# Composure X

## Realtime Compositing Workflow




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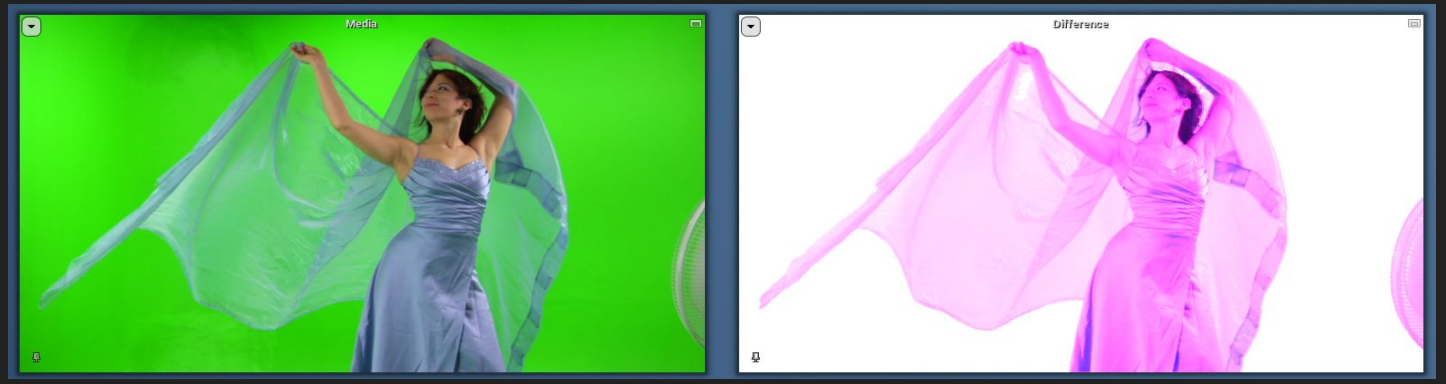
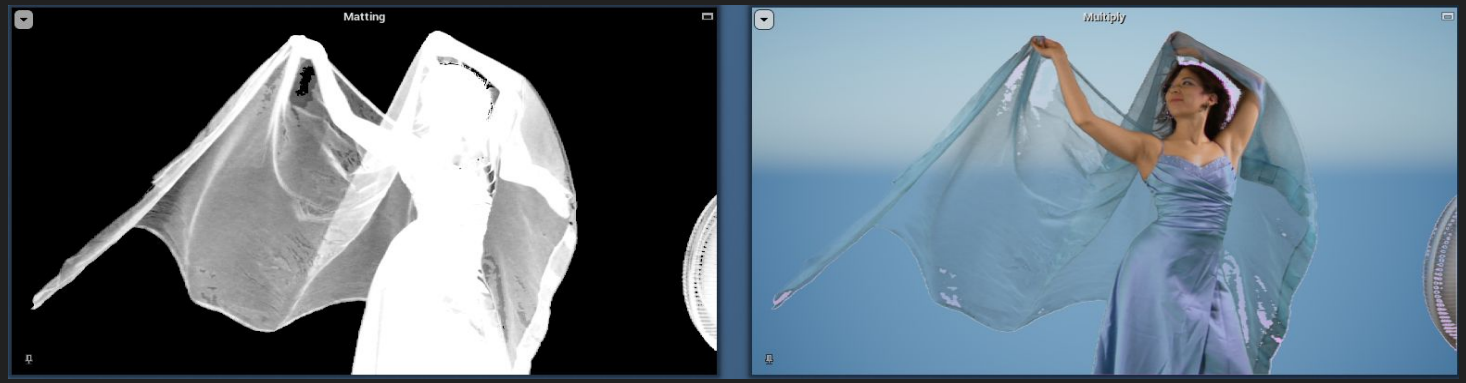
# Building real-time compositing tools?

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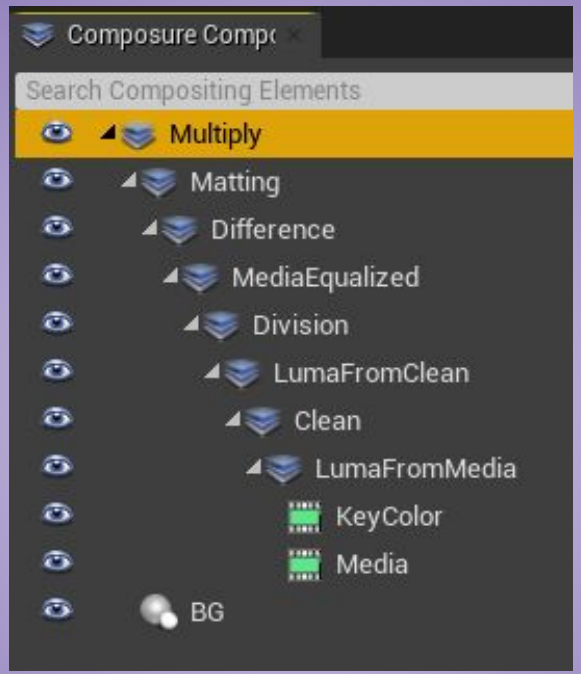
# Building real-time compositing tools?

