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What is a Digital Twin (Again)?

The definition debate continues. The Digital Twin Consortium (DTC), the Industry IoT Consortium (IIC), the ISO SC 41 subcommittee, Gartner, and others each have their definition. Each one gets criticized as soon as proposed. Now that all the relevant concepts seem to have been expressed, discussing the exact wording may seem like a waste of time. Isn't it the case, as a U.S. Supreme Court justice once famously said about a term describing a certain type of movies, that "you can't define it, but you know it when you see it"?

To summarize, however, some of the points of contention are:

- -Can there be multiple, separate twins of a single physical entity, serving different purposes? Some definitions seem to imply that there is only one.
- Is an actuation function (where the digital twin sends commands to the physical twin) an explicit capability in the definition?

For more information

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Reminder: Issue 300 (November 16) will be the last one, as we announced in issue 295. The company will continue to provide consulting service to existing and selected new clients, and the KIT archive will remain online for the foreseeable future.

- If a definition refers to real-time synchronization between the twins, what does "real time" mean? It varies according to the requirements of the application or system.
- Some definitions (such as Gartner's) do not even refer to any synchronization, in which case does this really define a digital twin, or just a bunch of CAD and simulation models?

Just asking those questions, even without answering them, should make everyone think of what constitutes a useful digital twin for their particular use case -- and that may be good enough. Good use cases may be more useful to adopters than an agreed definition, and that's what the ISO/IEC 30172 standard aims to do.

→ Artificial Intelligence Regulations

Wikipedia is not always a trustworthy reference, but the page on [Regulation of Artificial Intelligence](#) provides a good overview of this area of concern, which is heating up as governments and watchdog agencies get concerned about the potential impact of AI in such sensitive areas as medical decisions, financial decisions, autonomous vehicle control, etc., combined with the lack of transparency of machine learning models. The page specifically describes the state of regulatory efforts in China, the European Union, the United Kingdom, and the United States. That list is bound to grow considerably over the rest of this decade, and may result in a patchwork of laws and rules that will make it hard for AI system suppliers to market their solutions on a global basis.

→ Safe and Secure Medical Software

Blackberry QNX is hosting two one-hour webinars on "how a reliable and flexible software foundation can dramatically decrease development and safety certification times." The first session is on Tuesday, Sep. 21, at 11:00 EDT (8:00 PDT, 15:00 UTC). Fair warning: this is going to be in part an infomercial for the company's development environment. [Register here](#).

→ CRM Options

Customer Relationship Management (CRM) is a key capability of any organization, perhaps only second to Enterprise Resource Planning (ERP) in a large enterprise, and even more important in a small company that may not have -- or need -- a bona fide ERP. It is also the poster child for Software as a Service (SaaS) because of the leading role Salesforce played in promoting that model, starting 22 years ago already. Since then, many competitors have emerged while the on-premises CRM market, once dominated by Siebel (acquired by Oracle), has essentially disappeared.

While those trends are clear, choosing a CRM is still not a simple task. You may not need to worry too much about data lock-in -- data can be exported as tables, and there are enough extract-transform-load (ETL) tools available to reload it into another system if needed -- but there is a hidden cost in integrating the CRM with other systems in order to avoid having multiple unconnected versions of customer data.

TechRepublic's paper entitled [How to Choose the Right CRM Software](#) is a misnomer: it does little to really help you choose. But it is a useful overview of the key functions and requirements of CRM software and of the prominent vendors that may be most suitable. Specifically:

- Key capabilities include contact and lead management (of course), marketing automation, and analytics and reporting. The paper lists cloud deployment as a feature, but that should really be a separate item, along with supported devices and integration APIs or web services.
- The sectors listed as imposing additional requirements are healthcare, financial services, real estate, and nonprofits. The retail sector is clearly missing.
- The typical benefits to large enterprises and to small-to-medium businesses (SMBs) are listed. Nothing new here.
- The systems mentioned across those categories are *Zoho*, *Insightly*, *Salesforce*, *Freshworks*, *Hubspot*, *Drip*, *Pipedrive* and *Vtiger* across all sectors; *Kareo* and *Athenahealth* for health care specifically; *iPipeline* and *Redtail* for financial services; *Propertybase* and *Juniper Square* for real estate; and finally, *Kindful* and *Salsa* for nonprofits. Finally, *Nimble* and *Less Annoying CRM* (!) are mentioned as particularly appropriate for SMBs, *SAP* and *Netsuite* for large enterprises.

Each of these 20 solutions comes with about 5 lines stating its key characteristics. You still have to do the work, as the author of the paper admits at the end while offering the skimpiest of methodology recommendations. But the background provided by the paper, which is generally well written (a compliment we do not often give), should be useful.

Cloud Market: Hot to Sizzling

Speaking of Salesforce's pioneering role, the cloud has come a long way since 1999. Grand View Research, [cited here by HLPNETSECURITY](#), expects the global cloud market to grow annually by almost 20% and to be worth \$1.25 *trillion* by 2028. The highest demand will come from small and medium enterprises that can basically use the cloud to get rid of almost all their IT infrastructure. As a result, the fastest-growing service type will be IaaS (infrastructure as a service). We suspect that the move toward remote work is helping this trend: if your people are accessing an enterprise system from home over the Internet, deploying and managing this system on premises offers no advantage anymore.

Seen Recently...

"It is OK to click on stuff, that's what it was designed for. It is ok to open attachments in email, that's what it was designed for. Stop making our inability to engineer secure things the users' problem."

-- Daniel Cuthbert ([@dcuthbert](#)), spotted by Thomas Fischer ([@FVT](#))

"My generation was called the baby boomers. The next one will be called the baby Zoomers."

-- Claude Baudoin