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**mautilus**  
SOFTWARE SOLUTIONS

# SmartTV Development

Connected TVs, Google TV and Chromecast



**GDG DevFest**  
2013 Season

**Petr Mazanec**

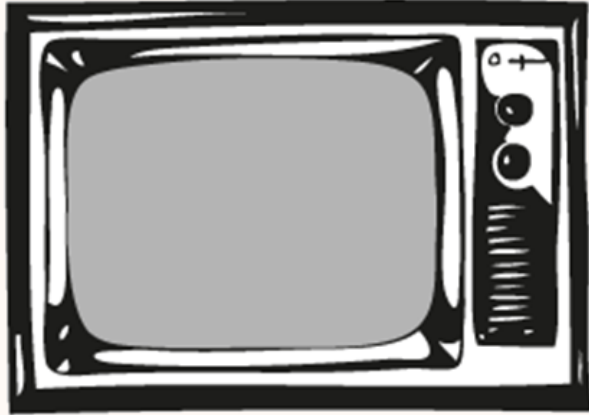
# Smart TV

## Content

- What is Smart TV?
- Smart TV in numbers
- Development and testing
- Applications examples
- Future

# Smart TV

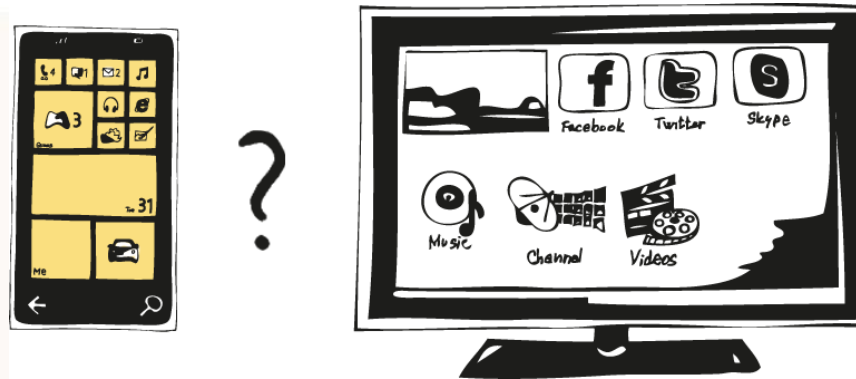
## What is the Smart TV?



- Internet connectivity
- 3<sup>rd</sup> party application development
- Content sharing in local networks
- Screen mirroring
- EPG
- Face recognition
- Social networks integration
- Etc.

# Smart TV

## Smart TV and Smart Phones



- Similar or different story?
- Do we see a convergence between both worlds?
- Personal vs. shared device

# Smart TV

## Smart TVs in Numbers



- 25% Czech citizens bought in 2012 new TV - 82% chosen smart TV
- 27% of newly sold TVs worldwide are smart
- In 2012 66 millions smart TVs were sold
- One (max. 2) TVs per family

# Smart TV

## Predictions

- In 2015 66% of all newly sold TVs will be smart
- In 2017 there will be 8.2 billion Internet connected devices and 5% will be smart TVs



# Smart TV

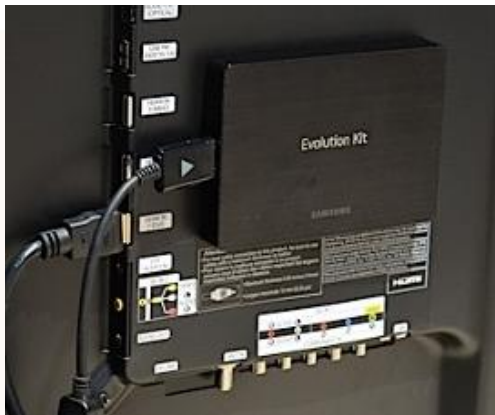
## Austrian Market

- Samsung 43%
- Philips 12%
- Sony 12%
- LG 12%



# Smart TV

## Hardware/OS



- Performance increases rapidly every year, but it is far behind new phones and tablets
- 2013 models are usually 2/4-core
- Linux + webkit
- Potential security threat
  - Always on
  - Root privileges, no firewalls
  - Fixed position, microphone, camera...



