OFFERING OVERVIEW

Oracle APEX Brings No Code and Low Code to the Oracle Database Ecosystem

One of the Best-Kept Secrets of the Oracle Technology Stack

Holger Mueller
Vice President and Principal Analyst

Copy Editor: Jim Donahue
Layout Editor: Aubrey Coggins

Produced exclusively for Constellation Research clients
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EXECUTIVE SUMMARY

This offering overview examines Oracle Application Express (APEX). This report identifies key differentiators, examines functional capabilities, considers the offering’s strengths and weaknesses, and provides use cases. Technology buyers should use this report to evaluate Oracle APEX for implementation of next-generation applications, especially when in a low-code/no-code situation.

The key differentiators of APEX are presented and reviewed regarding their benefits, uniqueness and differentiators in the low-code/no-code market. The report concludes with a set of recommendations for CxOs who are looking for an alternative to the traditional platform-as-a-service system.

Business Themes

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<th>Data to Decisions</th>
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ABOUT ORACLE APEX

Market Segment

Oracle APEX falls into the next-generation database market. It runs and operates solely in conjunction with the Oracle database and provides an important capability to Oracle database customers who are looking for low-code and no-code rapid programming options.

Target Markets

Oracle targets enterprises of all sizes and is keen to prove that data is better and more cheaply stored in its database than anywhere else. Oracle APEX is a low-code, high-productivity development tool that runs on top of the Oracle database. Oracle APEX is valuable to enterprises because it helps to bring this data to life in new applications. Potential customers must be open and ready to buy into the overall Oracle technology stack.

Functional Capabilities

Real-World Productivity

Getting code built, tested, deployed and maintained are the four basic tenets of developer productivity. Oracle APEX (see Figure 1) has primarily focused on the building and deployment aspects, providing support for three distinct developer personae, all on a single framework and platform:

1. **No code.** An APEX user can easily build code within the scope of forms, reports and charts, using a simple point-and-click user interface.

2. **Low code.** An APEX user experienced in SQL or PL/SQL can add business functionality to those forms, reports and charts, with little developer experience.

3. **Full code.** An APEX user with development skills can start coding, not just in SQL and PL/SQL but also in JavaScript, CSS, HTML, Oracle JET, SOAP and REST access, providing polyglot language support in Oracle APEX.
With that tiered approach, Oracle APEX gives its user a relatively low barrier of entry to getting productive on the platform. Experienced developers can bring their existing coding skills for the most popular languages or encapsulate their code assets that are running somewhere else via a SOAP or REST interface. All this leads to a high degree of productivity for Oracle APEX users, whether they use the platform from a no-code, low-code or full-code perspective.

**Powerful Components**

Nothing accelerates developer productivity more than components that can be used to assemble their applications. Oracle APEX includes the following components (see Figure 2):

- **Interactive grids.** An editable, interactive grid component allows developers to easily enable a spreadsheet-style user experience within a database system. The grid enables fixed headers, frozen columns, scroll pagination, multiple filters, sorting,
aggregations and many more things that make an application effective. Moreover, the grid can create master-detail views, which are a staple in applications that use a relational schema because they make one-to-many relationships easily available.

- **Oracle JET charts.** A picture says more than a thousand words, and chart components are popular with application developers. Oracle JET is fully HTML5 capable and supports bar, line, area, range, combination, scatter, bubble, polar, radar, pi, donut, funnel and stock charts.
• **User interface components.** Oracle APEX offers more microlevel components from which users can compose a complete user interface, such as cards and media lists. For instance, Theme Roller allows users to select their desired look and feel without the application developer having to create code to make the change happen.

• **Admin components.** Several administrative components are available with Oracle APEX—for instance, user administration, drop-down field management and user access rights.

Another key aspect of using components next to their features is their quality. Too often, developers find that powerful, desired components have a few defects, usually late in the development cycle of an application. It’s typically cumbersome to find fixes, remediation and workarounds for these defects, which can lead to the application’s rejection and a desperate search for a (hopefully) better replacement.

An advantage of Oracle APEX is that its components are well-proven, having been used extensively by Oracle customers for more than 13 years. Hundreds of thousands of applications have been built with these components, mostly infrastructure applications, but often in challenging multinational settings.

Finally, upgrading component libraries is often a risky and laborious undertaking, as component library providers tend to focus on the latest and greatest capabilities and not necessarily on upgradability for the installed base. Oracle APEX, on the other hand, makes it almost effortless for customers to upgrade components. Whenever customers upgrade their Oracle APEX platform, components also get upgraded, without developers having to make changes to the source code of their applications.

