



**VODAFONE GROUP
_RESEARCH AND DEVELOPMENT**

Mobile Broadcast and Interactivity

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Interactive Mobile TV
A Mobile VCE Seminar
22nd November 2005



Agenda

— Mobile Broadcast Use Cases

— Approaches to Interactivity

- Generic Browser, Streamed Multimedia, and Java-based middleware

— Interactive Middleware

- JSR 248, 249 and 272

— IP Datacast and DVB-CBMS

- Phase 1, features for phase 2, and a challenge



Mobile Broadcast Use Cases (1)

Mobile TV

- The simplest use case, easy to understand by a mass market audience
- Little to no integration with interactive/mobile network
- Mobile network provider in the role of collecting access fees and premium content fees
- Suitable content formats needed, special formatting adds to cost
- Has its limits, due to display size limitations



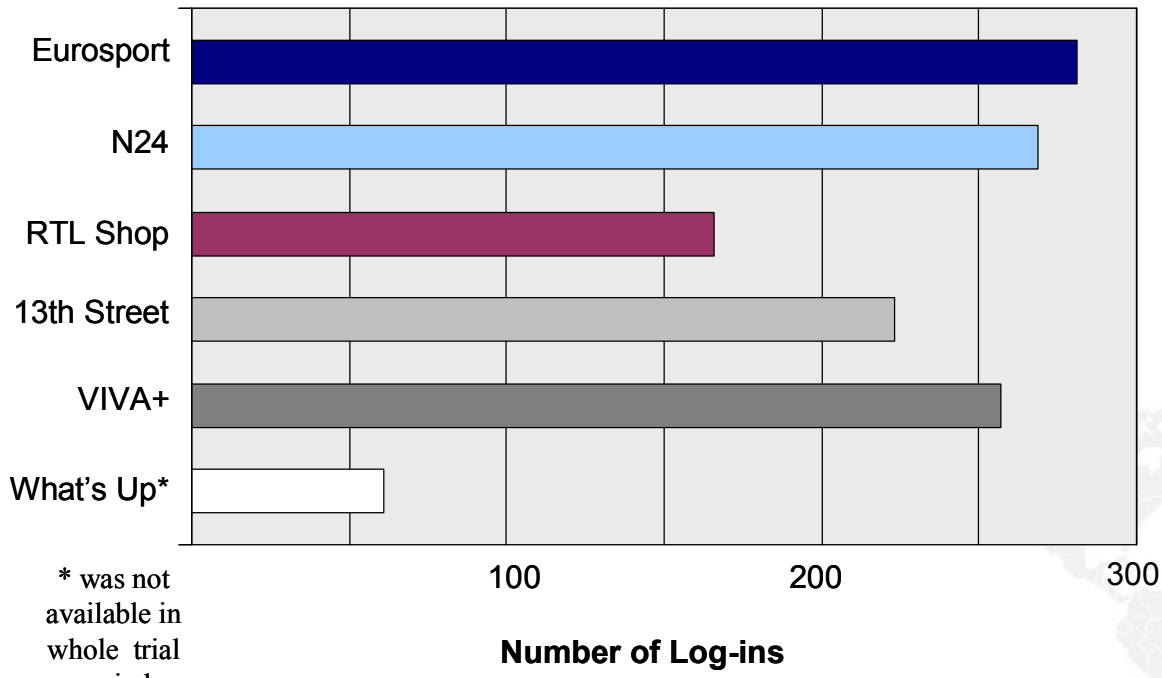
bmco: Total usage of services

Friendly user trial with 20 users,
Numbers are indicative,
not statistically representative!

Strong interest in Eurosport due to Olympic Games during trial period

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_GROUP R&D



Eurosport, N24 and VIVA+ were the most used services

Home-Shopping was the channel with the weakest usage

* was not available in whole trial period

Mobile Broadcast Use Cases (2)

— Mobile TV with synchronized, auxiliary data stream

- Auxiliary data stream contains:
 - Additional information that can be browsed (much like a multimedia teletext)
 - Interaction entry points (buttons), e.g. for voting, call-ins, merchandise purchasing (via SMS, HTTP, SOAP)
- All elements can be synchronized with audiovisual stream
- Evolutionary use case, still easy to understand
- Additional revenue stream through interactive transactions



Mobile TV vs. Interactive Approach

MobileTV approach



Non-integrated voting services

Unreadable video overlays

- Main revenue source is subscription, but interactivity should be enabling technology already in first devices (to reach critical mass)
- Example: Mobile Music TV

