Distributed Unity Applications: Evaluation of Approaches

**Approaches**

- **Virtual Scene**: Virtual objects are sprites of the same size and different color. Virtual objects rotate around Y-axis.
- **Partial Frustum**: Virtual objects are sprites of the same size and different color. Virtual objects rotate around Y-axis.
- **Selective synchronization**: tests objects against each frustum.
- **Low integrity level**: Low network overhead.
- **High overhead on the manager**: Depends on number of virtual objects and number of application instances.
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**Evaluation Scenarios**

- **Static**: Virtual objects are static and not synchronized. All virtual objects lay within the mutual frustum.
- **Dynamic**: Virtual objects are dynamic and synchronized. They rotate around their local Y-axis. Only a subset of all objects lay within the mutual frustum.
- **Multiple Lights**: One directional light at random position. The light casts shadows.

**Evaluation Hardware Setup**

The evaluation was performed using a large curved tiled display wall comprising 35 LCD displays, ordered through a seven (column) by five (row) grid. Each of the columns has a relative angle difference of 30 degrees along the Y-axis to adjacent columns, as such creating a slight curvature. The LCD displays are 46" panels with a 1080p resolution, resulting in a total of 72 megapixels. The installation is driven by a cluster of three PCs, each equipped with three GeForce GTX 780 Ti, providing a total of twelve outputs per PC.

**Results**

- **Standard**: One directional light at random position. The light casts no shadows.
- **Shadow**: One directional light at random position. The light casts shadows.
- **Multiple Lights**: One directional light and eight-point lights at random position. Neither of them casts shadows.

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