**Constellation’s POV:** Components are a significant success factor for productive application development as well as usability of the application itself. Components need to have the critical capabilities that the users of
the application expect, and that's the case with the Oracle APEX components. Easy upgrades are crucial for all applications, but especially ones built with no-code and low-code approaches because the professionals who have built them are often no longer available or have not used a tool like APEX for a long time.

**Oracle Database-Centric**
Technically speaking, Oracle APEX is a feature of the Oracle database that is architecturally integrated, if not part of the Oracle database. On the performance side, that means there is no network delay from an application server to a database server because all Oracle APEX code runs in the Oracle database. SQL requests coming from Oracle APEX are processed by the Oracle database with zero latency, as the Oracle APEX midtier is effectively a pass-through, solely serving as a proxy for browser requests directed toward the database. And Oracle APEX fits into the overall tool landscape by covering the “low-code” automation need, as well as tackling it from a SQL-PL/SQL or “data-first” perspective (see Figure 3).

**Figure 3. How Oracle APEX Fits into the Overall Oracle Development Tool and Language Landscape**

*Positioning of Oracle APEX with other Oracle App Dev offerings*
The advantage of this architecture also means that Oracle APEX applications can leverage and use all the capabilities of the Oracle database, from Real Application clusters, in memory, multitenancy, sharding and so forth, all the way to administration and monitoring capabilities provided by Oracle Enterprise Manager. Another key piece is the “living room” of any developer, the integrated development environment (IDE). Oracle’s APEX IDE (see Figure 4) is easy to use, utilizing common Oracle UX design patterns.

**Constellation's POV:** There are many advantages of native capabilities, and Oracle APEX shows them. APEX applications can scale just like a full-blown enterprise application running on the Oracle database. There are downsides to this tight integration, of course. An Oracle database is required, while access to third-party data sources is less elegant and comes with the common, usual performance penalty. But Oracle APEX was not intended to be a generic platform-as-a-service (PaaS) tool but, rather, a fast, productive application development environment.

![Figure 4. The Oracle APEX IDE](source: Oracle)
ANALYSIS AND OBSERVATIONS

Strengths and Weaknesses

Strengths
When enterprises evaluate or use Oracle APEX, Constellation expects them to experience the following strengths:

- **High productivity.** Enterprises need to develop a lot of software, and the faster they can develop it, the better. Oracle APEX components and overall developer experience reminds Constellation of a 1990s-style RAD (rapid application development) tool, only in the 21st century. Moreover, Oracle APEX allows users to build the highly desirable responsive applications with no detailed knowledge of HTML and CSS required.

- **Seamless Oracle database integration.** Performance is critical for next-generation applications, as CxOs know well. Because Oracle APEX sits natively on the Oracle database, it benefits from its scale, stability and performance.

- **Low-code/no-code benefits.** There are not enough developers in the world to build all the next-generation applications enterprises need to survive in the era of digital transformation. Enlisting and empowering reasonably technology-savvy business users in the software creation process will help to address this demand. Oracle APEX’s low-code and no-code capabilities cater to this need.

Weaknesses
Enterprises using Oracle APEX need to be aware of the capabilities and formative DNA of the product. When the nature of a next-generation application changes from a small-scale, low-code project (fewer than 10 developers) to a full-scale enterprise effort (more than 50 developers), the project demands may outgrow the APEX’s capabilities. CxOs need to be aware of the upper limits and demands of their projects.
Moreover, Oracle APEX runs only on the Oracle database. Should a next-generation application project require support for other databases or systems, Oracle APEX is not the right tool. Lastly, when it comes to sophisticated integration across multiple third-party systems, Oracle APEX is not the right tool.

**Competitive Positioning of Oracle**

Since 2012, Oracle has progressively unveiled its cloud offerings, leading to an end-to-end cloud strategy and product delivery. In 2015, Oracle’s cloud offerings came together in one integrated “chip-to-click” stack spanning from its SPARC CPUs to the mouse clicks of an application user. Oracle has an extensive portfolio of cloud applications but has been quickly enriching the feature set of its PaaS, and last year it rolled out a next-generation infrastructure as a service (IaaS).

**Competitive Positioning of Oracle APEX**

Building code has always been a cumbersome experience, requiring developers to learn about platforms, tools, algorithms and DevOps. With more software needed to power the world, the demand for developers is only going up. Constellation expects that the enterprise need for software will surpass the capacity available from traditional developers, and therefore sees low-code and no-code capabilities as crucial. This is the sweet spot for Oracle APEX.

