



# ITU-T H.760 Series Multimedia Application Framework

ITU-T H.761  
NCL and Ginga-NCL



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# ITU-T H.760 Series

Multimedia Application Frameworks (MAFR)



# IPTV Multimedia Applications

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- Resident
  - Applications installed by the manufacturer. EPG UI.
- Installable applications
  - Applications that can be installed by the user.
  - Runs locally, may access remote data. Widgets.
- Not installable, pulled applications
  - Online-available applications.
  - Request comes from terminal. Portals.
- Not installable, pushed applications
  - Available applications sent to the terminal with no request.
  - Broadcast applications. Content-related.





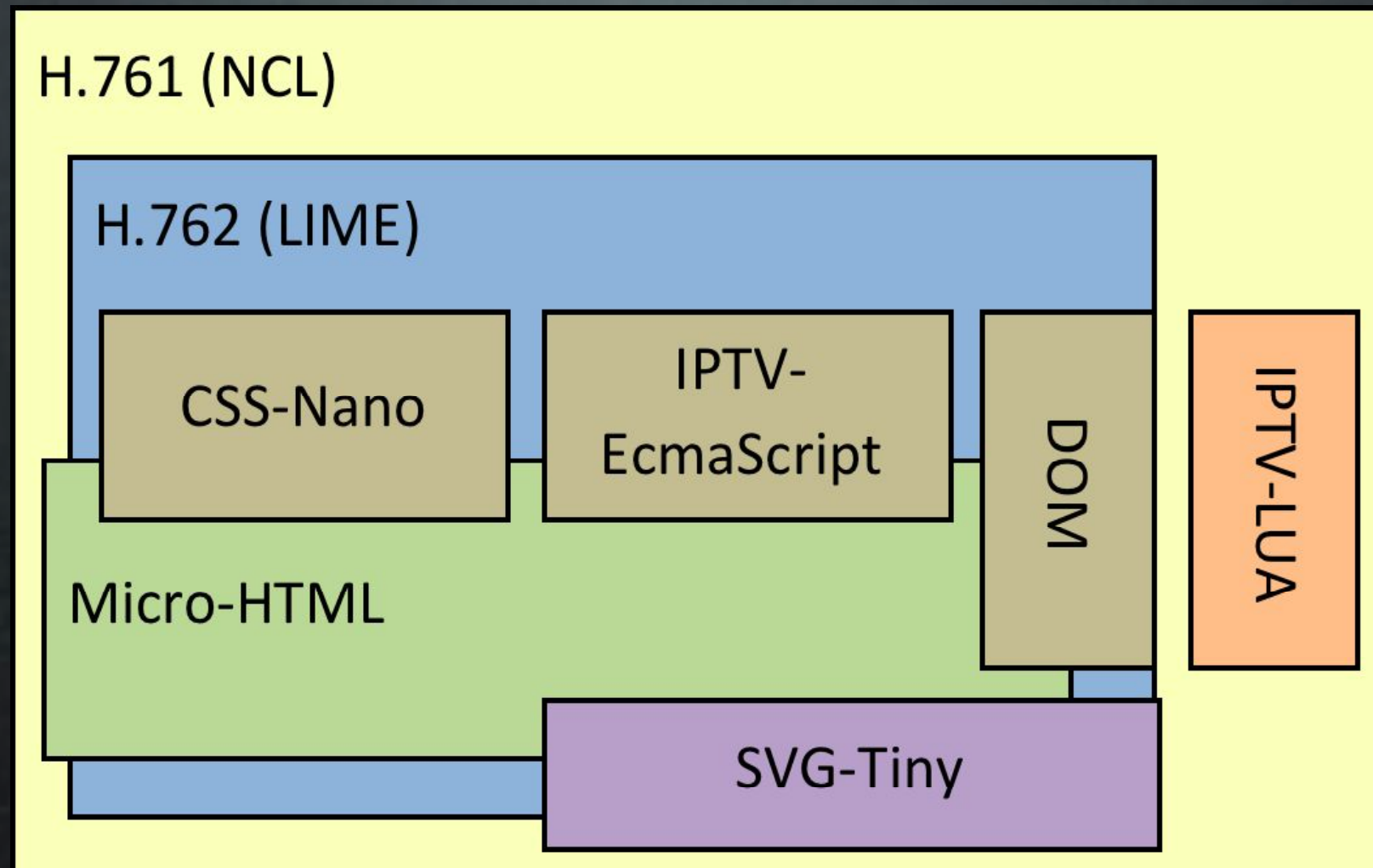
# MAFR Series

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- H.761 – Ginga-NCL Nested Context Language
- H.762 – LIME Lightweight Multimedia Environment
- H.763.1 – CSS Cascaded Stylesheets
- MAFR.6 – EcmaScript
- MAFR.10 – SVG Scalable Vector Graphics
- MAFR.14 – Lua scripting language



# Common MAFR Suite



# ITU-T H.761

Nested Context Language (NCL) and Ginga-NCL





# Requirements Synchronization

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# Requirements Synchronization





# Requirements Interactivity





# Requirements Interactivity





# Requirements

## Content Adaptation







# Requirements Content Adaptation





# Requirements Single Device







# Requirements

## Single Device, Live content





# Requirements

## Multiple Devices





# Requirements Multiple Devices





# Requirements Multiple Devices



# What is NCL



# What is NCL



# head

1

```
<head>
```

```
<regionBase>
```

```
...
```

```
</regionBase>
```

regions - *where*



```
<descriptorBase>
```

```
...
```

```
</descriptorBase>
```

descriptors - *how*

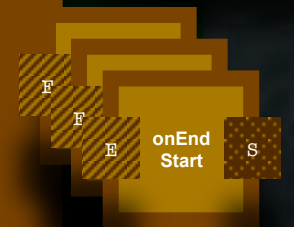


```
<connectorBase>
```

```
...
```

```
</connectorBase>
```

connectors - *when*



```
</head>
```

# body

2

```
<body>
```

```
<port id="pMain" component="video1" />
```

```
<!-- nodes -->
```

Contexts & media - *what*



```
<!-- links -->
```

Links - *when*

```
</body>
```