- Composure: Layers and Passes
- Multi Layer Passes
- CX Workflow
- CX Samples

# Layers or Passes?

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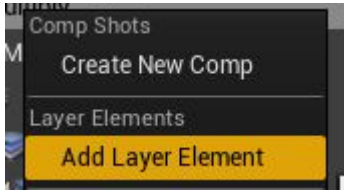
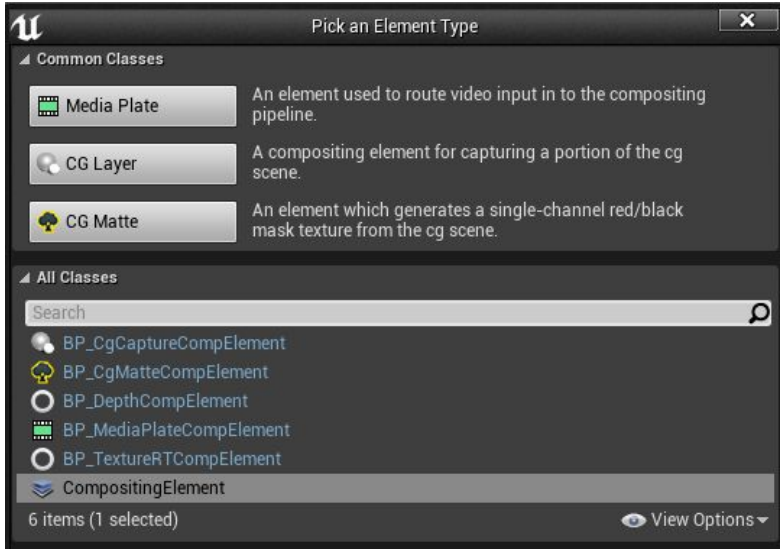
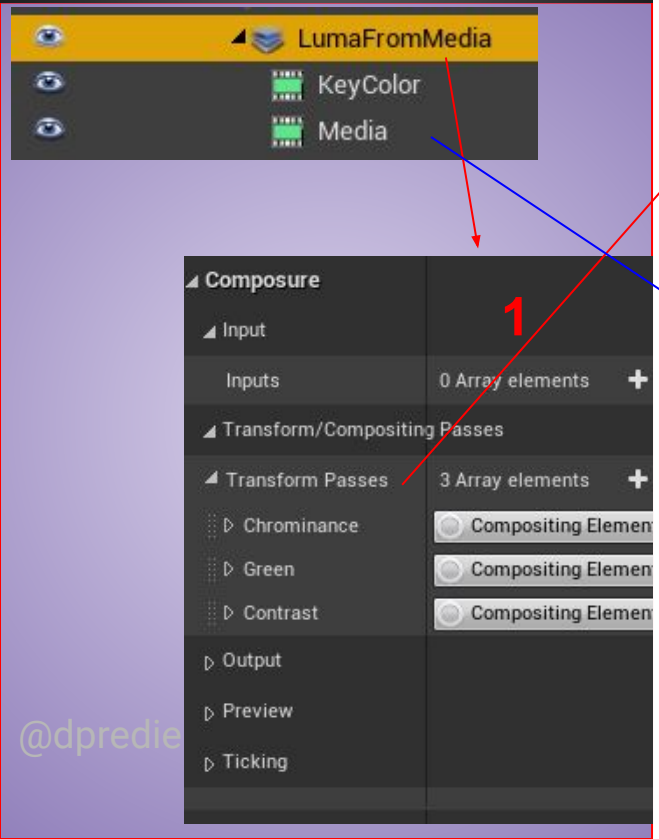
# Layers:

