

A Review of Digital Cinema

Michael Karagosian
NATO Digital Cinema Consultant



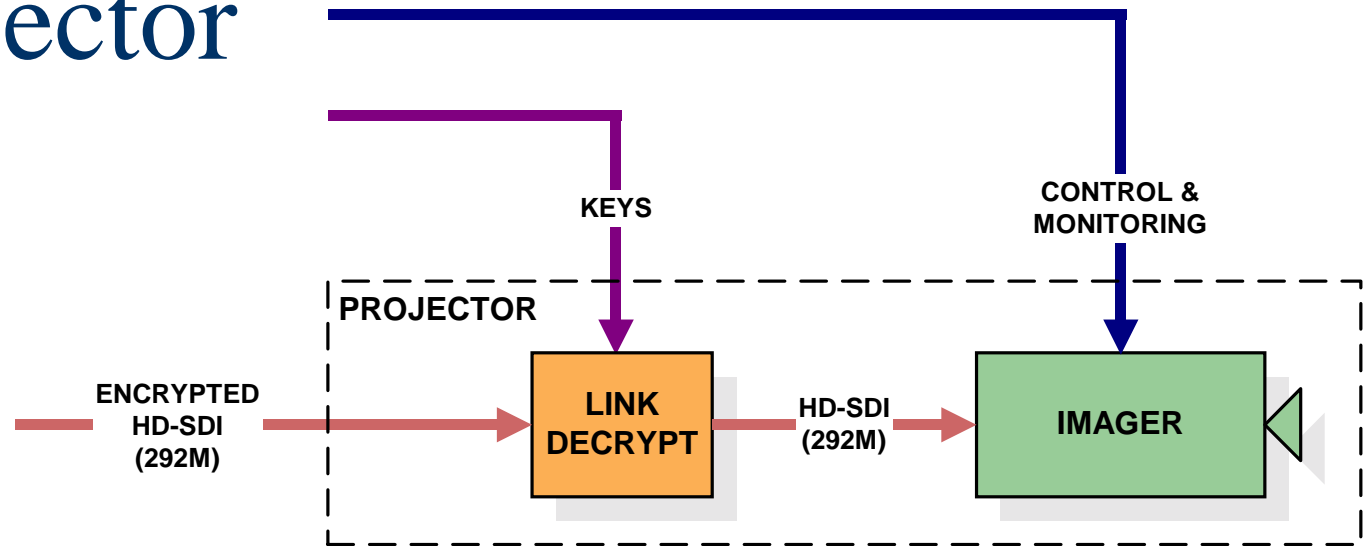


Digital Cinema Systems

- Exhibition System Organization
- Design Level Considerations
 - Standards

SYSTEM ORGANIZATION

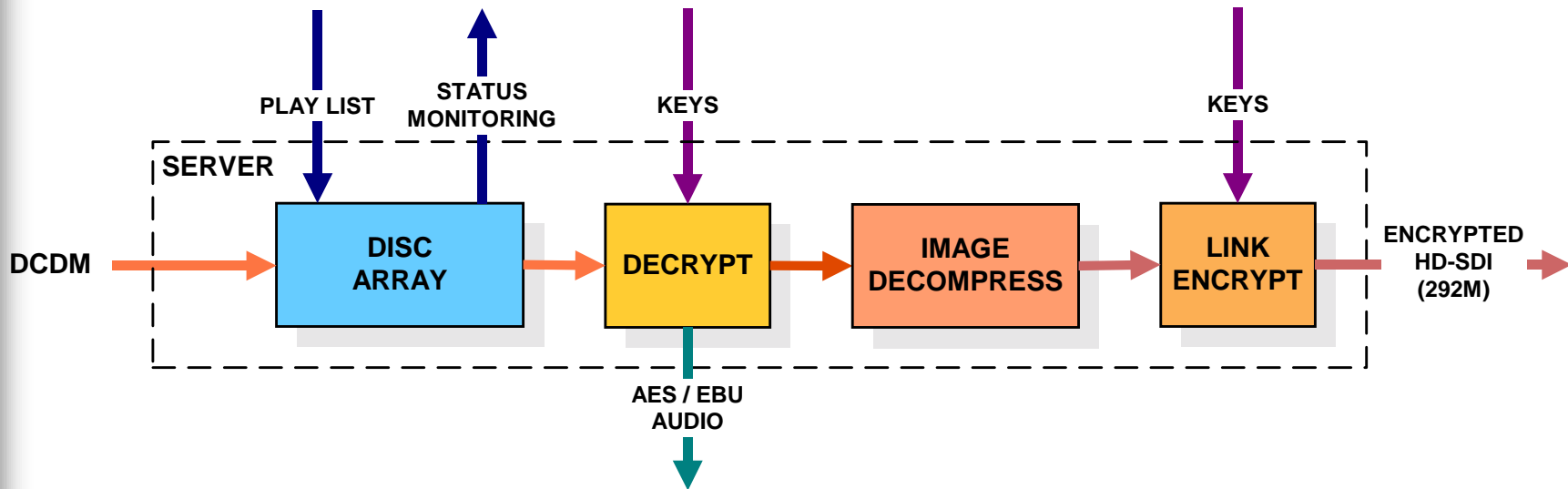
Projector



- Decryption
- Image Scaling
- Color Management
- Format and Lens Control
