Creating Multidevice Interactive Entertainment for the Living Room with Java

Motivation

- Consumer behavior and market trends

Searching for solution

- The 2nd Screen Model

- State of the Art of 2nd Screen Solutions

- Problems with the State of the Art 2nd Screen Solutions

Java to support a 2nd screen solution

-A 2nd screen solution based on DTV standards

- Why this solution is better than others

- Target devices

Show me the code!

Conclusion

References

MOTIVATION

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Majority of media consumption is screen-based

90% of all media interactions are screen based

38% of our daily media interactions are on smartphones

Source: Google/Ipsos/Sterling, 2012

Television no longer commands our full attention

77% of the times that viewers watch TV, it is with another device

49% with a smartphone

34% with a PC/laptop
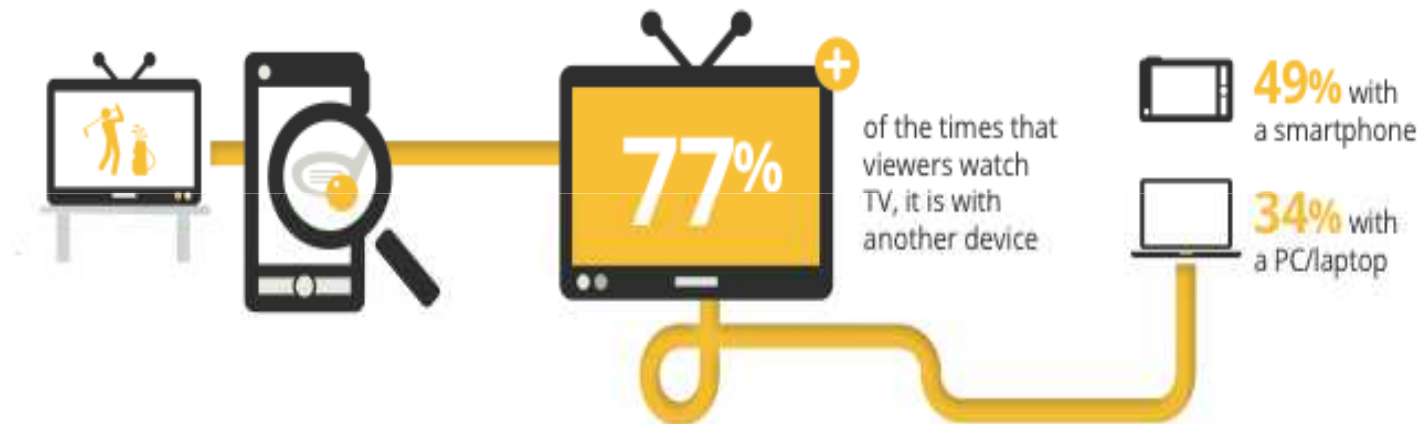
Source: Google/Ipsos/Sterling, 2012

WHILE THEY ARE WATCHING TV...

TOTVS

Consumer Behavior
People chat about what
they have seen on TV

WHAT?

People want to **TALK ABOUT** the program

People want to **GET MORE INFORMATION** about the program

People want to **SHARE THEIR OPINIONS**

Consumer Behavior
People chat about what
they have seen on TV

WHERE?

TOTVS

Consumer Behavior
People chat about what
they have seen on TV

WHEN?

Free time, breaks, while they are waiting, at lunchtime, coffee-time, etc.

NEW TREND

While they are watching TV!