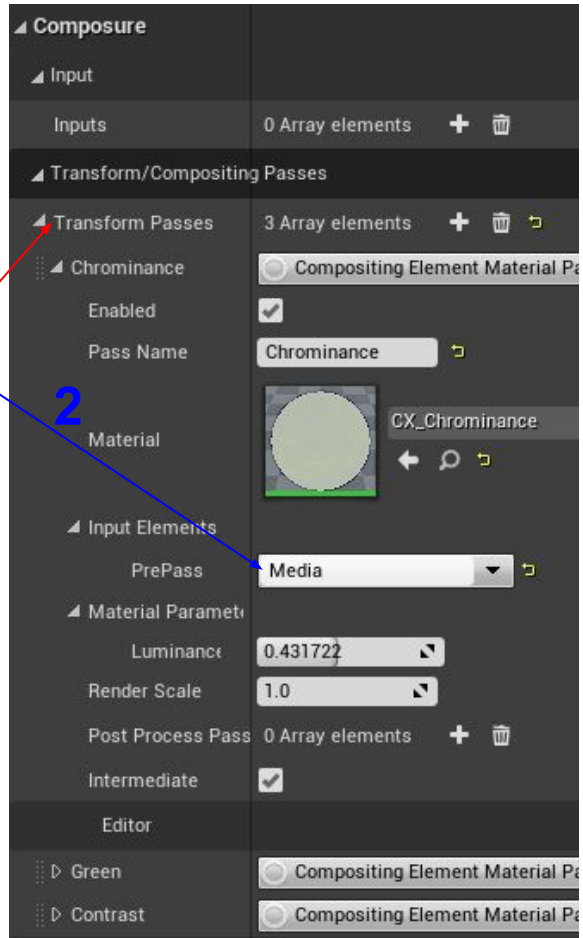


# Layers or Passes?

# Passes:



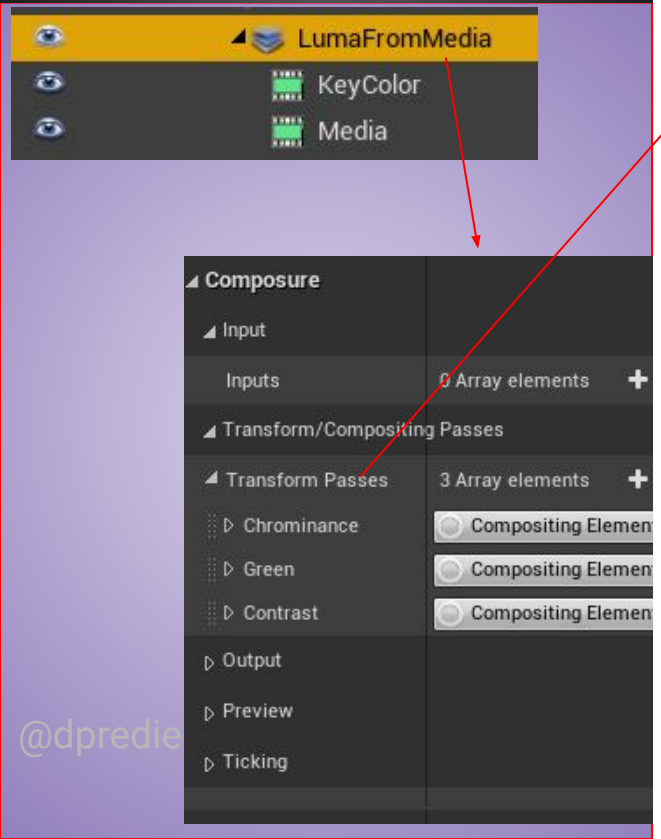



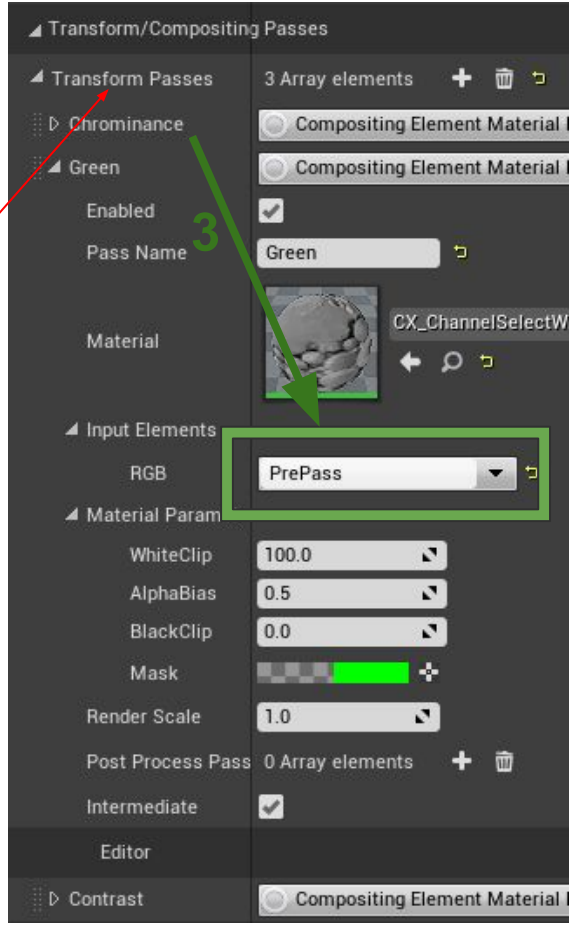

1. **Each Layer can have multiple passes**

2. **Each Pass can access result of any child Layers ( but not passes inside it)**

# Layers or Passes?

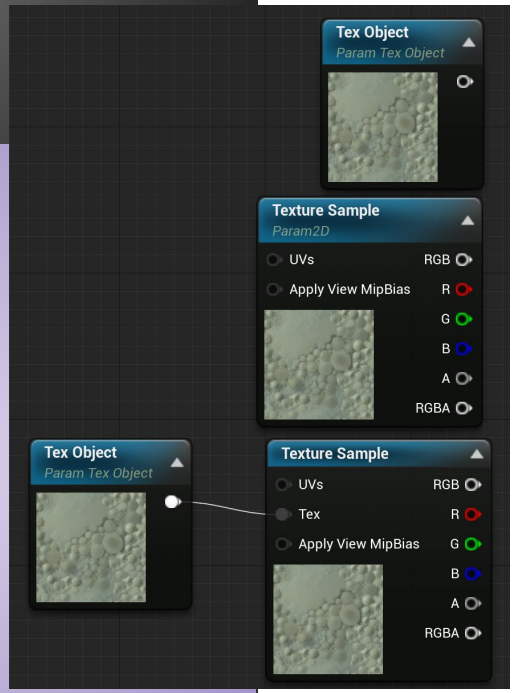
# Passes:




1. **Each Layer can have multiple passes**
2. **Each Pass can access result of any child Layers ( but not passes inside it)**
3. **Each Pass can access result of 1 pass preceding it**

# Why Build Multi Layers?




**Tex Object:**
Full Texture information ( can loop/access neighboring pixel)

**Texture Sample:**
single pixel's color ( cannot access neigboring pixel for manipulation)

You can generate Sample from Tex Obj, but you cannot make Tex Obj from a sample in single Blueprint.

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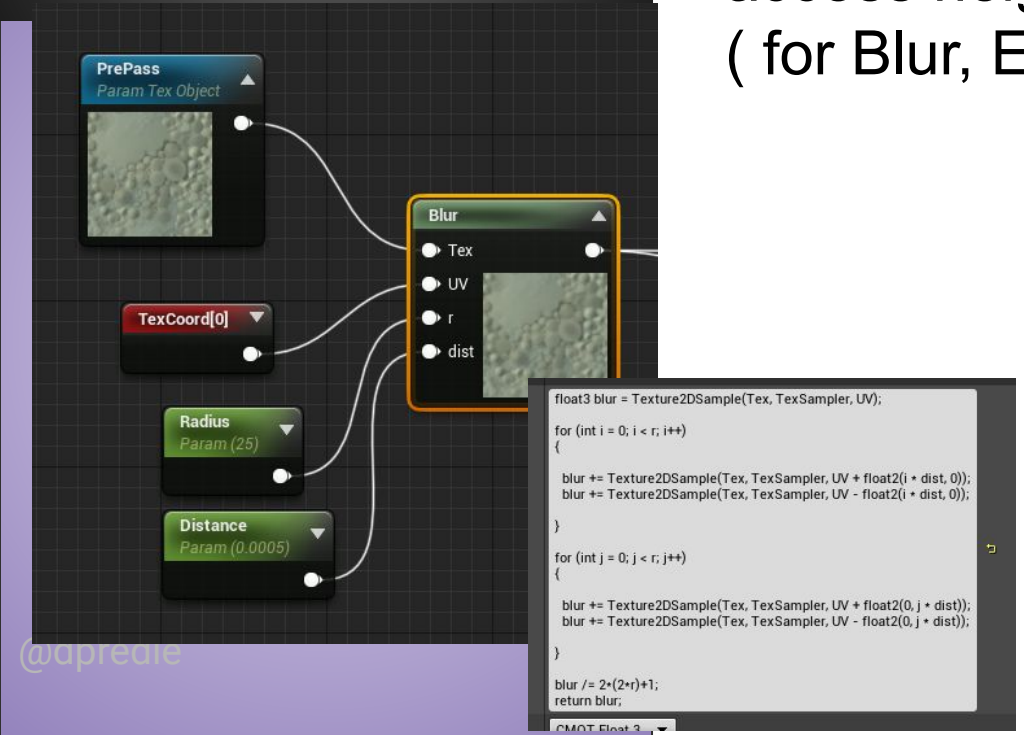
# Why Build Multi Layers?

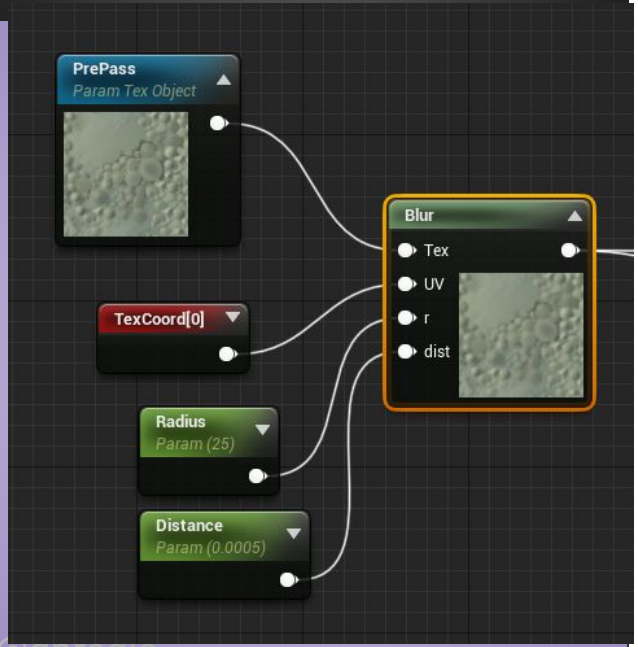
# Tex Object

With Tex Object Parameter you can access neighboring pixel for manipulation ( for Blur, Erode, etc).

result of these mathematical nodes are Texture Sample, so you cannot perform multiple Tex Object manipulation in 1 Material BP