# Smart TV

## Development



- JavaScript, CSS3, HTML5 (partly)
- Specific API
  - Remote control
  - Local storage
  - Video playback
  - Smart phone communication
  - DRM
  - Gestures
- On some TVs the C/C++ can be used and mixed with JavaScript (NaCl)

# Smart TV

## Development Tools



- Samsung SmartTV
- SmartTV SDK + emulator
- Google Chrome is used for development
  - Nice debugging tools
  - Fast
  - Ideal for cross-platform

# Smart TV

## TV specific development 1/4



- Object and fonts sizes
- Most popular screen sizes 32" – 40"
- Recommended viewer distance for 32" is 1.3 - 2.0m, but normally is much bigger
- Intuitive UI
- Kinetic controls
- DRM a streaming knowledge
- OTT

# Smart TV

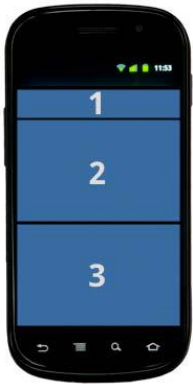
## TV specific development 2/4



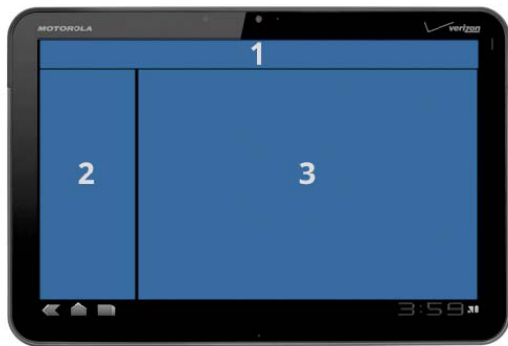
- Resolution: 1280x720px (HD)
- Performance and need for optimizations, light-weight JavaScript libraries - 2013 models are dual-core (ARMv7) LGE i Samsung
- SSL certificates
- HLS, SmoothStreaming, VAST, WebGL
- Web sockets vs. long polling, TV discovery