NEW CHALLENGE

To keep the audience focused on Broadcaster's Content

Ensure to the broadcaster full control over the 2nd screen content

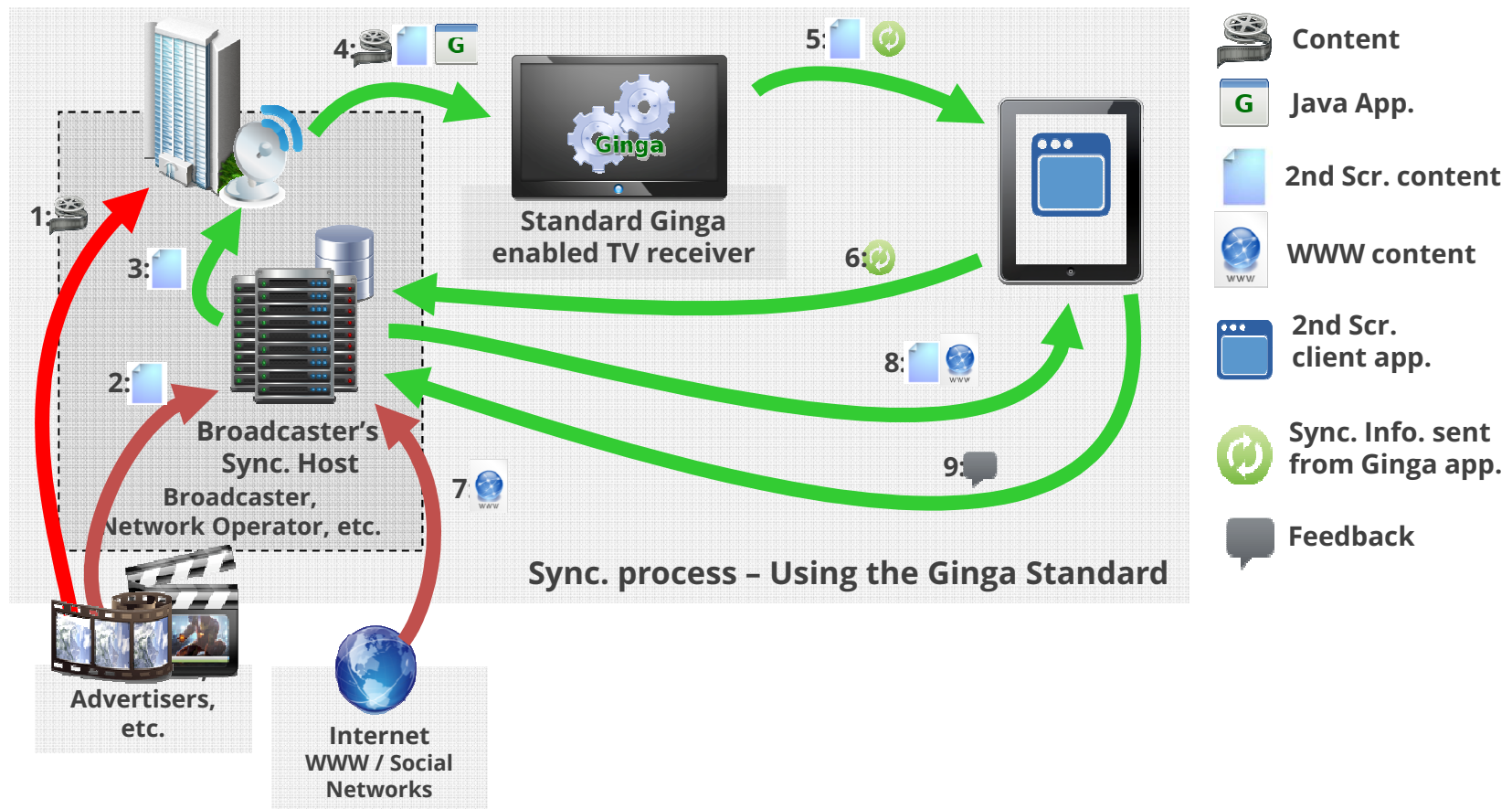Ensure that the user feedback goes directly to the broadcaster

Sync. Method can work with live events, recorded programs, time-shifted content playback, etc.

High reliable solution, providing a synchronization mechanism that is completely natural and does not require a user's action