Interactive broadcast approach



Optimized video for mobile reception

One-button premium SMS voting (€)

Optimized rendering of textual information

Community (€)

Instant Premium Downloads (€)

Interactivity is key for further growth & use of back-channel

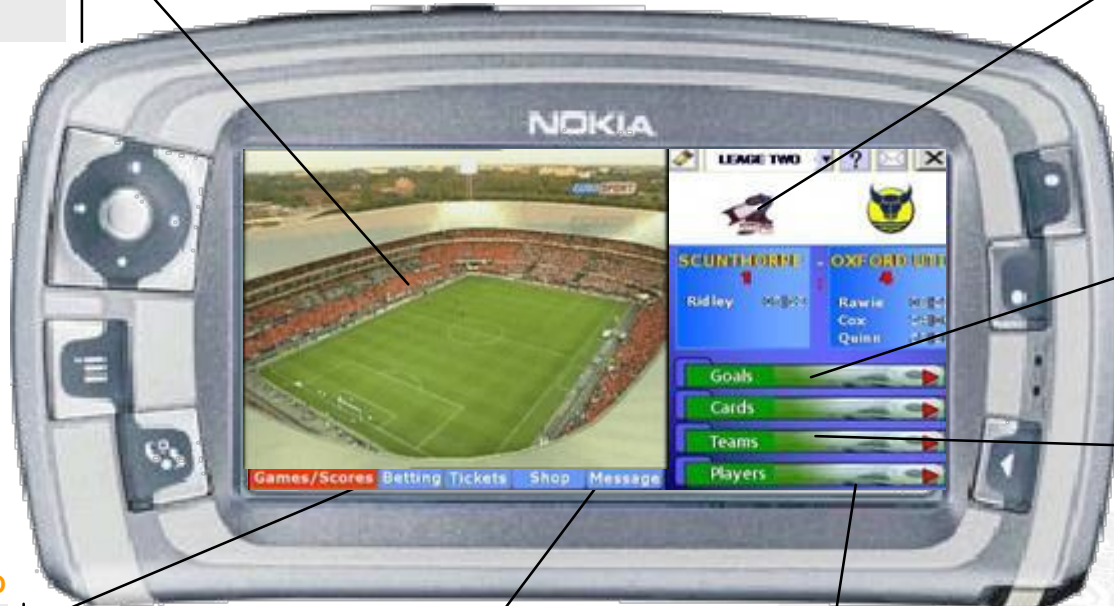
Use case: Sports channel

ACCESS

Available via DVB-H live transmission

CONVENIENCE

Direct access to online-betting



ADDITIONAL INFO

Match statistics

BACKGROUND INFO

Player overview

ADDITIONAL INFO

All sport news and results of the day/week/month

INTERACTION

Chat with other fans

INTERACTION

Player evaluation

Mobile Broadcast Use Cases (3)

Download applications

- Audio, music clips, premium information data bases
- Dedicated run-time applications
- Unattended download and/or update
- Application may provide interaction entry points
- More difficult to understand
- Revenue streams by subscription to service and interaction transactions

Example

- What's up (Berlin City- and Lifestyle Guide)
(Realized by touch mobile)



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Approaches to Interactivity (1)

“Generic Browser”

- All interactivity is defined declaratively in the broadcast stream
- Standardized information elements (text fields, buttons, logos, pictures), which can be customized and arranged in simple, pre-defined layouts
- Pre-defined set of interaction elements, such as SMS buttons or HTTP buttons
- All elements can be synchronized with the AV stream
- Just a generic browser/rendering application is required on the terminal, as all aspects of the application are defined in the broadcast stream
- Easy and inexpensive to deploy, e.g. for shopping TV, call-in or voting program formats, frequent changes and re-launches are easy to handle

Approaches to Interactivity (2)

— Streamed multimedia applications

- Again, the application is entirely defined in the broadcast stream
- More powerful control over graphics, animation and interaction
- Candidate: MPEG-LASeR (*Lightweight Application Scene Representation*)
 - “Flash for streaming”
 - Going to become MPEG-4 Part 20
 - Based on Tiny-SVG V1.1 resp. V1.2
- Again, just a generic run-time component is required on the terminal
- More expensive to develop applications, justified for higher-value content