# Smart TV

## TV specific development 3/4

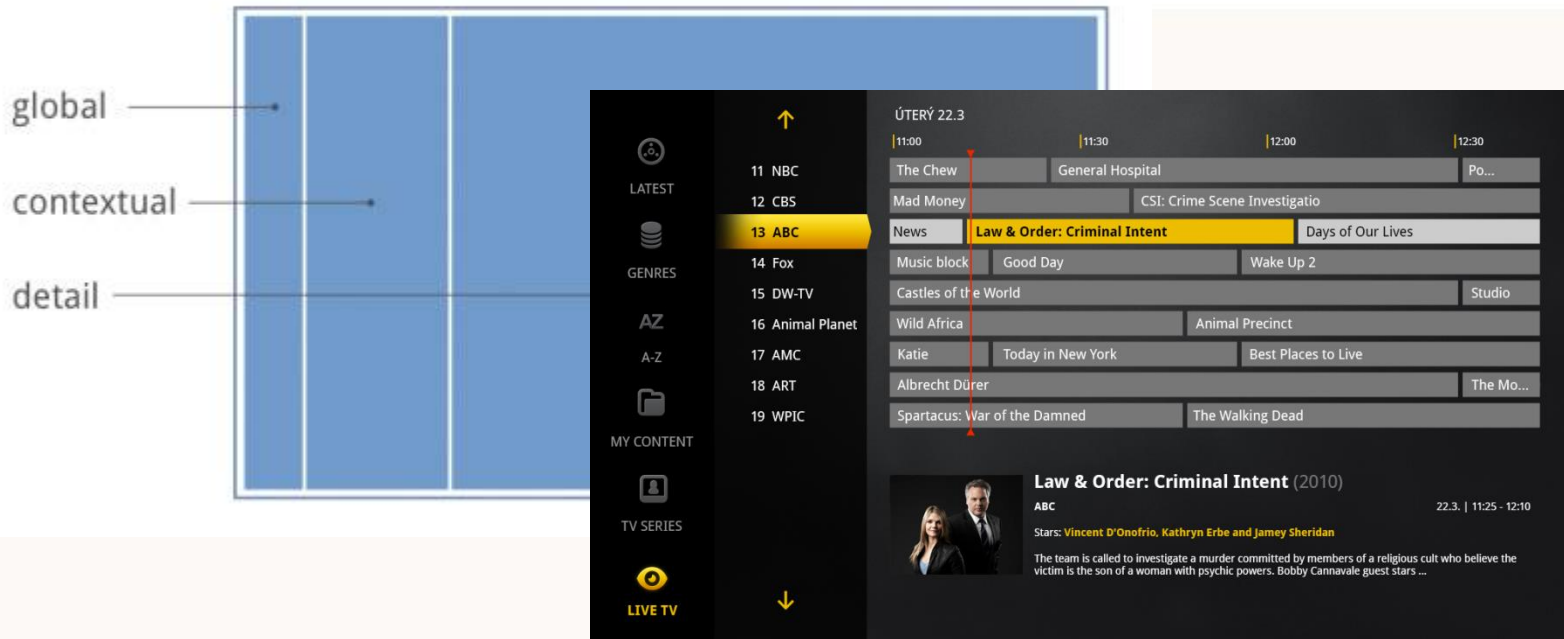


- Navigation, UI zones
- Use of focus, hover effects
- None scrolling
- TV is not a desktop



# Smart TV

## TV specific development 4/4



# Smart TV

## Streaming



- Progressive download
- Adaptive bit-rate (HLS, SmoothStreaming)
- Widevine, PlayReady DRM
- Icecast (AAC, mp3)

# Smart TV

## Cross-platform

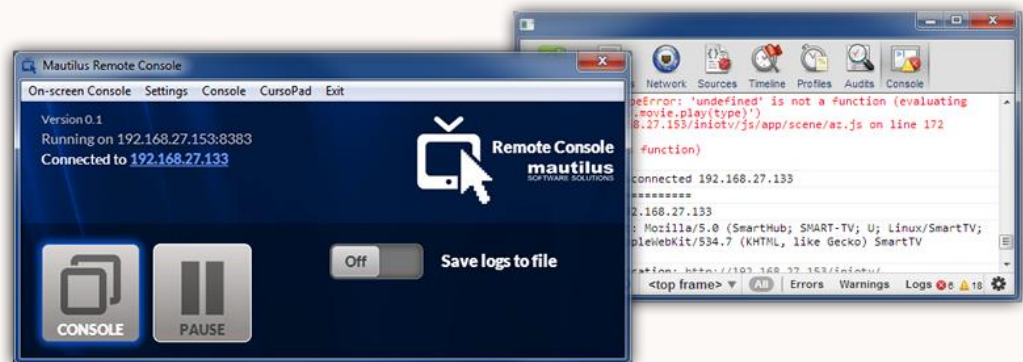
- Platform compatibility
  - Samsung 2011, 2012, 2013
  - LG 2011, 2012, 2013
  - Philips, Panasonic ...
- Vendors compatibility
- Regions (EU, USA, MENA, etc.), firmware
- Others
  - STB a multimedia centres: Boxee, WD
  - Game consoles



# Smart TV

## Testing

- Always on the target hardware, partly on emulator or in Chrome
- Firmwares checks
- On-screen logs
- Remote logging
- Wireshark
- <http://smarttv.mautilus.com/SDK/>



# Smart TV

## Testing on real hardware



- 40+ devices in our test lab



# Smart TV

## Testing - communication

Mr. Mazanec,

그간 잘 지내시고 계신지요?

UAE Dubai 재 MEAHQ B2B 팀에서 smart TV 기술지원을 담당하고 있는 유신우입니다.

중아 지역 법인에서 문의 온 건인데요, 한 번 살펴봐 주실 수 있으신지 여쭙습니다.

- [http://83.139.108.2:18129/ss/ch01\\_ss\\_encryption.isml/manifest](http://83.139.108.2:18129/ss/ch01_ss_encryption.isml/manifest)

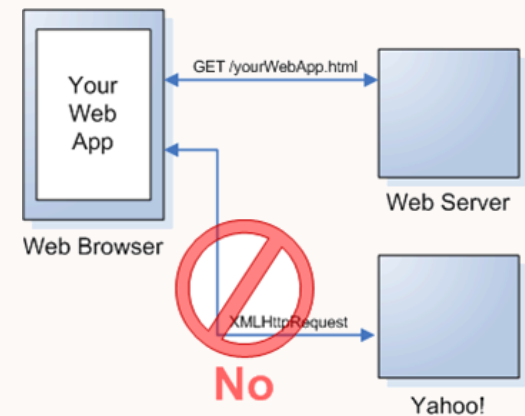
상기 해당 미디어에 접근 한 후, TV가 하기 주소로 revocation을 하는데, 그 즉시 TCP session이 reset된다고 합니다.