It makes sense for Oracle to offer its database product aggressively across vertical industries and horizontal use cases. Existing customers are using the product already, and Oracle does not plan to abandon them, nor can it afford to. The main challenge going forward for Oracle will be to convert its many database customers who run its database on-premises to its database cloud service, as this will be key to protecting its market leadership in the cloud era. While the database service has been available for some time, the overhauled IaaS layer should help accelerate uptake. Now we need to see whether Oracle can convert the on-premises database load to the cloud. This development is key in order for Oracle
to protect its overall market leadership in the cloud era.

Oracle APEX started out in 2004 as HTML DB and then continuously grew out functional capabilities until today (see Figure 5).

In the low-code and no-code space, Oracle competes most prominently with Salesforce, Mendix and OutSystems. Oracle APEX is bundled with the Oracle database, so when an Oracle database has been procured and deployed and is supported, it’s relatively easy for APEX to be the development tool of choice. When it comes to code portability, however, Mendix and OutSystems are more competitive than Oracle. And for customer relationship management uses, Salesforce has an advantage. But overall, APEX struggles more with not being known to the Oracle user base rather than winning against competitors.

Many customers don’t realize the tool exists, is already paid for and is installed with their Oracle database implementations. One of APEX’s big advantages—tight integration with
the Oracle database—is also a reason not to use it when an enterprise wants to write code that can run on multiple platforms. (In fairness, that use case is outside of the foundational design spec of APEX).

Key Differentiators

Here are the key differentiators that Constellation sees for Oracle Application Express:

1. **Integrated with Oracle’s database.** APEX is natively integrated with the Oracle database, which makes APEX a tool that is everywhere where the Oracle database is—and that means millions of enterprise installations. The integration also makes APEX applications run very quickly.

2. **Low entry cost.** APEX as a tool is effectively free to build code with, as it is included in the Oracle database license and support payments.

3. **Ease of use.** APEX is simple and intuitive to use, with powerful components available to aid and jumpstart application development. Even professionals who have never built an application before state that APEX is easy and productive to use.

4. **Time to solution.** Building an application with APEX is a speedy process, with results possible in hours rather than days or weeks. That velocity makes APEX an attractive tool for professionals who have budget constraints or are tired of waiting for help from IT and want to take their application destiny into their own hands.

5. **Standards based.** APEX uses SQL, the leading data query standard, as its main programming language. This positions APEX as a viable tool for tens of millions of developers.
CONSTELLATION’S REQUIREMENTS

Seven Criteria for Next-Gen Database Function Success

Constellation has established seven key criteria that determine the success of a next-gen database and key capabilities such as Oracle APEX (see Figure 6):

- **Capability fit.** The wide range of capabilities of Oracle Database 12c makes it a good default enterprise database, and Oracle APEX runs wherever the Oracle database is available.

- **Know-how fit.** With millions of certified Oracle database administrators, enterprises will see little challenge finding people with the know-how to operate and administrate an Oracle database. From a programming perspective, the fact that Oracle supports both polyglot programming for new capabilities and SQL means there is a wide developer talent pool for building next-gen applications. Oracle APEX also addresses the needs of the non-technical developer community.

- **Deployment fit.** Databases need to match the overall technology stack of an enterprise. The Oracle database has a strong record of interoperability but likely will work best in combination with the rest of the

Figure 6. Seven Criteria for a Next-Gen Database

Source: Constellation Research
Oracle technology stack. Enterprises must consider their readiness to depend on the overall Oracle technology stack versus just the database. Should they leave the Oracle ecosystem, the Oracle APEX applications are unlikely to still be of much value.

- **Ecosystem.** Given the long market leadership of the Oracle database in the RDBMS market, enterprises can find a very rich, even the richest, database ecosystem—from personnel to complementary vendors and partners. Practically all traditional hardware vendors have a sales and design branch focused on the Oracle database. Plenty of global and local partners (Constellation counted more than 2,000) offer services. Notably, the Oracle database also runs on the IaaS offerings of Amazon Web Services and Microsoft Azure. All this helps create more places where an Oracle APEX-built application can run.

- **Global presence.** Given the long business life of Oracle, the vendor is present in all markets and countries globally. Products, training materials and documentation are translated into many languages. And Oracle keeps investing in global capabilities—take the current release of the Oracle database, 12c R2, which has added Unicode 7.0 support.