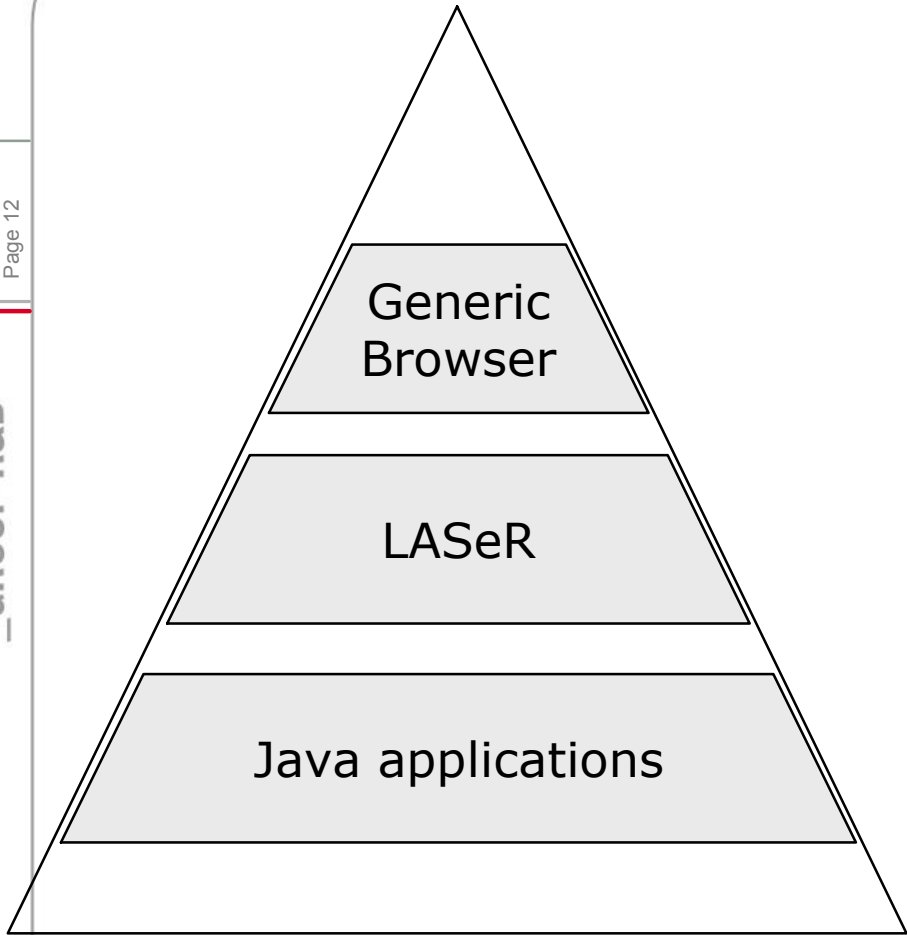
Approaches to Interactivity (3)

Java-based middleware

- Full-featured applications with complex logic
- Full control over interaction
- Applications may be downloaded over the broadcast channel or the interaction channel
- Expensive to develop
- Must be verified against all terminal types the operator wants to support for the application
- Justified for premium-content applications
- May be used to implement the “generic browser”



Interactivity: Middleware, LAsER, Generic Browser



Purely declarative, synchronized data streams
Pre-defined interactions
Generic terminal SW component
Economic deployment

Lightweight Application Scene Representation
Streamed multimedia
Versatile interactions
Generic terminal SW component

Full-featured applications with complex logic
Verification with all terminal types
Broadcast or interactive download
Expensive, only for value added services

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- _ Approaches to Interactivity
 - Generic Browser, Streamed Multimedia, and Java-based middleware
- _ **Interactive Middleware**
 - JSR 248, 249 and 272
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Interactive Middleware

- Mobile terminals are interactive from the beginning, unlike TV sets.
- Learning from the MHP experience
 - When MHP was conceived, JCP didn't exist yet
 - DVB was forced to create a “monolithic” specification
- JCP JSRs (Java Specification Requests) provide already many of the frameworks needed, such as MMAPAPI (Multimedia API, JSR 135)
- For general purpose orchestration of JSRs, mobile operators and handset manufacturers created Mobile Service Architecture (MSA) JSR 248 and 249 (Specification lead: Vodafone and Nokia)
- JSR 272 for Mobile Broadcast only specifies what is not provided otherwise

JSR 248 and 249: Mobile Service Architecture (MSA)

- Specify a mandatory set of JSRs for operator-qualified handsets as of middle 2006
- MSA for CLDC: JSR 248
- MSA for CDC: JSR 249
- Both created by the same experts group
- Both specify an equivalent set of JSRs
- JSR 248 is now in public review



