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October 1–5, 2017  
SAN FRANCISCO, CA

# Oracle Multitenant

Customer Panel

Session CON6729

**Franck Pachot**  
Oracle Consultant,  
Trainer and  
Technology Leader



**Claude Garalde**  
Lead Principal  
Technical Architect



**Todd West**  
Senior Manager,  
Software  
Development



**Dan Radunz**  
Chief Technology  
Officer



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# Franck Pachot

**Oracle Consultant, Trainer and Technology Leader, dbi-services**



Franck Pachot works with Oracle for more than 20 years, consultant, trainer and the Oracle Technology Leader at dbi-services (Switzerland).

Franck is ACE Director, Oracle Certified Master 12c, Oak Table member, and co-author of Oracle 12cR2 Multitenant (Oracle Press).



# Claude Garalde

## Lead Principal Technical Architect, AT&T



Claude Garalde is a Lead Principal Technical Architect for AT&T. He has been an employee of the company for 30 years and has been on AT&T's Technology Architecture Board (TAB) for 16 years. He leads AT&T's Data Management Standards team which establishes and enforces the data management technology standards for the enterprise. His expertise is in database, datastores, data management, data governance and cloud technologies. He achieved the status of Oracle Master in 1996 and is TOGAF 9 certified. He is also a charter member of Oracle's Database CAB and was a key innovator and contributor of the design of Oracle 12c Multitenant, Data Heat Map, and ILM Compression Automation. Claude was the lead architect on the team that conducted the PoCs that demonstrated the viabilities and benefits of deploying Oracle's Private Cloud within AT&T. He and his beautiful wife Cindy are proud parents of 8 kids and 2 grandchildren. He enjoys fly fishing, camping, football and basketball. If the opportunity presents itself please introduce yourself to Claude or connect with him on LinkedIn <http://www.linkedin.com/in/garalde>.

# Todd West

## Senior Manager, Software Development, NetSuite



Todd West, Sr. Manager of Database Engineering and Schema, is an Oracle database professional with 18 years of experience in performance optimization and design. Education: BA and MA in English Literature from University of California, Santa Barbara. His degrees contributed little to his current role other than to heighten his sense of personal irony. Connect: [www.linkedin.com/in/toddwest/](http://www.linkedin.com/in/toddwest/)

# Dan Radunz

## Chief Technology Officer, IQMS



Dan Radunz oversees IQMS's worldwide product development group supporting their entire Manufacturing ERP and MES software portfolio. He joined the company as CTO in January 2016, and has more than 25 years of experience using technology to deliver innovative software solutions. Just prior to joining IQMS in 2016 Dan was the CTO for HighJump Software running its product strategy and development groups. Prior to that, he was the vice president of Network Operations Center for Wireless Ronin Technologies where he managed Wireless Ronin's 24x7 support group and data center. Mr. Radunz holds a Bachelor of Science degree in business with an area of emphasis in management of information systems and a minor in computer science from the University of Minnesota's Carlson School of Management.

# Franck Pachot

Senior Consultant, Trainer and Technology Leader  
dbi-Services



# About me



Franck Pachot

Principal consultant

Oracle Technology Leader

Mobile +41 79 963 27 22

[franck.pachot@dbi-services.com](mailto:franck.pachot@dbi-services.com)



# Who we are



## Experts At Your Service

- > Over 50 specialists in IT infrastructure
- > Certified, experienced, passionate

## Based In Switzerland

- > 100% self-financed Swiss company
- > Over CHF 8 mio. Turnover

## Leading In Infrastructure Services

- > More than 150 customers in CH, D & F
- > Over 50 SLAs dbi FlexService contracted



# International Organization Single-Tenant



## International organization migrated to:

- > From VMware to Oracle Database Appliance
- > From ISO-Latin to UTF-8
- > From 11g to 12c (12.1)
- > to multitenant architecture in Single-Tenant: 16 CDBs

## Feedback:

- > It's the same commands. Just have to know what to run at CDB and what at PDB
- > Connection is as simple as changing tnsnames.ora
- > 16 CDBs (5 productions 11 Development) - no 12c non-CDB at all

# International Organization Single-Tenant



*“ This architecture is compatible with Cloud technology ”*

*“ Extending to many PDBs is just one more step ”*

*“ Our DBAs can get trained on the latest Oracle architecture ”*

# Private Bank Single Tenant



## Software (TEMENOS Triple'A)

supports only multitenant for 12c  
because non-CDB is deprecated

## Challenges

- > can't change connection string (SID instead of SERVICE\_NAME)
- > naming rules define in company policy not ready for CDB