- **TCO.** Total cost of ownership is the core organizational DNA of Oracle, starting from the very idea of implementing a relational database. But Oracle is also aware of the value its products bring and charges a premium for them, so enterprises must be aware of the costs and make their own cost-benefit analysis. The good news for enterprises on the Oracle APEX front is that the product is free of charge as long as the enterprise has a valid Oracle database license.

- **Vendor fit.** Ultimately, it is people who make things work. People at the customer and the vendor need to collaborate effectively when designing database applications. Enterprises must make sure that they find a cultural fit with their vendor, and sometimes Oracle's aggressive culture can be a challenge for enterprises.
USE CASES

Application Use Cases

Oracle APEX is a generic application platform tool that runs in a browser and allows the creation of database-driven applications, mostly for business-to-business use cases.

The primary use cases for Oracle APEX are (see Figure 7):

1. **Database applications.** There are millions of Oracle database instances out there, and professionals can use Oracle APEX to create modern, user-friendly applications with their data. Oracle APEX also gives the option to make these applications available on mobile platforms, substantially extending the application's user base.

2. **Extend enterprise applications.** Enterprise applications are seldom perfect and enterprises want to extend them. Oracle
APEX provides a fast and efficient way to provide these extensions.

3. **Modernize legacy applications.** Oracle APEX gives application owners the ability to catapult their applications into the 21st century, with relatively little effort and little time required.

4. **Apps featuring SQL and Oracle database features.** Every day, people are using the Oracle database and looking for applications that allow a more efficient use of it. Oracle APEX addresses this use case very well.

**PRICING**

Oracle APEX is free for customers who have a valid Oracle database license and are paying for maintenance.

**RECOMMENDATIONS**

Constellation sees the following scenarios where to consider Oracle APEX, assuming the enterprise is an Oracle database customer:

- **Build modern applications.** There are millions of older Oracle applications that have been built using Oracle Forms and Oracle Reports. And while these Oracle products have their successor products as well, they have not been designed with low-code and no-code user requirements in mind. Oracle APEX is an alternative to lift these applications into a modern browser and the HTML5-based application experience.

- **Extend enterprise applications.** Most Oracle databases are found in enterprises because they run important and often mission-critical applications. Not all these applications have modern extension frameworks, and Oracle APEX can play a key role here.

- **An app for any Oracle database content.** There are many instances where an application could improve the usage, analysis and presentation of data. This is a scenario where Oracle APEX excels.
• **Sysadmin apps.** Many Oracle database tables exist because of system administration and technical reasons. And while system administrators are usually technically literate, they deserve better, more modern and often more mobile applications, too. Oracle APEX does well in this scenario, addressing the needs of small applications dealing with technical data.

• **Empower no-code and low-code users.** CIOs and CTOs often don't have enough developer capacity at their disposal to address all the coding needs that their enterprise has. Starting a no-code/low-code initiative can address the developer shortage, empowering technically-savvy end users to address their applications needs by themselves. Oracle APEX was intended to exactly support this use case.

Enterprises that are not using the Oracle database will probably not find value using APEX because the underlying database licensing costs could be punitively high. CxOs should compare RAD and end-user productivity across platforms and consider planned utilization as part of a full cost-benefit analysis that could make the Oracle database a viable option (and with that, Oracle APEX) again.
Holger Mueller

Vice President and Principal Analyst

Holger Mueller is vice president and principal analyst at Constellation Research, providing guidance for the fundamental enablers of the cloud, IaaS, PaaS, with forays up the tech stack into big data, analytics and SaaS. Holger provides strategy and counsel to key clients, including chief information officers (CIO), chief technology officers (CTO), chief product officers (CPO), investment analysts, venture capitalists, sell-side firms and technology buyers.

Prior to joining Constellation Research, Holger was VP of products for NorthgateArinso, a KKR company. He led the transformation of products to the cloud and laid the foundation for new business-process-as-a-service (BPaaS) capabilities. Previously, he was the chief application architect with SAP and was also VP of products for FICO. Before that, he worked for Oracle in various management functions—both on the application development (CRM, Fusion) and business development sides. Holger started his career with Kiefer & Veittinger, which he helped grow from a startup to Europe’s largest CRM vendor from 1995 onwards. Holger has a Diplom Kaufmann from University of Mannheim, with a focus on Information Science, Marketing, International Management and Chemical Technology. As a native European, Mueller speaks six languages.

@holgermu | www.constellationr.com/users/holger-mueller

www.linkedin.com/in/holgermueller/
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