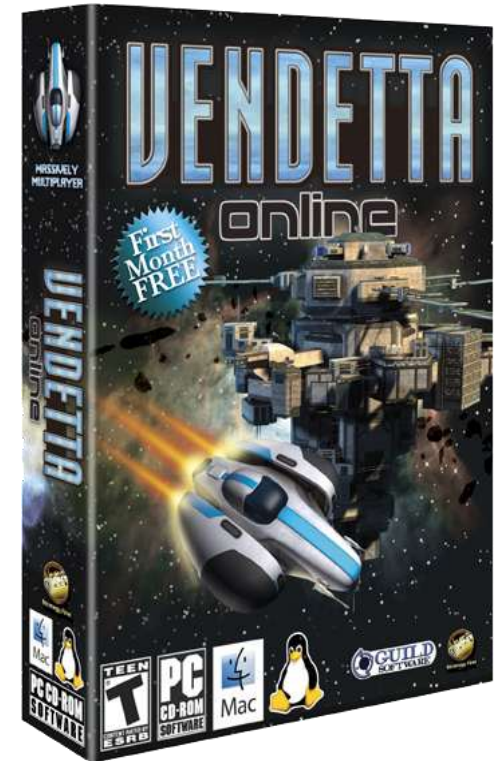


**The evolution of *Vendetta Online*
For mobile **Virtual Reality**.**

What is *Vendetta Online*?

- Cross platform Space MMO, running for many years.
- PC-first design, ported to mobile. Lots of text!
- Completely custom engine and renderer.
- First MMO to support the Oculus Rift (PC), in July of 2013.



Challenges of Mobile VR

1. **Framerate is *critical!*** Constant Fight of Performance vs Power and Heat. **Aim to be consistent.**
2. Completely different and unique user experience. Easy to upset new VR users.
3. Minimal controls: Game had to be Gear VR playable, *without* a game controller.

Challenge #1 – Framerate

- Be sure to set CPU/GPU throttling. CPU:3 and GPU:2 is a good starting point.
- Draw call overhead, state switching tends to be the biggest killer.
- Instancing and imposters can help reduce draw calls.
- Stereo-instanced clipping is tough in ES3, may be possible with geometry shader.
- Thread your CPU-intensive workloads.



Challenge #2 – VR Game Design

- Design for “VR First!” not “VR Also”.
- Avoid Rollercoasters: Expect every new user is having their *first* VR experience.
- Reading Sucks in VR: Aim for voiceovers, simplify when possible.
- Enhance the most useful visual details.



Challenge #3 – VR User Interface

- Limited controls on GearVR-only:
 - Swipe, Tap, Double-Tap, Long-Press, Back.
 - Touchpad is *relative*, not absolute. Ugh.
 - No Multi-Touch input.
 - Head orientation, possible motion-based controls?
- Don't force the user to turn their head too much for critical UI information.



In Conclusion

- Mobile VR is a challenge, but a stunning experience if you optimize use of resources.
- Engine site: <http://www.naos-engine.com>
- Game site: <http://www.vendetta-online.com>
- My email address: john@guildsoftware.com

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