



# PUSHING THE BOUNDARIES OF POSSIBILITY IN ARCHITECTURE

A report on the future of real-time technology by  
**Epic Games** and **Forrester Consulting**

Image courtesy of Zaha Hadid Architects





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# Time to get real

The game-changing nature of real-time technology

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Epic Games has come a long way since we launched Unreal Tournament in the late 1990s—and the pace of change has not slowed. Today, Unreal Engine is used by thousands of people around the world to develop cutting-edge visualizations, not just in gaming but for business applications, too.

“We are working with architects, manufacturers, media and entertainment companies, and designers to transform their businesses through real-time technology. In fact, our research with CGarchitect has shown a dramatic increase in Unreal Engine use within architecture—52% of architects doing real-time production now use Unreal Engine, versus the 10.5% that did so a year ago.

“The opportunity is huge, so we’ve partnered with leading global analysts Forrester to explore where things might be heading—and how real-time technology is already being used to fuel creativity and drive efficiency.”

”

**Marc Petit,**  
General Manager, Unreal Engine Enterprise

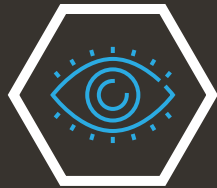


# What's in it for architects?



## CREATE ONCE, REUSE EVERYWHERE

Assets built in Unreal Engine can be used across stills, animation, and interactive experiences.




## EXPERIENCE DESIGN

Move from still images to driving the entire process through experiential design—the direct experience of design through immersive techniques.



## EXPLORE THE 'WHAT IFS'

Whether it's the choice of materials, or how the sun strikes a shape and creates shadows, interactive real-time technology enables better creative decision-making.



84%  
OF ARCHITECTS

agree that visualization is important to reduce design errors before structures are built.

# A market view from Forrester Consulting<sup>1</sup>

The pace of change continues to accelerate. Over the last few years, real-time rendering solutions have emerged as a vital solution helping to overcome the complexity, sophistication, and demand of enterprise workloads.

Significant innovation in interactive graphics software has been fundamental to this change. These advances are bringing about a new age of visualization, where game engine technology is being used to produce photorealistic virtual experiences prior to execution of designs.

Today's designers and visualization specialists are moving away from slower, iterative, traditional offline methods of rendering in favor of adopting real-time workflows. The result has been a game changer for many industries, enabling companies to overcome complexities, driving efficiency, and boosting creative choices.

<sup>1</sup>Taken from the Forrester Consulting study "Real-time rendering solutions: unlocking the power of now", commissioned by Epic Games

## What is real-time rendering?

The ability to produce visualizations such as animation, designs, or graphics instantly. That means making tweaks to a design and seeing the results immediately—without having to wait for rendering time.

**59%**

of decision makers say they are likely to adopt real-time technology within the next 12 months.

**69%**

The growth and complexity of computing workloads means more computing power is needed to get their jobs done.

**83%**

of firms are saving at least 25% of time compared to previous processes.

**65%**

Due to the hypercompetitive market, the need to reduce the time taken to create high-fidelity rendered images/animations is greater than ever before.