- Status Monitoring

SYSTEM ORGANIZATION

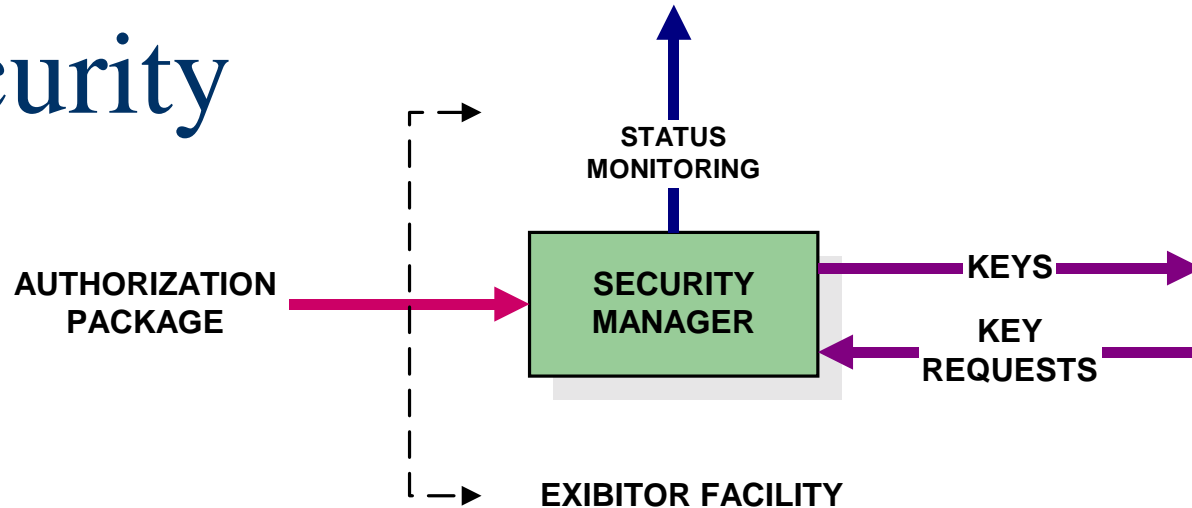
Server



- Play List Operations
- Decryption & Decompression
- Link Re-Encryption
- Status Monitoring

SYSTEM ORGANIZATION

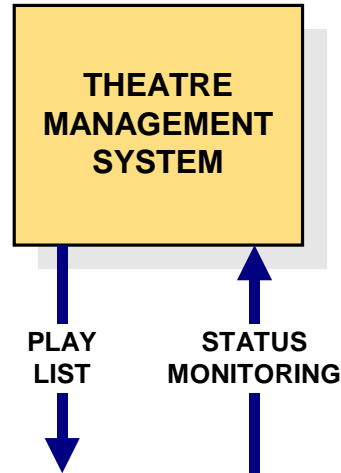
Security



- Authorization Package
= content keys + DRE
- Receives Key Requests
- Securely Transmits Keys to Devices
- Status Monitoring

