Collaborative Visualization with ParaView

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Introduction

- ParaView is a widely used visualization application
  - Cluster-based rendering
  - Remote data server
- As visualization workflows often involve visualization experts and domain science experts, there’s a strong use case for shared visualization
**Strategies**

- **Server -> Many Clients**

  ![Diagram showing server connected to multiple clients]

- **Server -> Client -> Many Clients**

  ![Diagram showing server connected to client, which then connects to multiple clients]

Communication External to ParaView
**Chosen Approach**

- Server -> Client -> Many Clients

- Insert video tap in rendering pipeline

- Leaves client/render cluster/data server structure intact
ParaView Streaming

- Update buffer on ParaView render
- Stream buffer as h261as
- VPMedia has much wider applicability
  - Used in VPCScreen
  - Can be easily integrated with other applications
**ParaView Streaming Plugin**

- Brings ParaView streaming to users of stock ParaView executables
- ParaView loads plugin at startup, adding toolbar buttons for control
- Available for ParaView 3.2, all platforms
Workflow - ParaView Streaming Plugin

- Agree on multicast address
- Establish correct version of vic at remote clients
- Coordinate launch of ParaView to send stream and vic(s) to receive
**Venue Client Plugin**

- Plugin support new in AG3.1 (Rhys again)
- Adds button to VenueClient toolbar
- When started, launches ParaView, loads ParaView Streaming Plugin, and begins streaming ParaView to the current AG Venue
Workflow - Venue Client Plugin

- Open ParaView from AG Venue Client toolbar
- Done
  - All coordination of addresses and installation of tools comes via AG, including bridging if necessary
User running ParaView with Streaming Plugin

Users running vic to display incoming visualization stream
Challenges

- No challenges with VPC/VPMedia
- Creating plugins for official ParaView releases
  - Strict library version matching required between ParaView, Qt, and plugin
  - Difficulty compounded by multiple platforms
  - Re-do with each version upgrade
  - Should improve somewhat now that Qt has been open sourced
Future Work

- Interaction
  - Customize vic to receive mouse interaction and direct to backend rendering?
    - *We’ve done this before (Shared Radiology)*
- Preserve application state in Venue
  - Model
  - Transformation
  - Display
References

- ParaView
  - paraview.org
- VPMedia
  - lives in trac.agcentral.org, migrating to UChicago SVN
- Shared Radiology
- ParaView Streaming Plugin
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