Unified user experience: base the solution on a widespread enough standard technology that can effectively reach a mass audience, independently of the solution provider or the manufacturers of the TV receivers and devices, in order to avoid fragmentation
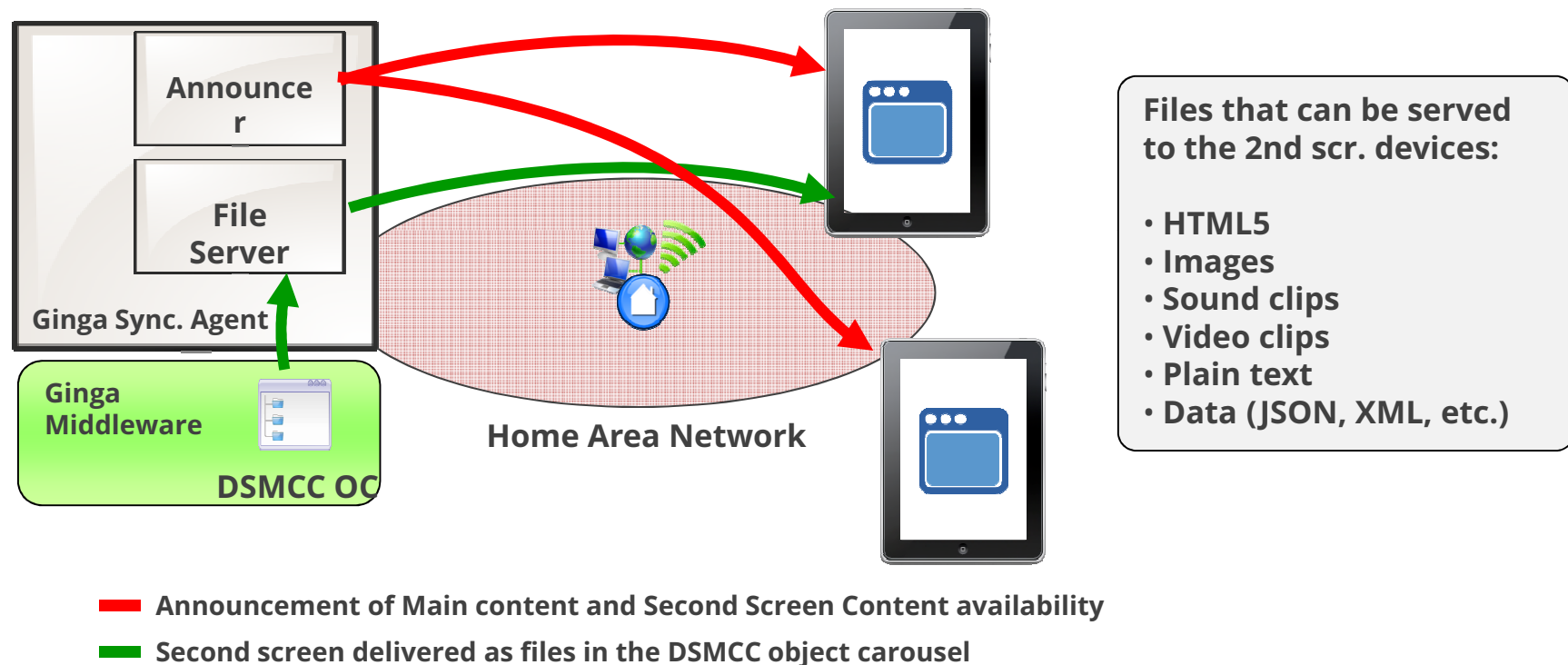
TOTVS

TOTVS

Announcer

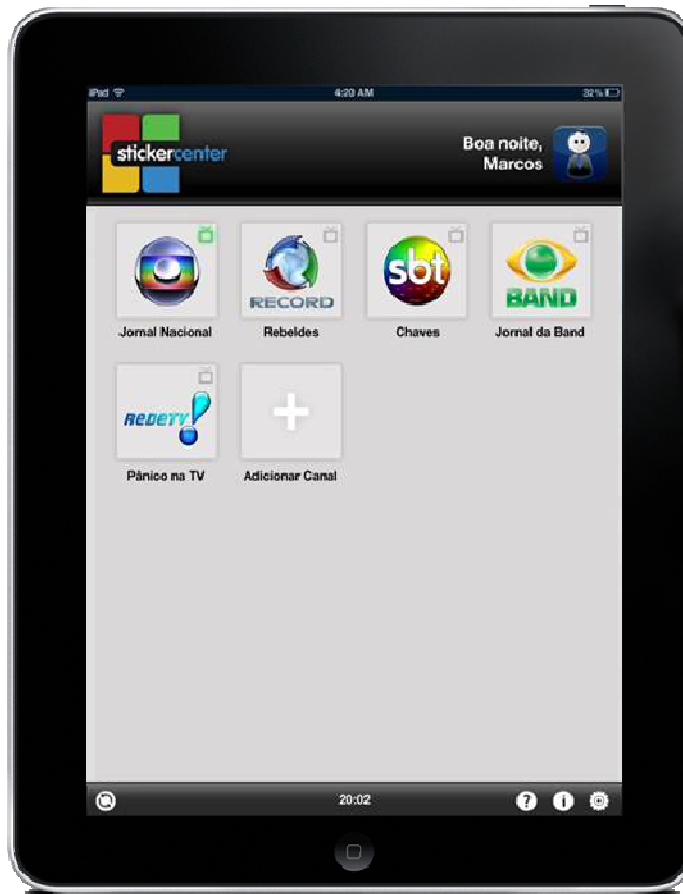**File Server**

Ginga Sync. Agent

Ginga Middleware

DSMCC OC

Home Area Network

Files that can be served to the 2nd scr. devices:

• **HTML5**
• **Images**
• **Sound clips**
• **Video clips**
• **Plain text**
• **Data (JSON, XML, etc.)**

Announcement of Main content and Second Screen Content availability

Second screen delivered as files in the DSMCC object carousel

Multi-broadcaster application

Syncs automatically with the broadcaster's Ginga Synchronization Agent executing in the TV set. No user action is needed.

No interactive content is required in the main screen. All the interactive content can be pushed to the 2nd screen devices.

Currently used by SBT in Brazil

Provider has full control over the 2nd screen content.
Independence from third-party service providers.

User feedback goes directly to the broadcaster

Sync. Method can work with live events, recorded programs,
time-shifted content playback, etc.

High reliable solution, providing a synchronization
mechanism that is completely natural and does not require
a user's action.

Provider has complete control over the user's 2nd screen
experience

Based on an standard technology that can effectively reach
a mass audience

With an open standard as powerful as Ginga, broadcasters can cross the boundary of the TV set and "broadcast" content even further, directly to the user's 2nd screen devices.

G

Ginga

Broadcaster, Network Operator, etc.

Standard Ginga enabled TV receiver
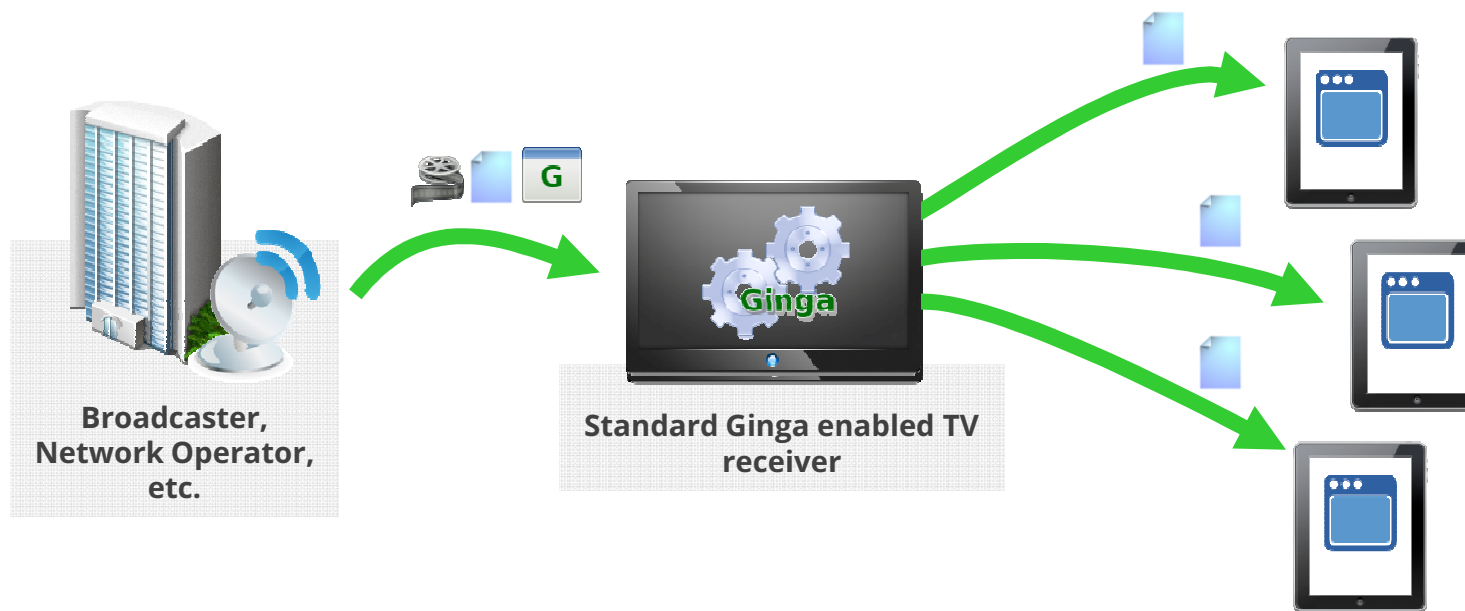
TARGET DEVICES

Java is everywhere!