# Why Build Multi Layers?

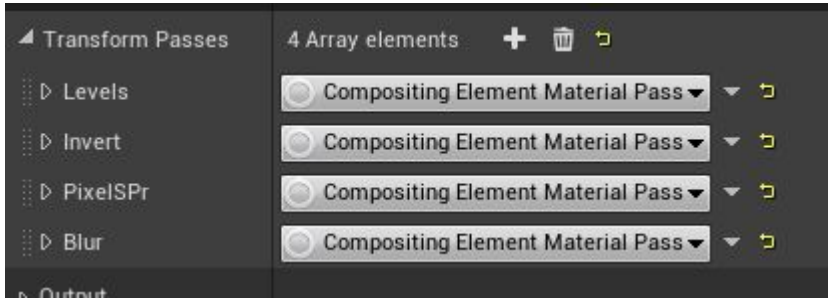





# Tex Object

For compositing workflow you need to do multiple manipulation passes ( preblur → Erode → blur, etc), which is not possible within single BP

as each Layer/Pass will output another Tex Object available for the next Layer/Pass to manipulate



# Why Build Multi Layers?

# Tex Object


… and so on

# Why Build Multi Layers?

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# Concerns on Performance

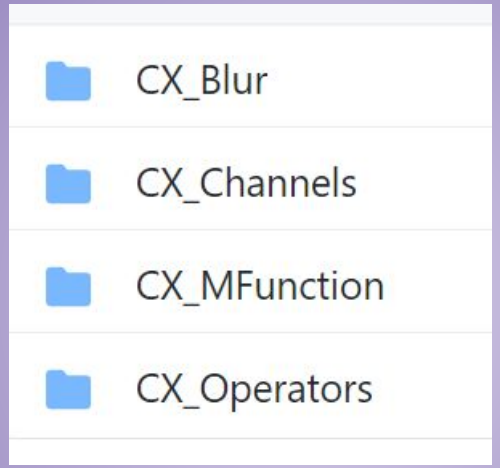
This workflow is best for **prototyping** the keyer/compositor

you have instant feedback on the layers and can go back to enable/disable each layer/passes

Once finalized, *you can build the compositor in fewer materials to optimize performance* ( fewer renders to Tex Obj)