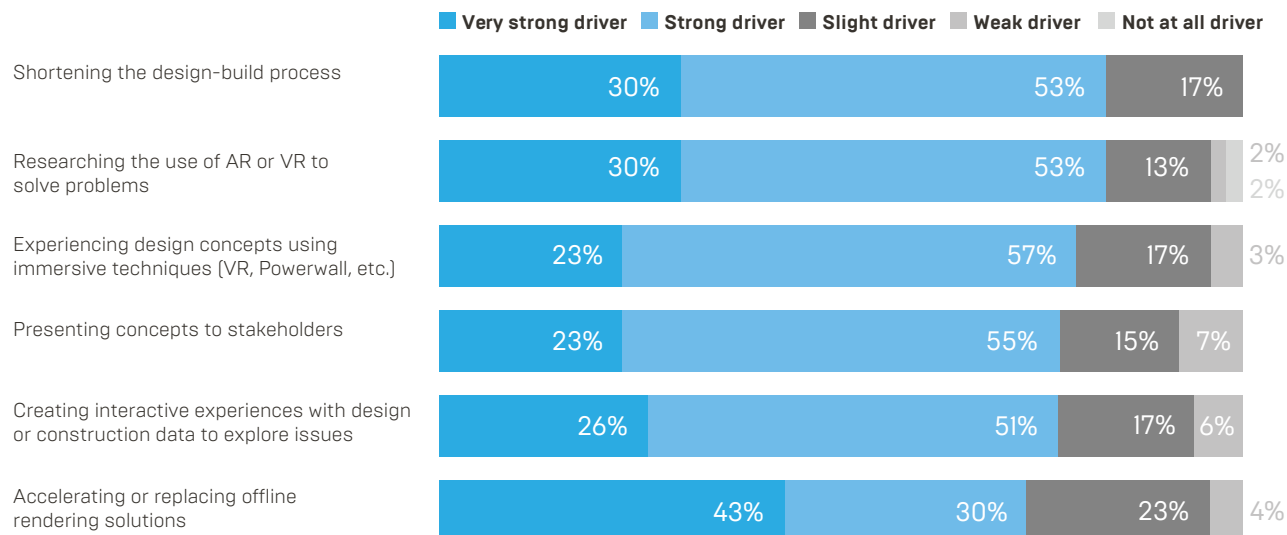


Image courtesy of EnTRE+ architects

# The opportunity in architecture

Architects are increasingly using 3D modeling tools to bring designs to life, long before physical materials get involved. Now, real-time engines are becoming integrated into the architectural visualization stage for the broader benefits the technology brings. Forrester's research found that the need for real-time rendering solutions is driven by the need to visualize big data, as well as the growth in complexity of workloads. For architecture firms specifically, 84% of respondents believe that visualization is important to reduce design errors before structures are built.

How interested would you be in using real-time rendering technology for each of the following scenarios?





# How Zaha Hadid Architects is disrupting the industry with real-time technology

Image courtesy of Zaha Hadid Architects

Zaha Hadid Architects (ZHA) is developing transformational projects across six continents. Based in London for 40 years, ZHA has redefined architecture for the 21st century with a repertoire of projects that have captured imaginations—receiving the highest honors from civic, professional, and academic institutions worldwide.

ZHA is one of the world's most consistently inventive architectural studios. Its hugely talented and dedicated teams of experienced professionals work with passion and commitment to honor visionary architect Zaha Hadid's legacy and deliver outstanding projects across the globe.

Here, Helmut Kinzler, senior associate and head of VR, discusses the work he's leading in building real-time technology into the company's workflow—creating virtual environments for clients and colleagues to explore throughout the decision-making process.

"If I look at the work I was doing 20 years ago, I was operating a physical model workshop where we were using resin models. How times have changed.

"Zaha Hadid Architects recognized that, when the digital age was upon us, we needed to understand it and explore the benefits of new technologies. Now, we have our own coding team—and when I look around the office I can see my colleagues moving around and building entirely within VR environments.

"Our focus is on bringing real-world considerations into VR. We want our architects to be able to immediately create a model, which can then influence their thought processes.

**"The ability to create in real time is fantastic for creativity,**

as right away we can see the impact our designs will have on the space around us.

"This real-time aspect also accelerates the decision-making process. Architecture happens before physics and materials get involved; there is a cultural context you want clients to communicate to you. Whilst we want to express ourselves as creatives, we need to respect others' needs and thoughts. Individuality is part of our ethos and real-time enables this.



**“The ability to develop interiors for aesthetic interfacing—all within a VR environment—means we can process clients’ changes quicker.** We can present our ideas to a client and they provide their feedback in real time. Having a live discussion about it makes the design stage far more collaborative.