JSR 248: MSA for CLDC

PDA Optional Packages (JSR 75)
Bluetooth (JSR 82)
MMAPI (JSR 135)
Web Services (JSR 172)
Security & Trust (JSR 177)
Location (JSR 179)
SIP (JSR 180)
Mobile 3D (JSR 184)
JTWI (JSR 185)
Wireless Messaging (JSR 205)
Content Handler (JSR 215)
Scalable 2D VG (JSR 226)
Payment (JSR 229)
Adv. Multimedia Suppl. (JSR 234)
Mobile I18N (JSR 238)
MIDP 2.0 (JSR 118)
J2ME CLDC 1.1 (JSR 139)



JSR 248: MSA JSRs included

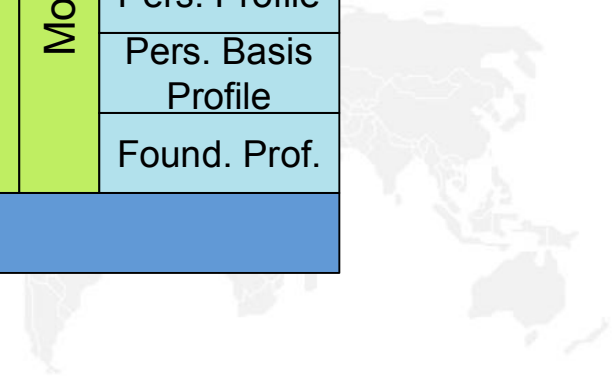
- J2ME Connected Limited Device Configuration 1.1 (JSR 139)
- Mobile Information Device Profile 2.0 (JSR 118)
- JAVA Technology for the Wireless Industry 1.0 (JSR 185)
- PDA Optional Packages for the J2ME Platform (JSR 75)
- JAVA APIs for Bluetooth (JSR 82)
- Mobile Media API (JSR 135)
- J2ME Web Services (JSR 172)
- Security and Trust Services API (JSR 177)
- Location API for J2ME (JSR 179)
- SIP API for J2ME (JSR 180)
- Mobile 3D Graphics API (JSR 184)
- Wireless Messaging API (JSR 205)
- Content Handler API (JSR 211)
- Scalable 2D Vector Graphics API for J2ME (JSR 226)
- Payment API (JSR 229)
- Advanced Multimedia Supplements (JSR 234)
- Mobile Internationalization API (JSR 238)



JSR 249: MSA for CDC

JSR 248

PDA Optional Packages (JSR 75)			
Bluetooth (JSR 82)			
MMAPI (JSR 135)			
Web Services (JSR 172)			
Security & Trust (JSR 177)			
Location (JSR 179)			
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Mobile I18N (JSR 238)			
Found. Prof.		Pers. Profile	
Pers. Basis Profile		JDBC (JSR 169)	
Adv. Gr. & UI (JSR 209)		Mob. Op. Mg. (JSR 232)	
J2ME CDC 1.1 (JSR 218)			



JSR 272: Mobile Broadcast Service API for Handheld Terminals

- The scope of the proposal can be divided into two topic areas:
 - 1. Managing the interactive broadcasting services containing
 - Service search and discovery
 - Service & content access and consumption
 - Reception and consumption scheduling and timing
 - Service subscription, purchasing and
 - 2. Managing the applications delivered via the broadcasting stream containing
 - Receiving and management of Java applications
 - Application parameterization



JSR 272: MBS (continued)

— Specifically references only:

- MIDP 2.0
- MMAPI 1.1 (JSR 135)
- AMMS (optional)
- Generic Connection Framework (GCF) for interactive services



JSR 272: MBS APIs

— Service management level

- Service search and discovery
 - Full access to service guide information
 - Query and extraction of specific information
 - “Zapping” support, i.e. quick discovery of all available services
- Service & content access and consumption
 - Broadcast content/service retrieval (incl. tuning)
 - Access to AV broadcast streams by MMAPAPI (JSR 135)
 - Access to subtitles, tickers, image, and hypertext data
 - Access to terminal capability parameters, including signal strength, error rate, terminal profile information, version
 - Service lifecycle management
- Reception/consumption scheduling and timing
 - Plan the consumption of a given service
 - Perform storing/recording at scheduled times
- Service subscription, purchase and interaction
 - Framework for user identification, service purchasing and provisioning (but no new payment API)



JSR 272: MBS APIs (cont.)

