## CALIFORNIA ACADEMY OF SCIENCES

The California Academy of Sciences is one of the largest museums of natural history in the world. It was founded in 1853 as a learning center, and carries out original research and finds out innovative, technological ways to exhibit and educate. At the center of the facility is the Morrison Planetarium, which features the world's largest, completely digital planetarium dome. Inside, six 4K projectors are complimented by a 13.1 surround sound system, offering viewers a fully immersive, 180 degree experience (see photo on page 30).

"Our visualization studio produces content for the entire museum, but the most challenging is for our planetarium," says Michael Garza, senior planetarium & production engineering manager, California Academy of Sciences. "We created an immersive experience that takes six 4K projectors, stitches and blends them across the entire 180-degree screen."

The Cal Academy is primarily a UNIX centric house — every artist has two work stations — both LINUX and Mac. They use Maya, Houdini, Nuke, Clarise and other software tools commonly found in Hollywood studios to create CG elements used in combination with 3D photogrammetry. For instance, visitors will find eel and fish that are entirely CG elements and coral that is photogrammetry, resulting in real images projected on to 3D geometry. With all of this content, Cal Academy ends up producing around six times more storage.

"Making immersive content requires an enormous amount of bandwidth," says Garza. "We find it's very challenging to give the artists the ability to preview this content in a way that gives them the look and quality that they need to make their creative decisions."
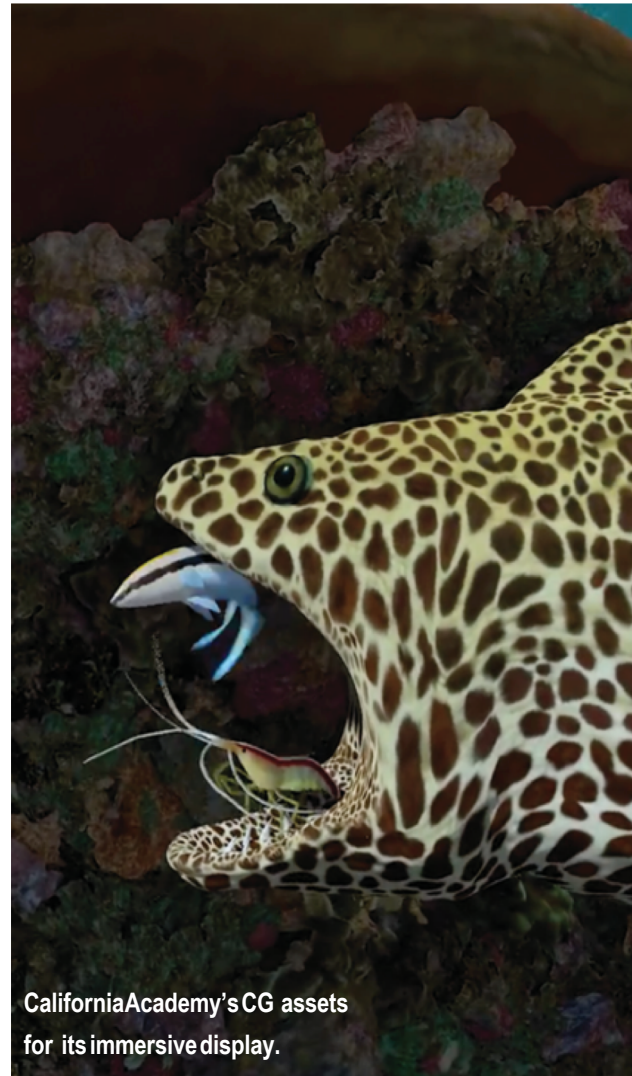


California Academy's CG assets for its immersive display.

Garza continues that, "working with high dynamic range content like OpenEXR really balloons the content. We built a high-performance foundation that allows us to work with this massive amount of media. Panasas (https://www.panasas.com) is our core storage. We rely on it for our large planetarium shows and large productions. We also rely on it for its performance and reliability. It's the backbone of everything we do at the planetarium."

The Cal Academy needs to run 24/7 and expects whatever their artists are able to put in the render queue will be done by the next morning so they can watch their content.

"There's no doubt that the variety of storage vendors we tried in the past have not been able to live up to the demands we put at them," adds Garza. "Panasas has consistently been able to give us the performance and reliability that we need for our productions." **P**



**A 180-degree experience at Cal Academy.**