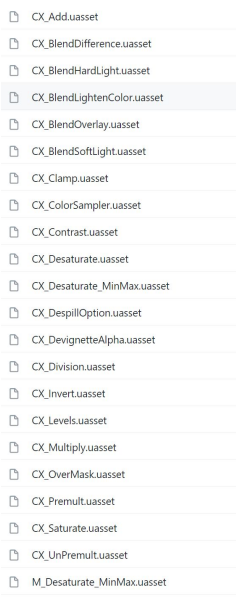
# Compositing in Composure

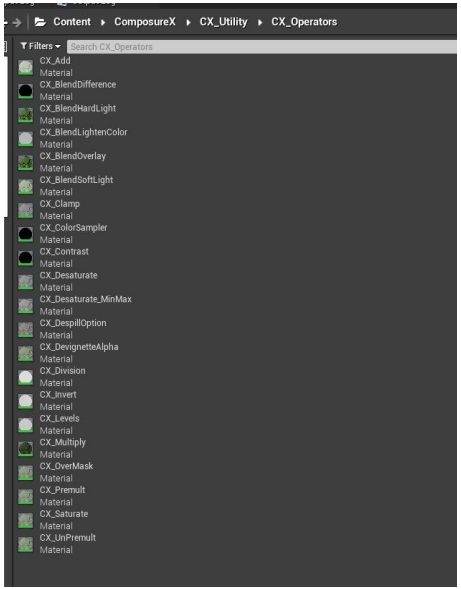
# CX - Workflow




https://github.com/dpredie/ComposureX

Copy Paste Content/ComposureX folder to Windows Explorer UE Project Content/

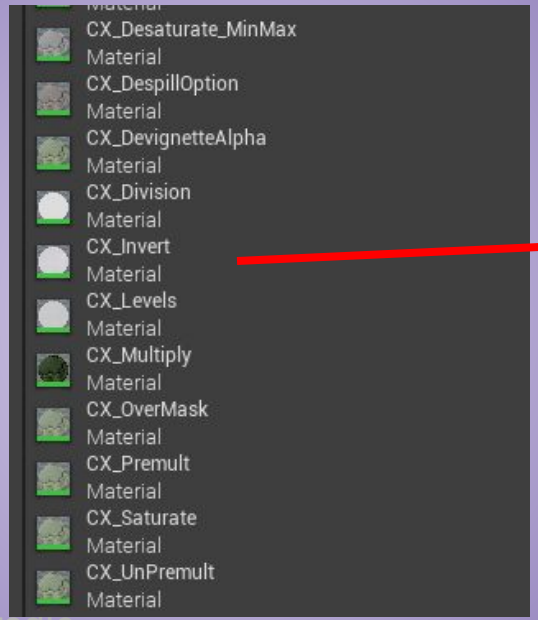


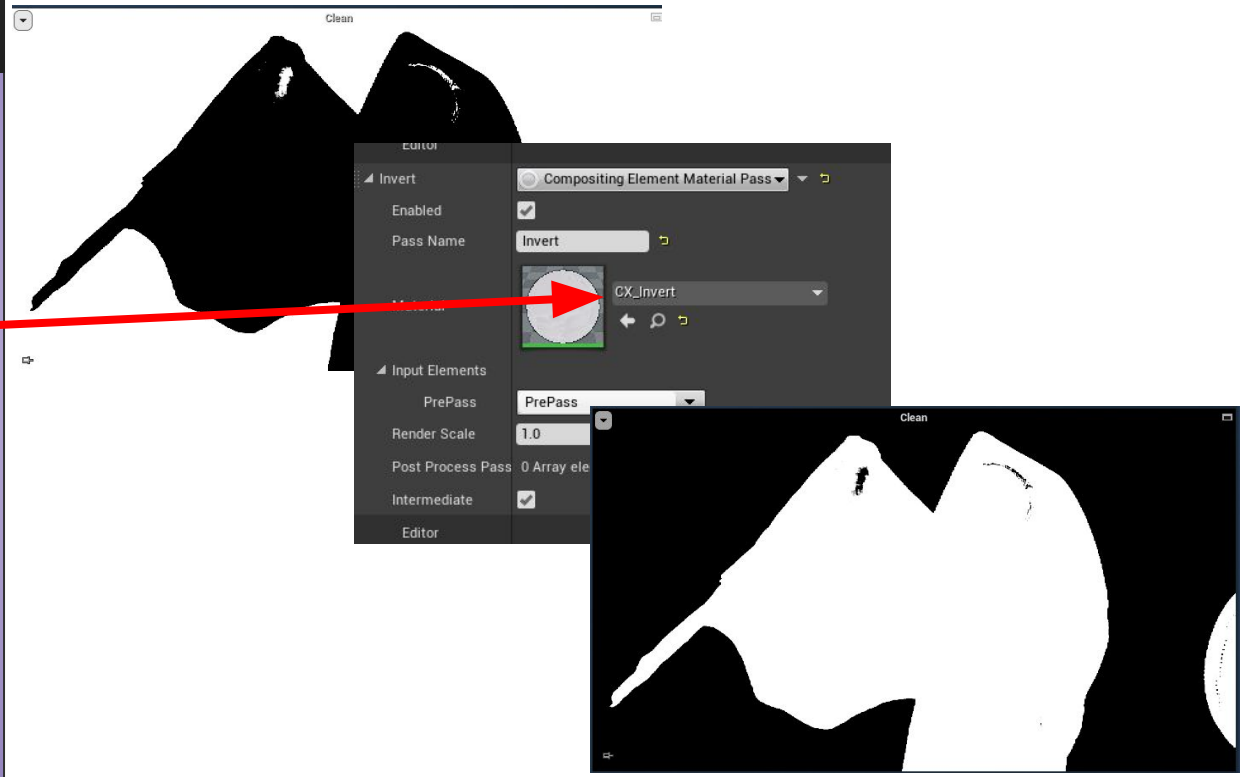



# Compositing in Composure

# CX - Utilities

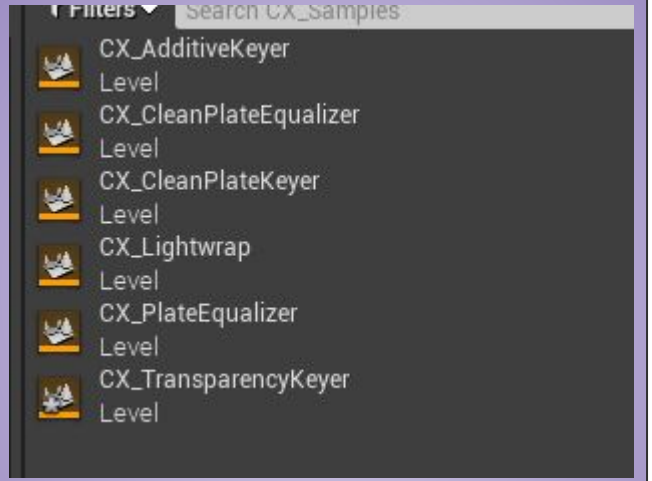
Each CX Utilities can be used in Composure Layers/Passes as Materials similar to offline compositor nodes



# Compositing in Composure

# CX - Samples




Included Samples:

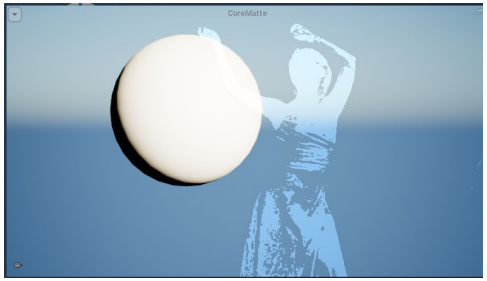
1. Additive Keyer
2. Screen Equalizers
   a. Clean Plate Equalizer ( if Clean Plate image is provided)
   b. Plate Equalizer ( Clean Plate estimated )
3. Clean Plate Keyer
4. Transparency Keyer ( based on 2.b)
5. Lightwrap