— Application management level

- Receiving and management of Java applications delivered via broadcast
- Application parameterization support

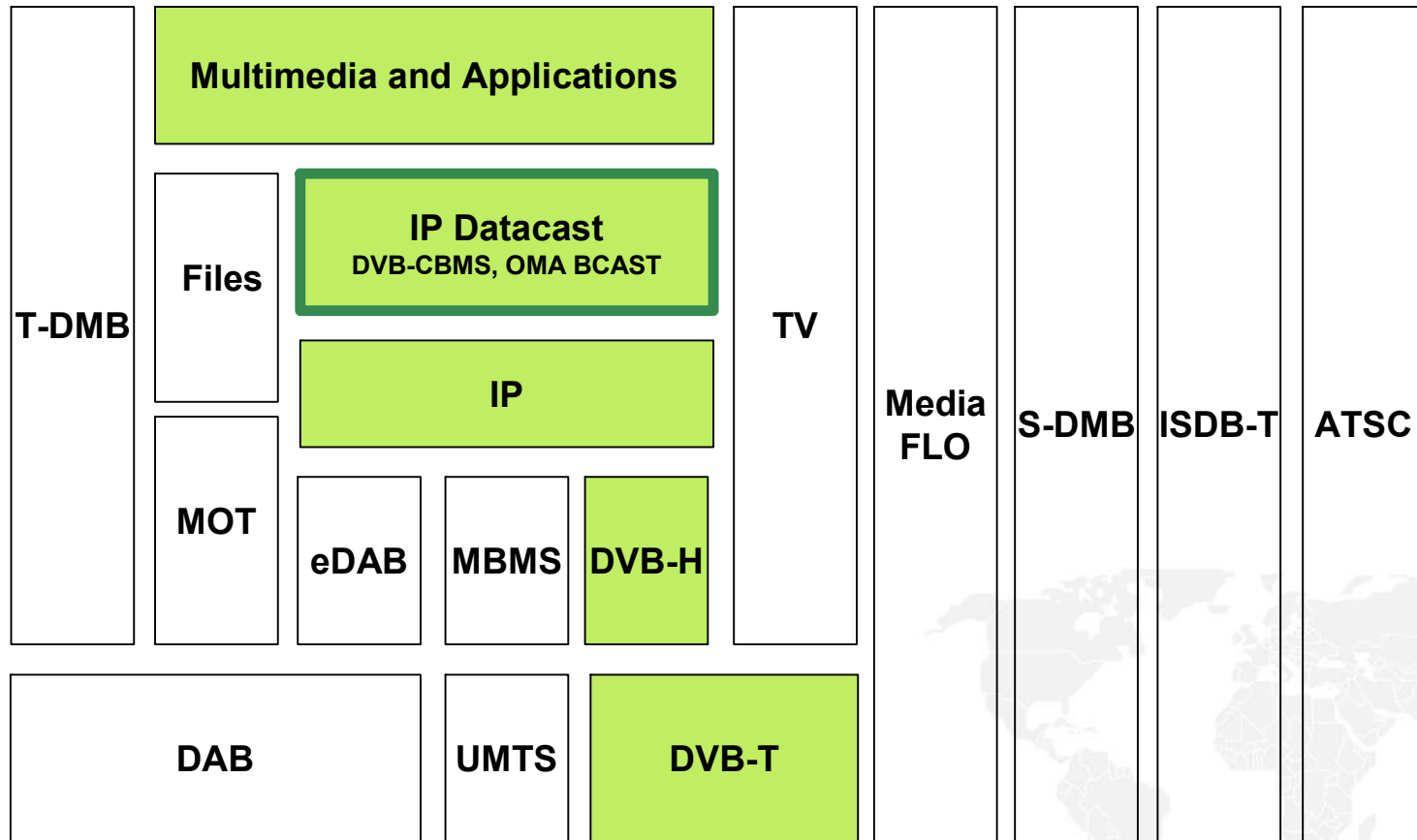


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IP Datacast: The Application Architecture



Standardization: DVB-CBMS (1)

- Phase 1 final draft specifications approved
 - SPP (Service Purchase and Protection) with a delay
- Components (ETSI documents, to be published)
 - Use Cases
 - Architecture
 - Electronic Service Guide (ESG)
 - Content Delivery Protocols
 - PSI/SI for IPDC in DVB-H Systems
 - Service Purchase and Protection
 - Specification for the use of Video and Audio Coding in DVB services delivered directly over IP, Annex B
- Sufficient just for protected Mobile TV and download services
- Phase 2 is about to be started

Standardization: DVB-CBMS (2)

— Features to be discussed for phase 2

- A generic “trigger” mechanism to support synchronized actions in the terminal
- ESG retrieval using the interaction channel
- Integration of location services
- Downloads to secure storage media
- Interactivity in general
 - Browsers, multimedia formats, and middleware
- and more ...