SYSTEM ORGANIZATION

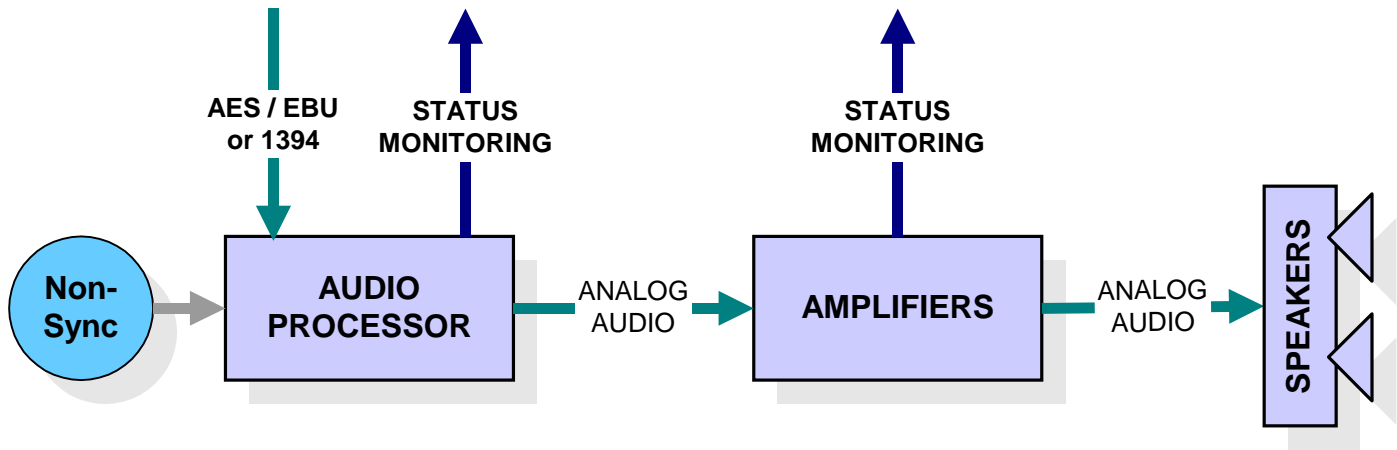
Theatre Management System



- Server Management
- Play List Generation
- Status Monitoring

SYSTEM ORGANIZATION

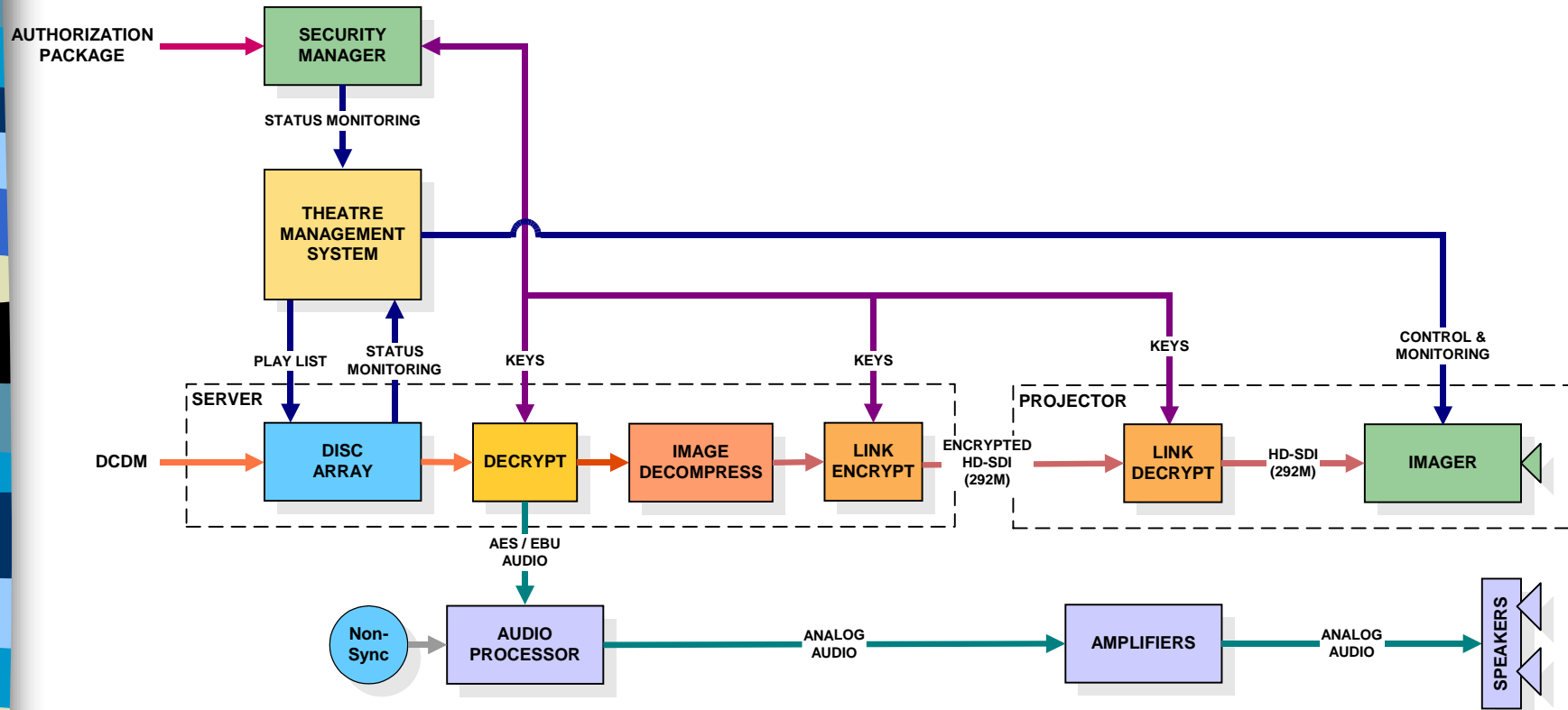
Audio System



- Digital Input -- AES/EBU or 1394
- Format Control via Metadata
- Status Monitoring

SYSTEM ORGANIZATION

Exhibition System





Where Standards Apply

1