# Compositing in Composure

# CX - Additive Keyer


Keying without Alpha Channel, also known as Straight Dry Key/Despill Based Keyer







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# Compositing in Composure

# CX - Clean Plate Equalizer

1. Provide Clean Plate Image & Equalize uneven background ( Luma Based )


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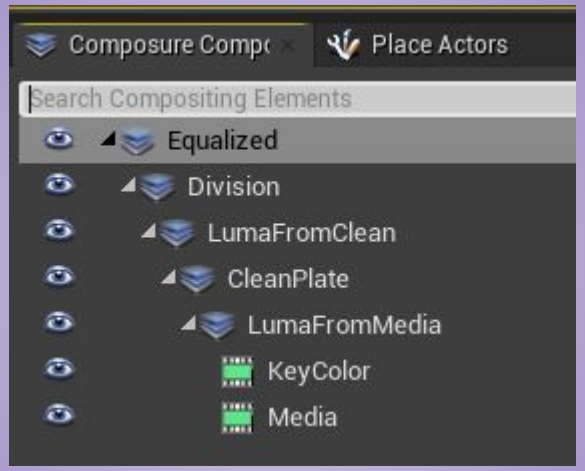
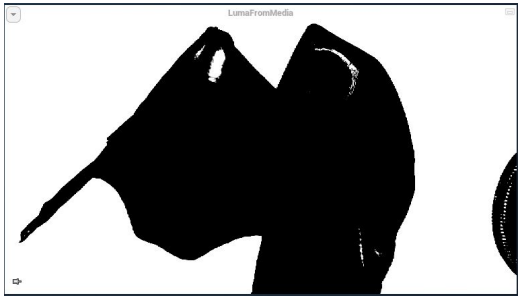
# Compositing in Composure

# CX - Plate Equalizer




2. Estimate Clean Plate Image & Equalize uneven background ( Luma Based )

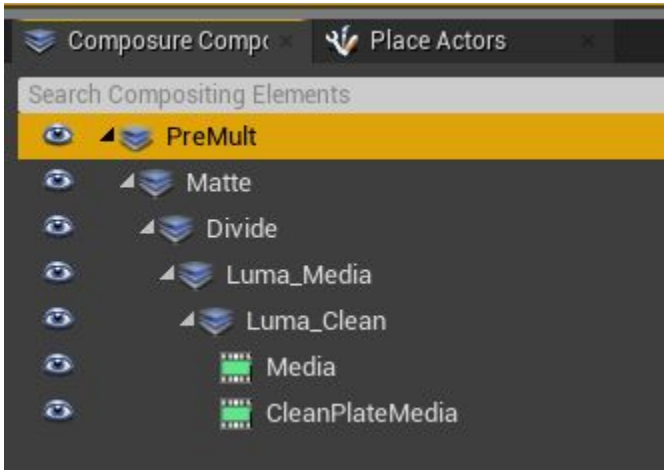





# Compositing in Composure

# CX - Clean Plate Keyer

Luma difference between provided Clean Plate & Media

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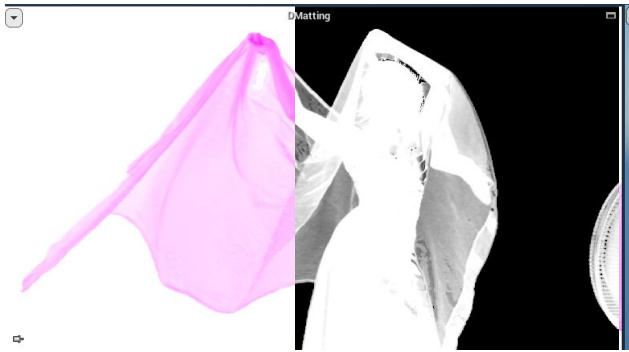
# Compositing in Composure