개발사 측에서 확보한 network stream transaction을 공유 드릴 수 있을 것 같습니다만, 전달 되는 동안 한 번 살펴봐 주실 수 있으신지요?

# Smart TV

## Application ready?

- Agreement with TV vendor
- QA approval: 4-6 weeks
- Application hosting (CDNs)
  - Same origin policy



# Smart TV

## SmartTV Alliance



- LG, Philips (TP Vision), Vestel, Toshiba, Panasonic
- Specifications
- SDK, tools
- Technical support
- Common QA

# Smart TV

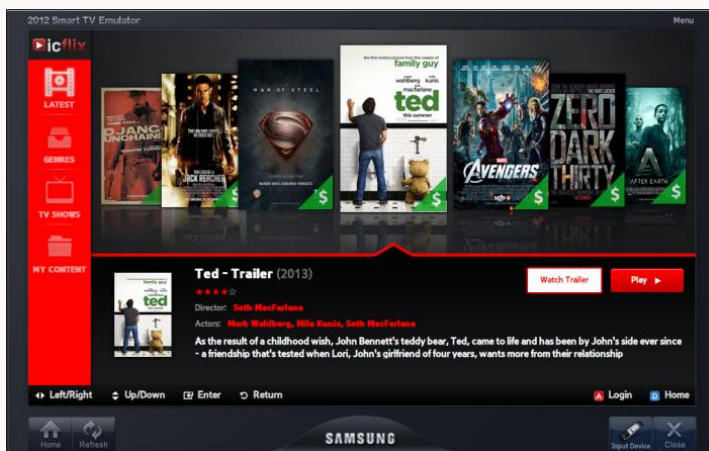
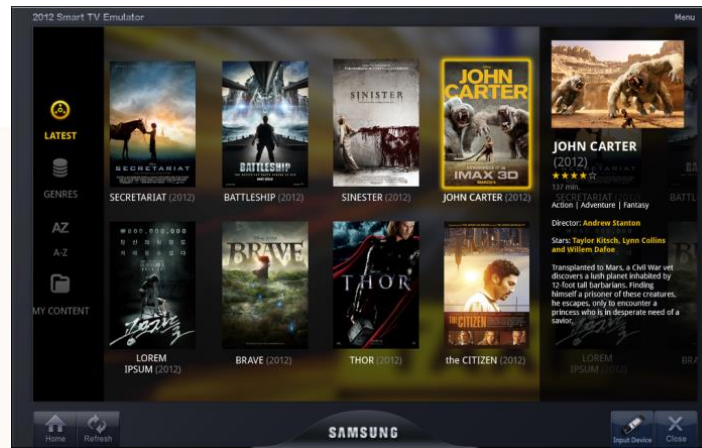
## Applications' examples

- VoD/OTT (VOYO,Netflix, Hulu, HBO.GO, ivi.ru)
- Live TV (catch-up, timeshift, start-over)
- Radios, concerts
- Magazines, newspapers, video mag.
- Simple games
- Sport news
- Traffic situation