4.5 Billion Java-Enabled Devices

1.8 Billion Java-Enabled Phones

20 Million Java TV Devices

800 Million Java Desktops

6 Million Developers

SHOW ME
THE CODE

TOTVS

```java
public class SecondScreenXlet implements Xlet {

protected GingaAgent secondScreenAgent;

protected XletContext xletcontext;

public void initXlet(XletContext xc) throws XletStateChangeException {
    this.xletcontext = xc;
}

public void startXlet() throws XletStateChangeException {
    secondScreenAgent = new GingaAgent();
}

public void pauseXlet() {
}

public void destroyXlet(boolean bln) throws XletStateChangeException {
    secondScreenAgent.terminate();
}

}
```

```java
public class MAGICMonitor implements ManagerListener {
Manager manager;

public MAGICMonitor() {

    manager = Manager.getInstance();
    manager.addListener(this);
    manager.init();
}

 public void managerEvent(MagicEvent event) {
     Peer peer = event.getPeer();

     if (event instanceof ResourceAddedEvent) {
       final Resource r = ((ResourceAddedEvent)event).getResource();
     } else if (event instanceof ContentAddedEvent) {
       final Content c = ((ContentAddedEvent)event).getContent();
     }

 }
```

```
final Command createCommand(String id, String name, String argName,
                            String argValue, ExtraInfo broadcasterInfo) {

    Command cmd = manager.getCommandFactory().createCommandText(id, name);

    cmd.getCommandControl().putExtraInfo(broadcasterInfo);

    cmd.getCommandControl().setCommandArgument(argName, argValue);

return command;
}
 manager.mySelf().getPeerControl().addPublishedCommand(cmd);
```

CONCLUSION

Five key elements of the 2nd screen model have been identified: Content Sync. Method, Interaction, Feedback and Massive adoption.

State of the art 2nd screen solutions have two major issues for content provider and advertisers: lack of control over the second screen content and platform fragmentation. Also, lack of uniform usability, synchronization reliability and providing a mass user experience have also been considered as issues.

In response to these issues, a second screen solution has been described based on experiences with Interactive TV development in Brazil and 11 other countries in LATAM. It's major strengths are:
- Allows the content provider to cross the TV receiver boundary and directly reach other devices in the user's home, enabling to control the whole second screen experience.
- Meets requirements for delivering Content, with a reliable Sync. Method, provides unified Interaction and can be Massively Adopted.

Large contents could not be sent to user duo to DSMCC limit. Its 6MB.

The larger your application is, the longer it will require to provide the content to the second screen.
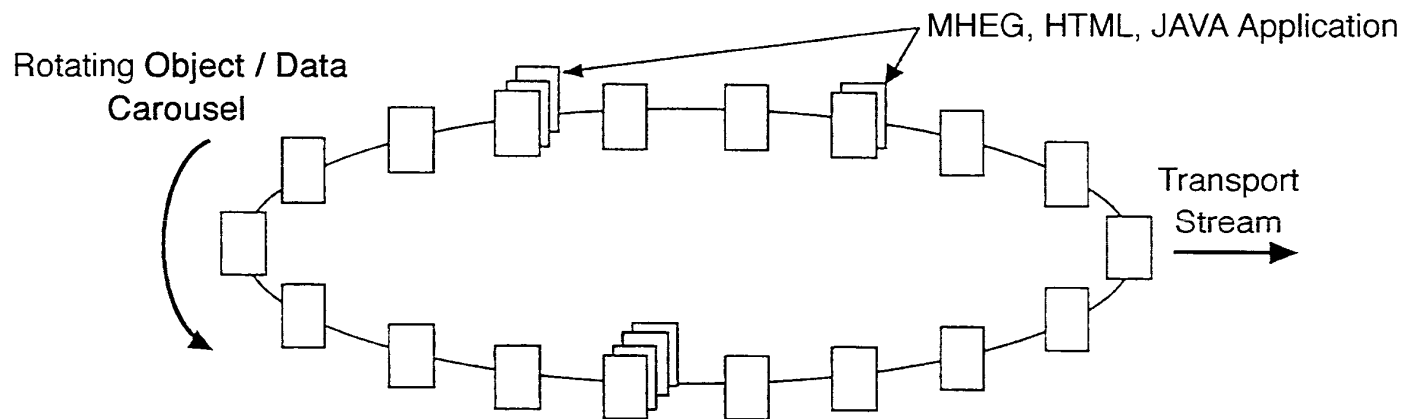
Consider use Data Section Filter APIs to handle those restrictions.