## But finally nothing difficult

- > listener.ora USE\_SID\_AS\_SERVICE
- > naming rules define in company policy not ready for CDB

# Solutions for security

## Database as a Service



### Agile development

- > multiple development projects
- > Agile: one database per developer
- > Quick and easy provisioning (something like Docker)

### Solution

- > Oracle multitenant option
- > Enterprise Manager REST API to provision from developer portal

### Challenges

- > 150 PDBs in a CDB, Constantly dropped and created
  - > DBAs were used to lot of very small instances
- > This requires new configuration settings:
  - > No Automatic Memory Management, hugepages,



# Claude Garalde

Lead Principal Technical Architect, AT&T  
AT&T

# ORACLE 12C MULTITENANT BENEFITS FOR AT&T

## AT&T



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Claude Garalde

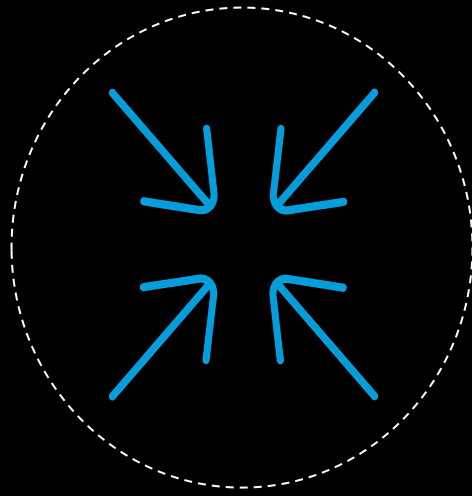
Lead Principal Technical Architect



# ORACLE 12C MULTITENANT BENEFITS - AT&T



FAST & EASY



MANAGE MANY  
AS ONE  
OR  
ONE BY ONE



COMPUTE  
& FTE  
RESOURCE  
COST  
EFFICIENCIES



AT&T's  
DEPLOYMENT  
OF 12c  
MULTITENANT



AT&T &  
ORACLE  
UNIQUE  
RELATIONSHIP

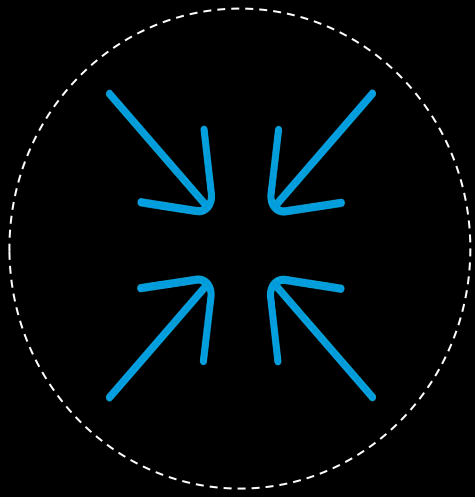
# ORACLE 12C MULTITENANT BENEFITS – AT&T



FAST & EASY

- Once the Oracle 12c Multitenant Container Database (CDB) is configured, the tenants or Pluggable Databases (PDBs) can be deployed easily and rapidly with DDL or Oracle Cloud Control.
- Prior to Oracle 12c new database builds took much longer since it required an installation of the OS and Oracle binaries before creating the database. With the Multitenant feature we can stand up a new database rapidly in just a few minutes.
- PDBs inherit SLAs of the 12c CDB, this means you can create a primary CDB with DataGuard to a remote Standby CDB and then every PDB created in the primary CDB is now Dataguard protected upon creation.
- The same is true when creating a CDB on Oracle Real Application Clusters (RAC), now every PDB created on that CDB is now RAC enabled automatically.
- Supports rapid “Golden PDB” cloning for Development and Test teams.

# ORACLE 12C MULTITENANT BENEFITS – AT&T



MANAGE MANY  
AS ONE  
OR  
ONE BY ONE

- Enables managing many as one with the control to manage each PDB independently.
- Supports CDB level backup and recovery, while enabling individual PDB level full or point-in-time recoveries.
- Patching or Upgrading of the CDB patches or upgrades all PDBs simultaneously.
- Even so you can still manage PDB upgrades independently by creating a new CDB that is patched or upgraded and then unplugging each PDB from the original CDB and plugging it into the upgraded CDB one at a time. This enables easy yet rapid PDB by PDB upgrades.
- Flexible Load balancing PDB by PDB with resource management or by moving a busy PDB to a Container that has extra compute capacity.