# Smart TV

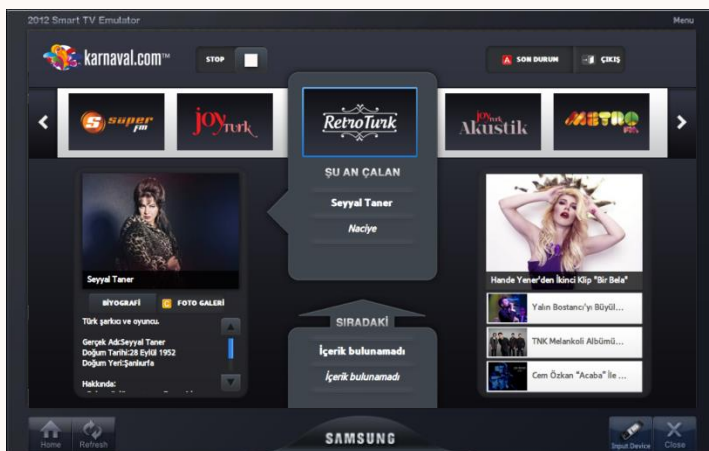
## Application examples 1/3





# Smart TV

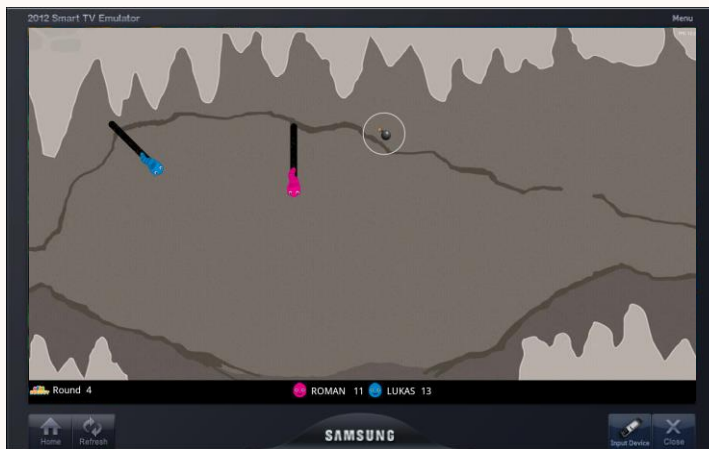
## Application examples 2/3





# Smart TV

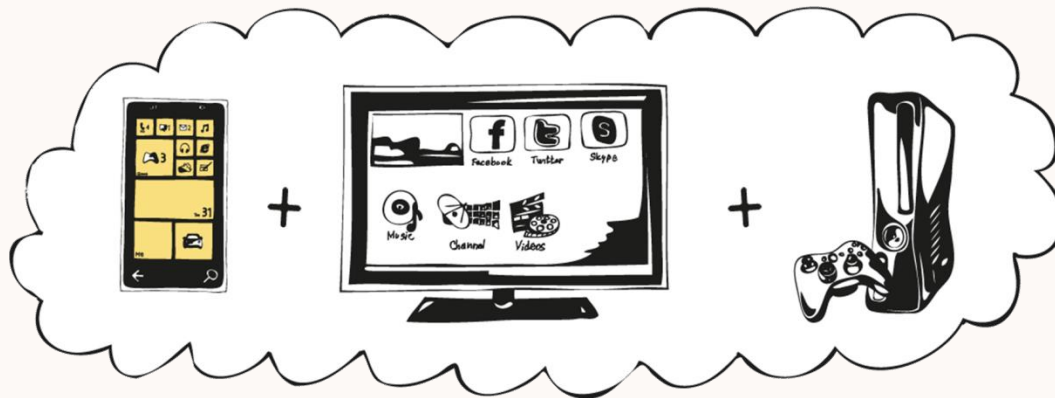
## Application examples 3/3



# Smart TV

## One world

- Multiscreen approach
- Companion (2<sup>nd</sup> screen) applications



# Smart TV

Future – intelligent and multifunctional walls?



# GoogleTV

Bye, bye Google TV? For how long?



- Pros
  - Good idea, right time
  - Nice devices
- Cons
  - Price
  - Few applications
- Cons
  - Google did not care
  - Commercial failure (low consumers interest)
  - User-interface
  - Remote controller

# GoogleTV

## Google TV devices

- Marvell Armada 1.2 GHz dual-core
- 1 GB DD3 RAM
- 4-8 GB
- (750 MHz GPU)





# GoogleTV

## Android TV x GoogleTV



```
if (getPackageManager().hasSystemFeature("com.google.android.tv")) {  
    Log.d("TV Test", "Running on Google TV!");  
}
```

# GoogleTV

## Google TV/Android sticks vs. STBs

- Fixed environment for long time
- Video players
- Simple user interface
- Cheap when purchase in large quantities
- Controlled environment
- Controlled firmware updates
- Much simpler customer care
- On-demand features
- Branding, etc.