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```
TransportStream transportStream =
Tuner.getInstances()[0].getCurrentTransportStream();

// create and reserve a filter collection
collection = new DataSectionFilterCollection(transportStream, 1);

collection.reserve(true, 1000, new ScarceResourceListener() {

    public boolean releaseRequested(ScarceResource resource) {
    return true;
    }

    public void releaseForced(ScarceResource resource) {
    }

    public void released(ScarceResource resource) {
    }
});

// connect to transport stream and start filtering
collection.connect( this );
```

```
circularFilter = collection.newCircularFilter(DEFAULT_CIRCULARFILTER_SIZE);

// create a listener for filter events
filterListener = new DTVFilterListener(circularFilter,
DEFAULT_CIRCULARFILTER_SIZE);

circularFilter.addSectionFilterListener(filterListener);
circularFilter.startFiltering(this);
```

Long-form private table section		
syntax	bit index	# of bits
table_id	0	8
the table_id identifies the table section. A table may be one or more table sections, all with the same table_id		
section_syntax_indicator	8	1
the section_syntax_indicator signals whether the section is a "short" or "long" section.		
private_indicator	9	1
MPEG no longer determines the semantics of this field. Formerly, if this value was 1, then a CRC-32 would be appended to the end of the table section.		
reserved	10	2
section_length	12	12
this specifies how many bytes are in the rest of this table section, including the CRC-32 field.		
table_id_extension	24	16
reserved	40	2
version_number	42	5
current_next_indicator	47	1
section_number	48	8
last_section_number	56	8
private_data_byte	64	var
CRC_32		32

QUESTIONS AND ANSWERS

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[1] The Ginga interactive DTV standard is defined by the Brazilian Standardization Forum, Associação Brasileira de Normas Técnicas (ABNT) in ABNT NBR 15606, "Digital terrestrial television - Data coding and transmission specifications for digital broadcasting", which is divided into 8 published parts. http://www.forumsbtvd.org.br/materias.asp?id=112.

[2] See ITU, April 2010, Worldwide common core - Application environment for digital interactive television services (ITU-T Recommendation J.200).

[3] See ITU, December 2009, Harmonization of declarative content format for interactive television applications (ITU-T Recommendation J.201).

[4] See ITU, August 2010, Harmonization of procedural content formats for interactive TV applications (ITU-T Recommendation J.202).

[5] See ITU, January 2012, Requirements for Integrated Broadcast and Broadband DTV application control framework (ITU-T Recommendation J.205)

[6] Boquimpani, A., Glidden, R., Perrone, H., 2011. Ginga: an Open, Inclusive Platform for Content Distribution on Connected TV Infrastructure. IBC 2011

[7] See Gorham, S., September 2010, "Nielsen and ABC's Innovative iPad App Connects New 'Generation' of Viewers" http://blog.nielsen.com/nielsenwire/online_mobile/nielsen-and-abcs-innovative-ipad-app-connects-new-generation-of-viewers/

[8]   See Nielsen, September 2010, "Disney/ABC Television Group and Nielsen Team to Create Innovative iPad Application for Upcoming Primetime Drama 'My Generation'" http://www.nielsen.com/us/en/insights/press-room/2010/disney_abc_televisiongroupandnielsenteamtocreateinnovativeipadap.html

[9] See Martin, D., February 2012, "The Big Problem with the Second Screen" http://www.forbes.com/sites/davidmartin/2012/02/23/the-big-problem-with-the-second-screen/

[10] See Shields, M., April 2012, Second-Screen Sports Options Circumventing TV Rights Pacts. Can ESPN steal the show without paying astronomical broadcast rights fees? http://www.adweek.com/news/technology/second-screen-sports-options-circumventing-tv-rights-pacts-139468

[11] See Gaylord, C., April 2012, 'Second screen' apps turn digital distractions into TV companions: http://www.csmonitor.com/Innovation/Tech/2012/0417/Second-screen-apps-turn-digital-distractions-into-TV-companions

[12] See SecondScreen Network, "The Ad Platform for the Second Screen" http://www.secondscreen.com/how-it-works