# ORACLE 12C MULTITENANT BENEFITS – AT&T



COMPUTE  
& FTE  
RESOURCE  
COST  
EFFICIENCIES

- No VM Hypervisor required .
- Potential 10X+ reduction in Linux and Oracle Installs (eliminates guest OS and DBMS install per VM).
- When you reduce the number of Oracle instances running on VMs then you eliminate all the background processes and SGAs associated with each instance.
- This can easily recoup 20%+ of compute and memory resources.
- Enables Cloud like DBaaS functionality on Roll-Your-Own RAC or on Oracle's Exadata Cloud Machine.
- 12c Multitenant can also provide significant reduction in FTE costs due to the reduction of the number of Linux and Oracle instances that need to be installed, configured, managed, and maintained.

# ORACLE 12C MULTITENANT BENEFITS – AT&T



AT&T's  
DEPLOYMENT  
OF 12c  
MULTITENANT

- Oracle 12c Multitenant has been in use since April of 2015 on AT&T's myAT&T Sales Platform. The myAT&T Sales is an online platform supporting consumer facing applications.
- With Oracle 12c Multitenant the myAT&T Sales team created 3 containers with 50+ PDBs as follows:
  - The 12c container1 has a 16GB SGA and supports (24) PDBs
  - The 12c container2 has a 22GB SGA and supports (21) PDBs
  - The 12c container3 has an SGA of 15GB and supports (7) PDBs
- Dev and Test teams can rapidly clone a "Golden PDB" quickly and accurately for new development or for destructive testing.
- Oracle 12c Multitenant has been extremely stable, with great performance and excellent compute resource utilization.
- Due to efficiencies of 12c Multitenant the myAT&T application experienced 4x productivity gains on their DBA team.

# ORACLE 12C MULTITENANT BENEFITS - AT&T

AT&T



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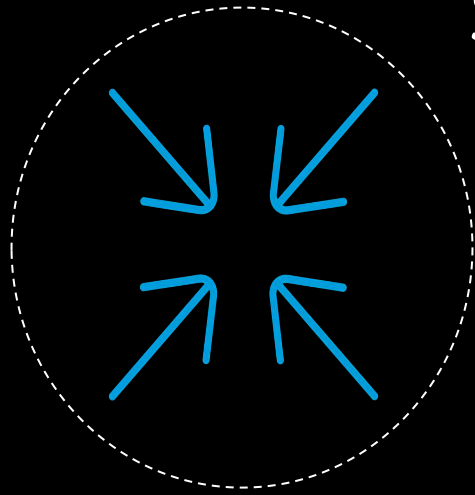
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# ORACLE 12C MULTITENANT BENEFITS - AT&T SUMMARY



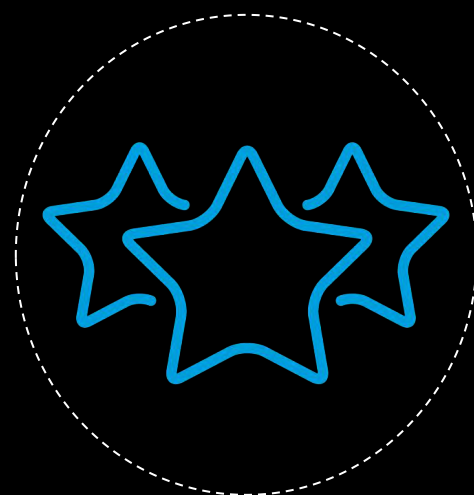
FAST & EASY



MANAGE MANY  
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AT&T's  
DEPLOYMENT  
OF 12c  
MULTITENANT



AT&T &  
ORACLE  
UNIQUE  
RELATIONSHIP

# Todd West

**Senior Manager, Software Development**  
**NetSuite**



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# ORACLE 18C MULTITENANCY AT NETSUITE

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October 2017

# NETSUITE: WE INVENTED ROW-LEVEL MULTITENANCY -- AND NOW WE'RE ADOPTING A BETTER DESIGN

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Legacy Design: VPD with row-level security based on an account number stored in every row.

Benefits: airtight security enforced by environment variable used in all views, and set on all sessions.

Drawbacks: wasted space in multi-column indexes, optimizer confusion, wasted space in table, cost of setting and clearing the account on every connection, complexity of view abstractions.

Modern Design: Oracle multitenancy at the instance level (the Pluggable DB).