# Chromecast

## Chrome tab mirroring

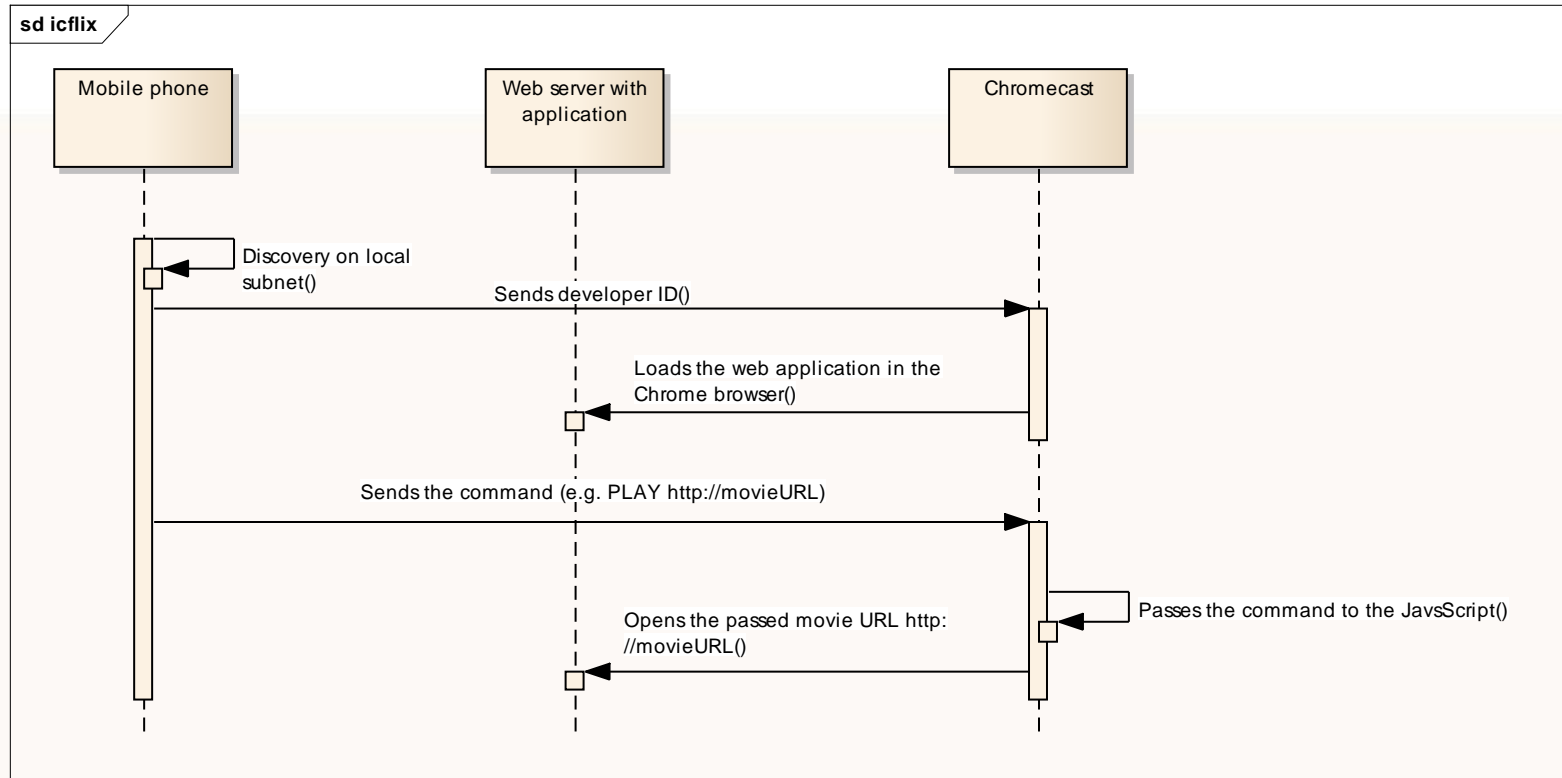
- Mirrors the Chrome browser tab (plugin is required)
- The content is send to the Chromecast as video
- Not all video-plugins are supported
- Content played in DRM protected web players might be blocked





# Chromecast

## Direct streaming



# Thank you!



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