“There are broader business benefits from working in VR and real-time, too. The nature of our work means our teams are travelling globally, but by collaborating within VR environments we can work with anyone around the world within a Zaha Hadid brand space. We just need two VR headsets to connect with clients in an instant.

“If I can save two days’ travel on a work trip, there are also huge environmental and economical benefits. Plus, you save money in translation. You can’t argue with a picture that’s right in front of you—there are no language barriers in images.

“In the office, we’ve configured Oculus Rift headset stations for our design team to work. These are used to build clay models, discuss and evaluate designs, and to showcase designs during meetings. We’ve done around 100 presentations in mobile stereoscopic for things like pitches and evaluations.

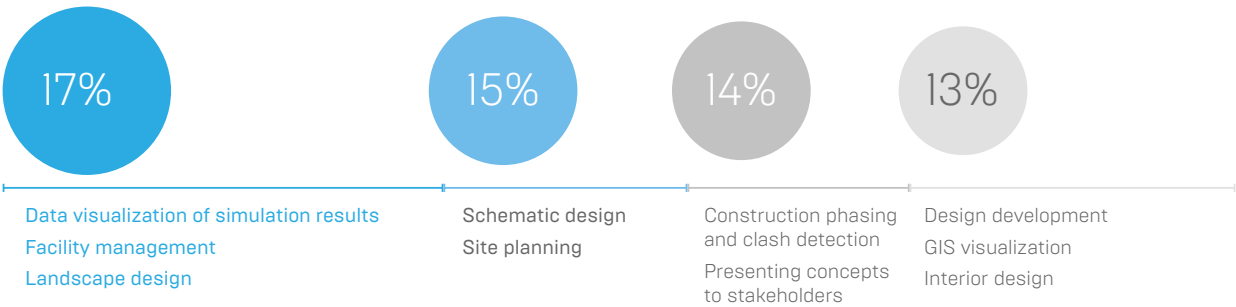
“It’s been an educational step adopting VR—we want our architects using and understanding it by habit. While a plan drawing has valuable instruction, VR offers aspects we can add to complement the design discussion. **We’re in a better, experiential design age, and we want our architects to build in this new infrastructure.”**