Benefits: smaller indexes, smaller tables, simpler schema, better execution plans (less “choice confusion”), faster hard parsing (fewer candidate indexes to consider), less connection overhead, enables use of result cache, enables patching many PDBs at once (consistency, ease of admin).

# BENEFIT MATRIX: REMOVE VPD

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| What Changes                            | Direct Benefit Expected          | Indirect Benefits  |
|---|----------------------------------|--|
| Table: drop account column              | 1-10% of table storage reclaimed | Reduced I/O; each block contains data for only one account       |
| Index: drop account column              | 10-85% index size reduction      | Less optimizer confusion; shorter hard parse; better compression |
| View: remove account filtering          | 1-10% better performance         | Less plan confusion; simpler                                     |
| Connection: remove environment variable | 1-3% of DB time reclaimed        | 0-1% Java time reclaimed (no more session setup/cleanup code)    |

# BENEFIT MATRIX: USE PDB

| What Changes                               | Direct Benefit Expected   | Indirect Benefits  |
|--|---|--|
| Resource Manager: better control           | Fewer calls to support and customer-reported complaints           | Consistency of service / response time                               |
| Migrates: much shorter                     | Up to 90% shorter scheduled downtimes; less data to work on       | Enables per-account downtimes, more granular                         |
| Backup: shared redo logs                   | Combined background processes                                     | ---  |
| Recovery: faster                           | 10-200x faster to recover a single PDB than a shared VPD database | Data corruption isolated to one customer, not many                   |
| Patching and AWR: single points of control | Patch one container to upgrade 100 PDB instances; AWR in CDB      | Consistent configuration; whole-host visibility for high load events |

# Dan Radunz

Chief Technology Officer  
IQMS

# IQMS at a Glance



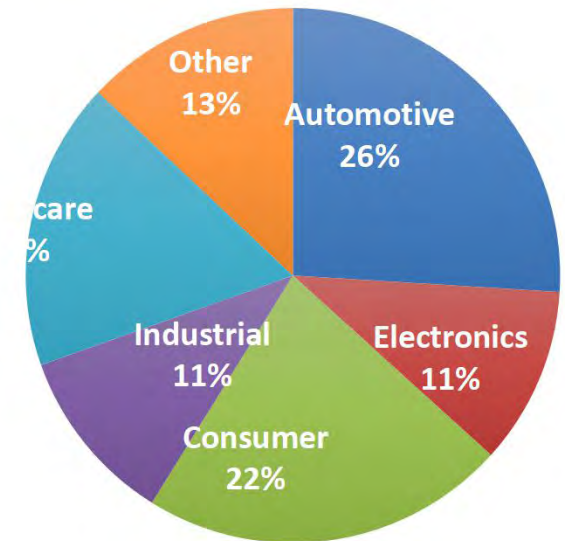
- Founded 1987
- ERP + MES for discrete and batch process manufacturers
- 1000+ customers
- Mid-market focus
  - North America
  - Europe, Asia, Central America
- Headquarters in California
- Support and implementation offices in Chicago, Charlotte, Toronto, Mexico City, London and Shenzhen
- 20% CAGR last 5 years



# What Makes IQMS Unique

- Manufacturing focus
- Comprehensive functionality
- Single database ERP+MES+WMS
- In house EDI and supply chain integration team
- Ease-of-use
- “Implementation by Design”
  - Manufacturing process-driven implementation

IQMS End User Markets



# Why we choose Oracle DBaaS Multitenant

- We run on the Oracle database
- Mission Critical
- Shared infrastructure, cost savings
- Ease of manageability
- No application changes required



# Our Experience and Results

- ISV Partner Friendly
  - More than infrastructure provider
  - Architecture assistance
  - Go to Market assistance, joint selling and events
- Achieved all our goals
- Enterprise Level SLA's
- Investigating App Containers next









# To Learn More about **Oracle Multitenant**

| Session   | Day       | Time     | Room  | Speaker                        |
|---|-----------|----------|---|--------------------------------|
| Oracle Multitenant:<br>Best Practices                                       | Monday    | 11:00 am | West – 3010   | John McHugh<br>Gerald Bowers   |
| Oracle Multitenant:<br>Stale Standalone to Superb SaaS<br>in Single Session | Tuesday   | 11:30 am | West – 3010   | Patrick Wheeler<br>Thomas Baby |
| Oracle Multitenant:<br>Ask The Architects                                   | Wednesday | 11:00 am | West – 3010   | Kumar Rajamani<br>et al.       |
| Lockdown Profiles   | Wednesday | 12:00 pm | West – 3016   | Pravin Jha et al.              |
| Oracle Multitenant:<br>Hands-on Lab   | Monday    | 12:45 pm | Hilton Union Square<br>(Ballroom Level)<br>Plaza Room A | Can Tuzla et al.               |
|   | Tuesday   | 9:45 am  |   |                                |
|   | Wednesday | 8:00 am  |   |                                |

