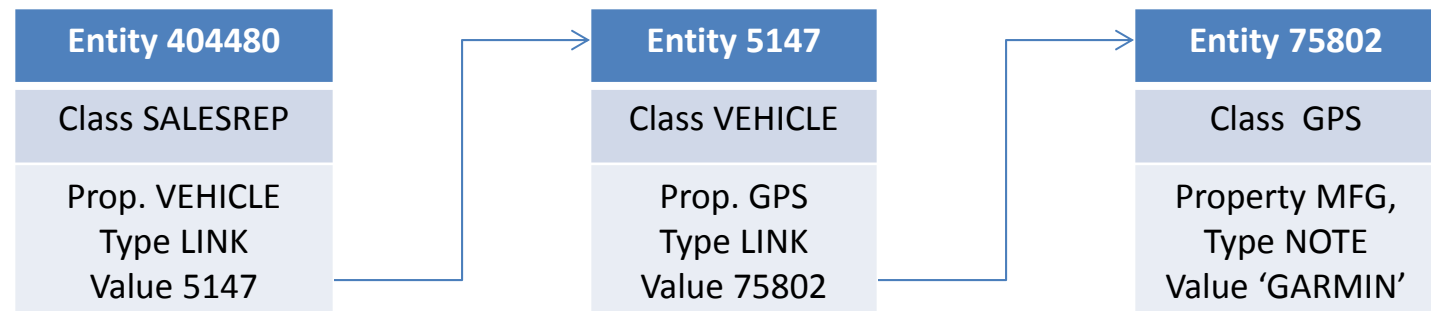
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MORE...

- No, it's not your rich uncle's 1964 Bentley.
- The GET functions on subtables use recursion to automatically inherit its ancestor's non-conflicting properties. Hence property scoping is honored.
- Example – Assume the following:
  - SALESREP class is subordinate (linked via ParentID) to the COMPANY class.
  - The COMPANY class has a WEBSITE property of type NOTE, the SALESREP class does not.
  - The field MySalesmanID contains the unique ID of an entity of class SALESREP.
- **MyWebsite = getNote(MySalesmanID:'WEBSITE');**
  - The field MyWebsite would receive the value (a URL) of the WEBSITE property belonging to the salesman's parent entity (of class COMPANY).



## Encapsulation....

- No, it's not how allergy pills are made.
- The GET functions on subtables can accept a period delimited path of link properties to navigate to another entity's properties.



- **HisGPSMfg = getNote(404480 : 'VEHICLE.GPS.MFG');**
  - Hence, the LINK data type is like a method, giving us the ability to drill down through the database.
  - Last property can be any type, the rest are LINK types.

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## Polymorphism...

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MORE...

- No, it's not the name of a girl you met at your first college mixer.
- The LINK data type subtable allows one entity to connect to another through a property, whose value is the unique ID of another entity.
  - But it doesn't say which class the other one is, does it ?
- Example – Assume the following:
  - The SALESREP has a property HERO of type LINK.
  - One salesman has a HERO value which is an entity ID of class PERSON.
  - Another salesman's HERO value is an entity ID of class DOG.
  - The getClass function can be used to distinguish them.

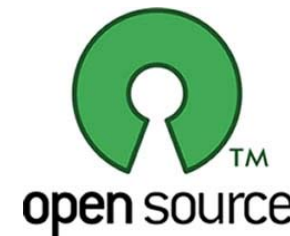


*...Data's new direction*

The open source project



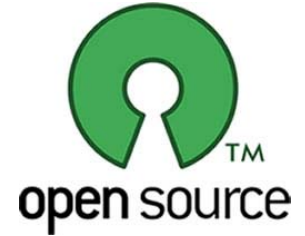




## The open source project.....

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MORE...

- Launched 2Q12, refreshed semi-annually.
- Cannot thrive without IT community feedback & code contributions.
- Repository on GitHub <http://githum.com>
  - SAVF for installation.
  - Source code.
  - Installation guide, tech reference, slide shows.
- LinkedIn group:
  - “Inuendo - Data's new direction”
- Twitter account - @InuendoData



## Still baking....

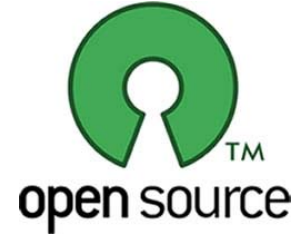
RUNDOWN
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OPEN WIDE
BETTY CROCKER
MORE...

- Desperately seeking browser based front end
  - Class, entity maintenance (single point !!!)
  - Entity search window (single point !!!)
  - Needs young blood with HTML5 skills
    - Can do a green screen if necessary, but ☹
- DB2 Linux/AIX version (SQL only, no RPG)
- MySQL version
  - Waiting for DB2 version stability
  - Challenges with function overloading
- GitHub best place for status updates.



- Time travel commands added (May 2014)
  - Set Session Moment.
  - Display Session Moment.
  - Clear Session Moment.
- Allows IBM i jobs to exist in a frozen moment in the past, in LIVE partition.
  - GET functions use that moment instead of system time when no Moment argument specified.
  - PUT functions disabled.
- Unparalleled power for troubleshooting Inuendo compliant applications.

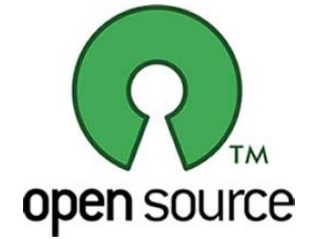
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HOVERBOARD
Y AGAIN
Q & A
THANKS
BOTTOM



## Future milestones....

RUNDOWN
DELOREAN
HOVERBOARD
Y AGAIN
Q & A
THANKS
BOTTOM

- Multiple applications, full compliance
  - Bridged via LINK type properties
- Multiple platforms, applications
  - Single Inuendo host DB
  - All I/O through SQL use of GET/PUT
- Multiple enterprises or municipalities
  - Each one subordinate to the FOUNDER
  - Merging algorithms not that complicated
  - Pipe dream ? Don't rule it out. ☺
- And where better to host it all...



<b>RUNDOWN</b>
<b>MR. FEENY</b>
<b>ANDROSTENE</b>
<b>SO RETRO</b>
<b>EXPOSE</b>
<b>OPEN WIDE</b>
<b>BETTY CROCKER</b>
<b>DELOREAN</b>
<b>I AGAIN</b>
<b>Y AGAIN</b>
<b>Q &amp; A</b>
<b>BOTTOM</b>



## IBM i: Designed for data

Deliver business insights and analytics services faster with IBM i integration

Watch the video

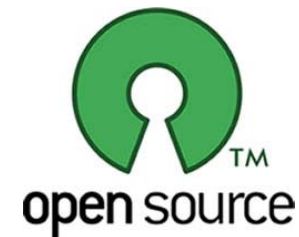




## Why should I get involved ?....

RUNDOWN
DELOREAN
HOVERBOARD
Y AGAIN
Q & A
THANKS
BOTTOM

- Countless opportunities for consultative and technical engagements worldwide.
  - Anywhere aging applications are a challenge.
  - Anywhere integration is a challenge
  - Anywhere data integrity is a challenge
  - Anywhere new development is a challenge.
  - Long lasting business relationships
- A chance to build database skills
  - SQL, triggers, referential integrity, etc.
- A chance to build development skills
  - RPG, PHP, Python, C#, Java, etc.
- A chance to set the standard, not follow it.



# Questions

(and hopefully answers)

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@InuendoData

*...Data's new direction*

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