## Zaha Hadid Architects in numbers

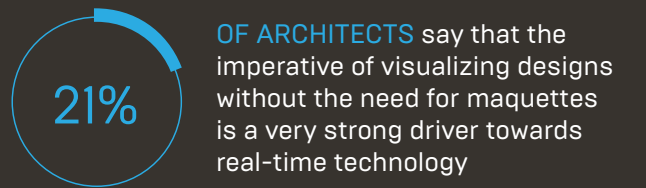
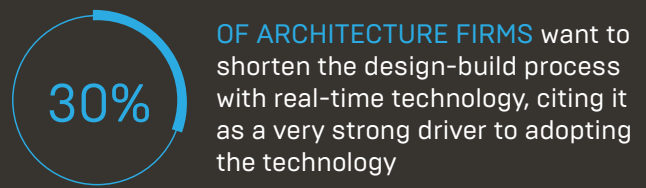
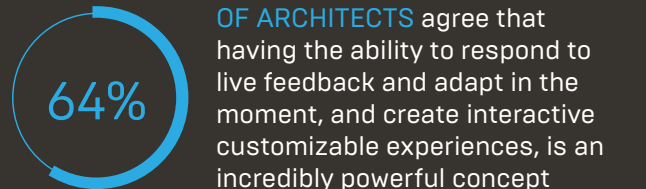
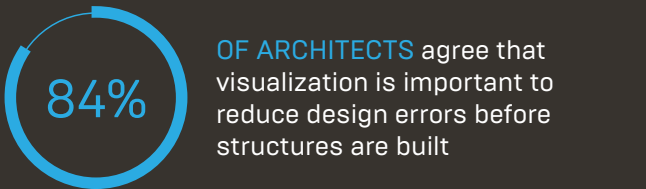
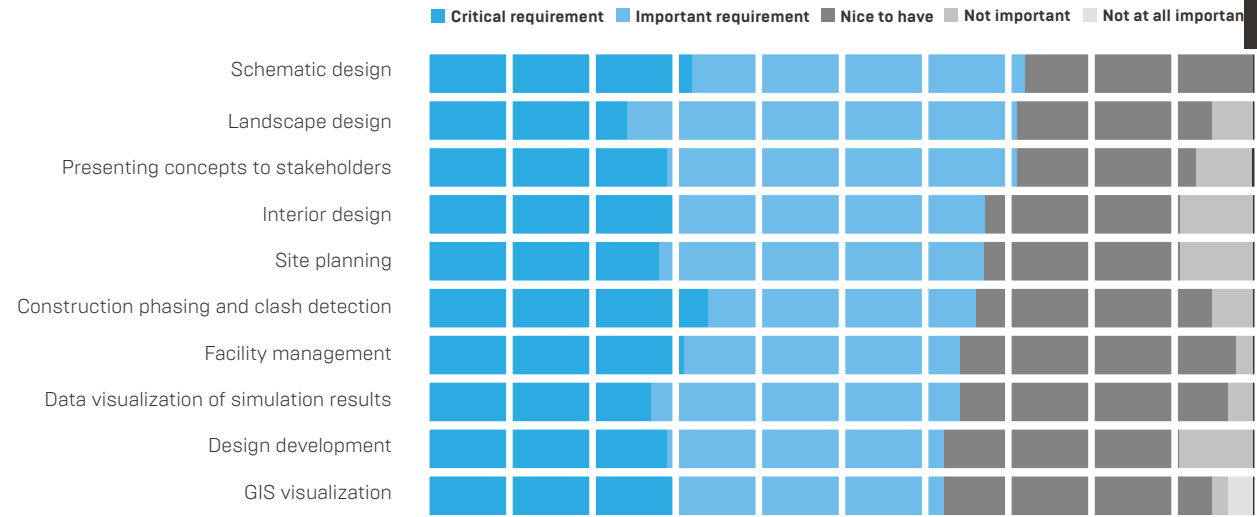
100	internal presentations delivered in VR
300+	architects working on transformative cultural, corporate, and residential spaces
950	projects
44	countries

# The future of visualization in architecture

Architecture firms currently use real-time rendering for:



The areas where real-time technology is most important for architects:









# Introducing Unreal Engine

A comprehensive real-time  
visualization solution

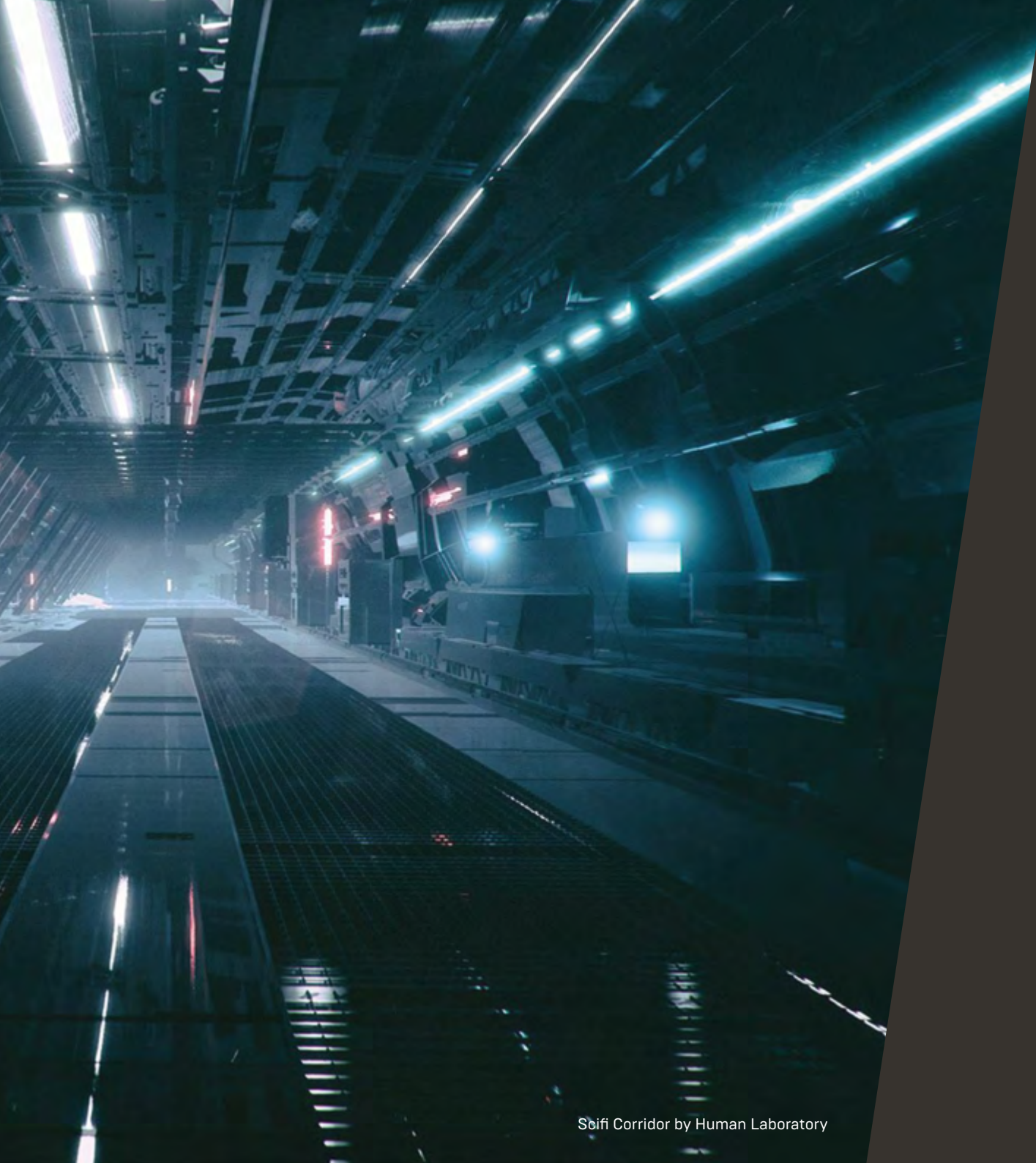
Created by Epic Games, Unreal Engine is the world's most open and advanced real-time 3D creation platform. While it continues to serve its original purpose as a state-of-the-art game engine, it has evolved to serve additional industries including architecture, automotive and transportation, film and television, broadcast and live events, and training and simulation.

One such evolution is Datasmith, a workflow toolkit included with Unreal Engine that simplifies the import, preparation, and aggregation of CAD, BIM, and 3ds Max data, drastically reducing iteration time for creating stunning architectural visualizations and immersive experiences.

**Find out more and sign up for free at**  
**[www.unrealengine.com](http://www.unrealengine.com)**







**“With Datasmith, I can literally do the same thing I did in four weeks in one day, and that is magic.”**

**Carlos Cristerna,**  
Visualization Director, Neoscape

**“Datasmith’s biggest advantage is its ability to bring in objects, add lightmap UVs, and generate working materials with minimal cleanup. This has cut our time by around 60%. Datasmith is definitely proving to be a game changer.”**

**Austin Reed,**  
3D Visualization Team Lead, HNTB Corporation





A modern dining area with a wooden table, black chairs, and large windows overlooking a forest. The room has a warm, natural aesthetic with light wood flooring and walls. Sunlight streams in through the windows, creating a bright and airy atmosphere. A white text box is overlaid on the right side of the image.

## Research methodology

These findings are drawn from a study conducted by Forrester Consulting on behalf of Epic Games in 2018.

The study involved an online survey of 168 key decision makers with a knowledge of real-time engine technology across key industries including media and entertainment, manufacturing, and architecture in the USA and UK. The findings provide a nationally representative view of the adoption of real-time technology in these markets.





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