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# To Learn More about **Oracle Multitenant**

| Session   |  | Day       | Time     | Room                         | Speaker  |
|---|--|-----------|----------|------------------------------|--|
| Uncompromising SaaS on Oracle Cloud, Powered by In-Memory and Multitenant       |    | Sunday    | 10:45 am | Moscone South Room 156       | Silviu Lupsa   |
| Upgrade to 12c Release 12.2: Real-World Customer Cases                          |    | Monday    | 2:15pm   | Moscone West Room 3010       | Mike Dietrich<br>Alain Fuhrer                              |
| Oracle Multitenant: Customer Panel  | <br><br><br> | Tuesday   | 4:45 pm  | Moscone West Room 3010       | Franck Pachot<br>Claude Garalde<br>Todd West<br>Dan Radunz |
| Building a SaaS Solution on Oracle Database Cloud Service - Multitenant Edition |    | Wednesday | 12:00 pm | Moscone West Room 3014       | Timour Ezizov  |
| Migrating RAC Databases to Oracle Multitenant                                   |    | Thursday  | 1:15 pm  | Park Central – Franciscan II | David Hickson  |

# Oracle Multitenant Adoption

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# Oracle Applications Certified with Multitenant

## Oracle Applications

- Fusion Applications
- Applications Unlimited
  - Siebel
  - PeopleSoft
  - JD Edwards
- Oracle Cloud Applications
  - Taleo Business Edition
  - RightNow

## Oracle Applications (continued...)

- Oracle Argus Analytics
- Oracle Utilities Mobile Workforce Management
- Oracle FLEXCUBE Direct
- Oracle Argus Mart
- Supply Chain
- Oracle Utilities Customer Care and Billing
- Oracle Argus Insight
- Oracle Utilities Work and Asset Management
- Retail Analytics
- Oracle Argus Safety
- Planning Non-RPAS
- Oracle Utilities Smart Grid Gateway
- Merch Suite
- Oracle Utilities Meter Data Management System
- Stores Suite
- ...

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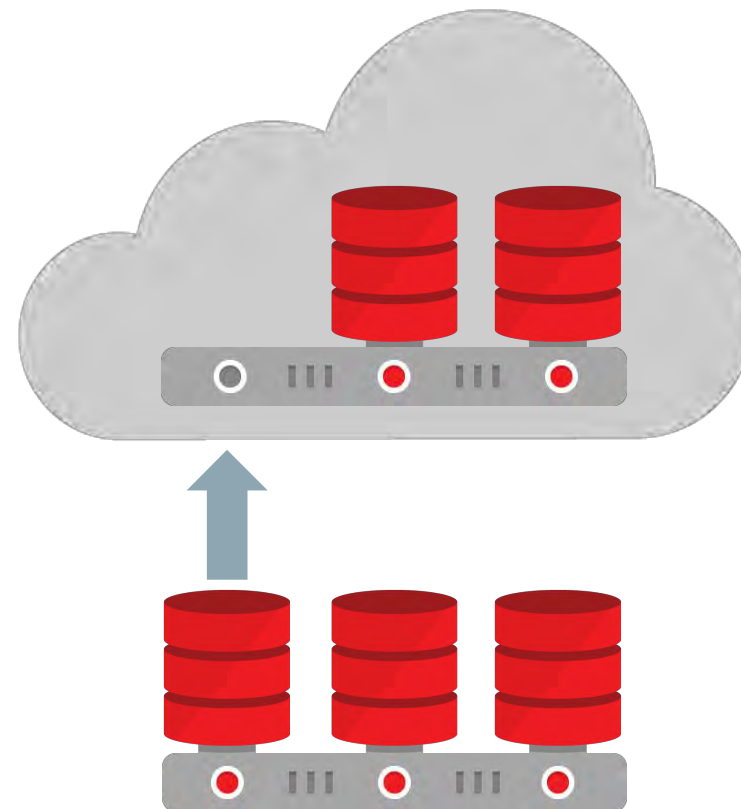
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[cloud.oracle.com/database](https://cloud.oracle.com/database)



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# Integrated Cloud

## Applications & Platform Services

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