# CX - Transparency Keyer

Difference Based Keyer using 2.b. Equalized Plate

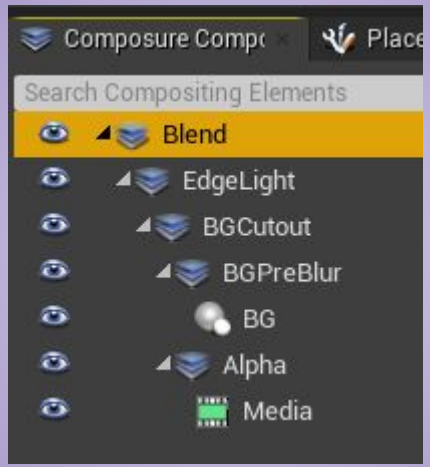


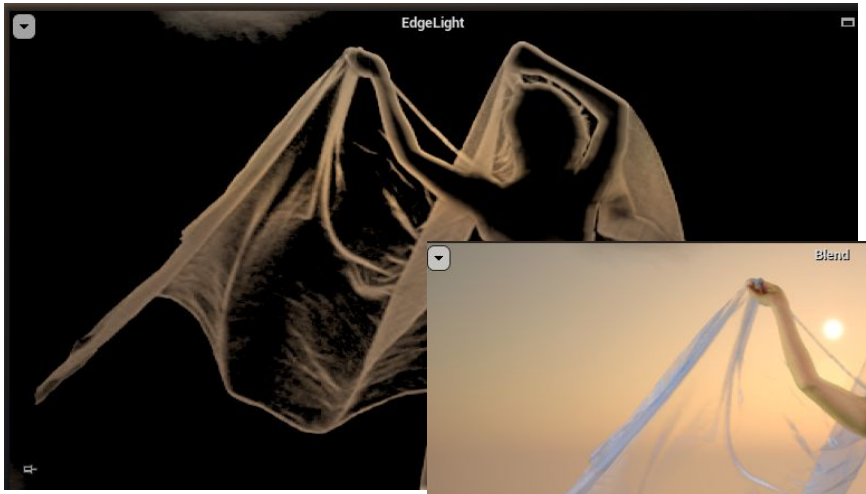




# Compositing in Composure

# CX - Lightwrap

Modular implementation using CX - using epic's M_SinglePasscolorDiffKeyer, but any previous keyer that generate alpha can be used





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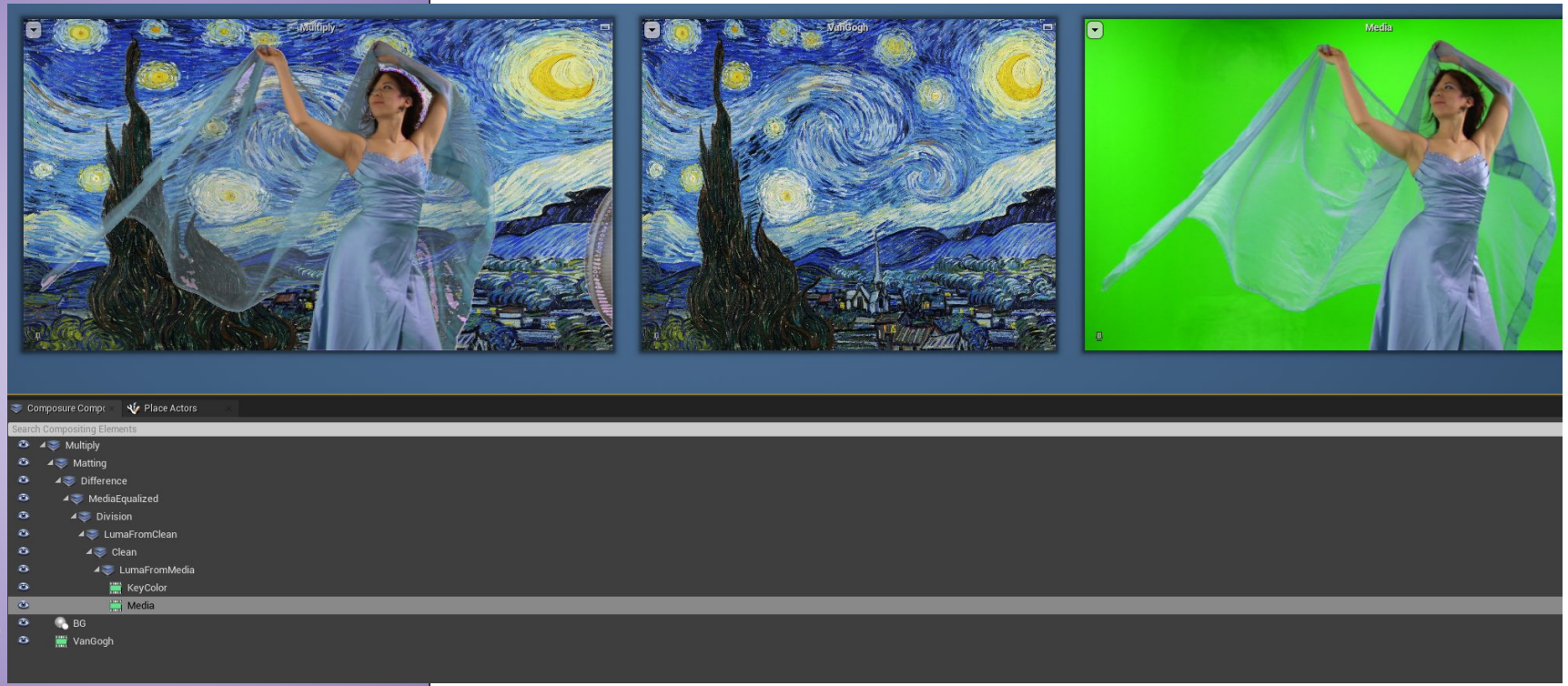
# What's Possible

UE can become a real-time software keyer - not necessarily using UE Environments. Any Camera/Video/Image feed can be fed to Composure layers



# Credits

- MihranStepanyan for Plate Equalizer algorithm
  - https://www.youtube.com/c/MihranStepanyan/videos
- Clement Gharini for Straight Dry Key algorithm
  - https://www.youtube.com/watch?v=FRNFfPN8WjI