Challenge: Integration of mobile and broadcast network

— So far, both networks are complementary and do not know about each other (at the network level)

- Only applications may know about both
- Can lead to an awkward service quality

— IoN, Interworking of Networks, takes a good start here

— Potential for further development:

- Utilization of location service for broadcast network discovery
- Integrate MBMS, DVB-H and DXB (IPDC over DAB), maybe even WiFi, since all of them support IPDC applications and hybrid terminals are to be expected





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Phone

Games

Movie

Interactive

Shopping

Utilities



What's Up? - Cinema **Tap**

◀ **Movie Starts** ▶

Mann unter Feuer

USA 2004, 142 Min.
R: Tony Scott
D: Denzel Washington
Dakota Fanning
Christopher Walken
Giancarlo Giannini

Start: 30.09.2004,
FSK: 16

MESSAGE MOVIE FINDER MORE

STORY TICKET

Phone

Games

Movie

Interactive

Shopping

Utilities



What's Up? - Cinema

Tap

Movie Story

Mann unter Feuer

ACTION

Der Rache-Thriller von Tony Scott wandelt auf den Spuren von Charles Bronsons "Ein Mann sieht rot" - und spiegelt den militanten Geist der Bush-Administration.

MESSAGE

MOVIE FINDER

MORE

TICKET

BACK

Ticket



Mann unter Feuer

Kino: CinemaxX Potsdamer Platz - 19

Datum/Zeit: 20.10.04 19:30

Kino Adresse: Potsdamer Straße 5
10785 Berlin



CALL

ADD TO CALENDAR

Tickets: 0 30 / 25922111

MESSAGE

MOVIE FINDER

MORE

MAP

BACK

Phone

Games

Movie

Interactive

Shopping

Utilities

What's Up? - Cinema Map tip

The map displays a street grid in Berlin. A red circle highlights the location of CinemaxX at Potodamer Platz, 10785 Berlin. The map includes labels for streets such as Lennéstr., Bellevuestr., Pötsdamer Str., and Joseph-von-Eichendorff-Gasse. A yellow line indicates a route or boundary.

CinemaxX
Potodamer Straße 1-4
Potodamer Platz
10785 Berlin

MESSAGE CINEMAS NEARBY ROUTING BACK

Phone

Games

Movie

Interactive

Shopping

Utilities



PLUS



NEXT > 7%

**KOOL SAVAS
FEAT. LUMMIDEE_
DIE BESTEN TAGE ...**



2ND > 3,8%

**FERRIS MC &
TOBIE TOBSEN_
FEIERABEND IN DER ...**



3RD > 3,2%

**BRITNEY SPEARS
FEAT. MADONNA_
AGAINST THE MUSIC**



PROGRAM

MESSAGE

VOTING

MORE

2'55

**HERBI34 > SUSI I LOVE YOU
HEIRATE MICH SOBALD DU MAL ZEIT
HAST !!! KUSS DEIN BÄRCHEN**



GET THE CLIP > VIDEO LIST

ALEXANDER_	3 MIN.
FREE LIKE THE WIND	🚫
ANASTACIA_	8,2%
LEFT OUTSIDE ALONE	
BRITNEY FEAT. MADONNA	3,2%
AGAINST THE MUSIC	
BABY BASH_	2,3%
SUGA SUGA	
BACKYARD BABIES_	1,3%
MINUS CELSIUS	
BEATSTEAKS_	0,7%
HAND IN HAND	
TONI MARSHALL_	0,0%
BRAINDEAD	



GET THE CLIP > VIDEO LIST

- ALEXANDER_ 3 MIN.
- FREE LIKE THE WIND
- ANASTACIA_ 8,2%
- LEFT OUTSIDE ALONE
- BRITNEY FEAT. MADONNA 3,2%**
- AGAINST THE MUSIC**
- BABY BASH_ 2,3%
- SUGA SUGA

▶ Britney feat. Madonna
Against the Music

Markus, du bist mein
Superstar!