- Image & Audio File Formats
 - SMPTE (DTIM)
- Colorimetry
 - SMPTE
- Metadata Content & File Format
 - SMPTE



Where Standards Apply

2

- Compression
 - MPEG / SMPTE
- Encryption
 - AES/Rijndael, Triple DES
- Data Packaging Method
 - SMPTE

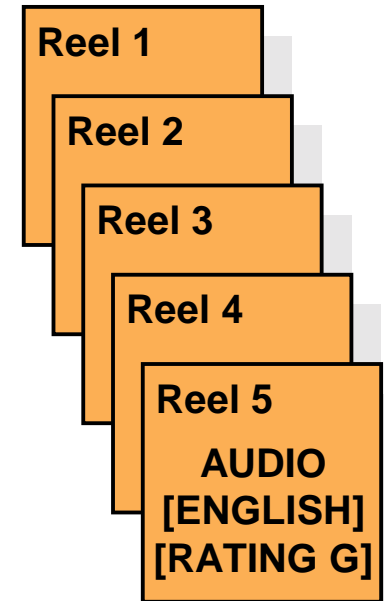
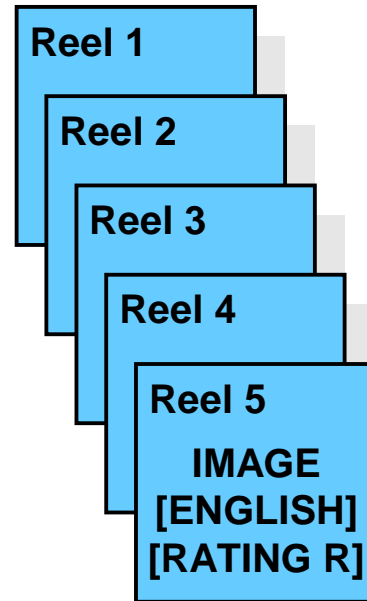
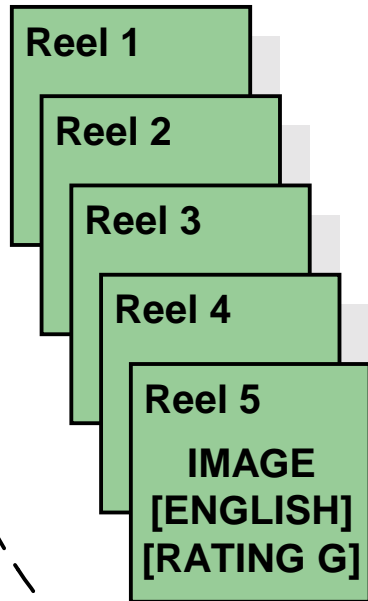


Where Standards Apply

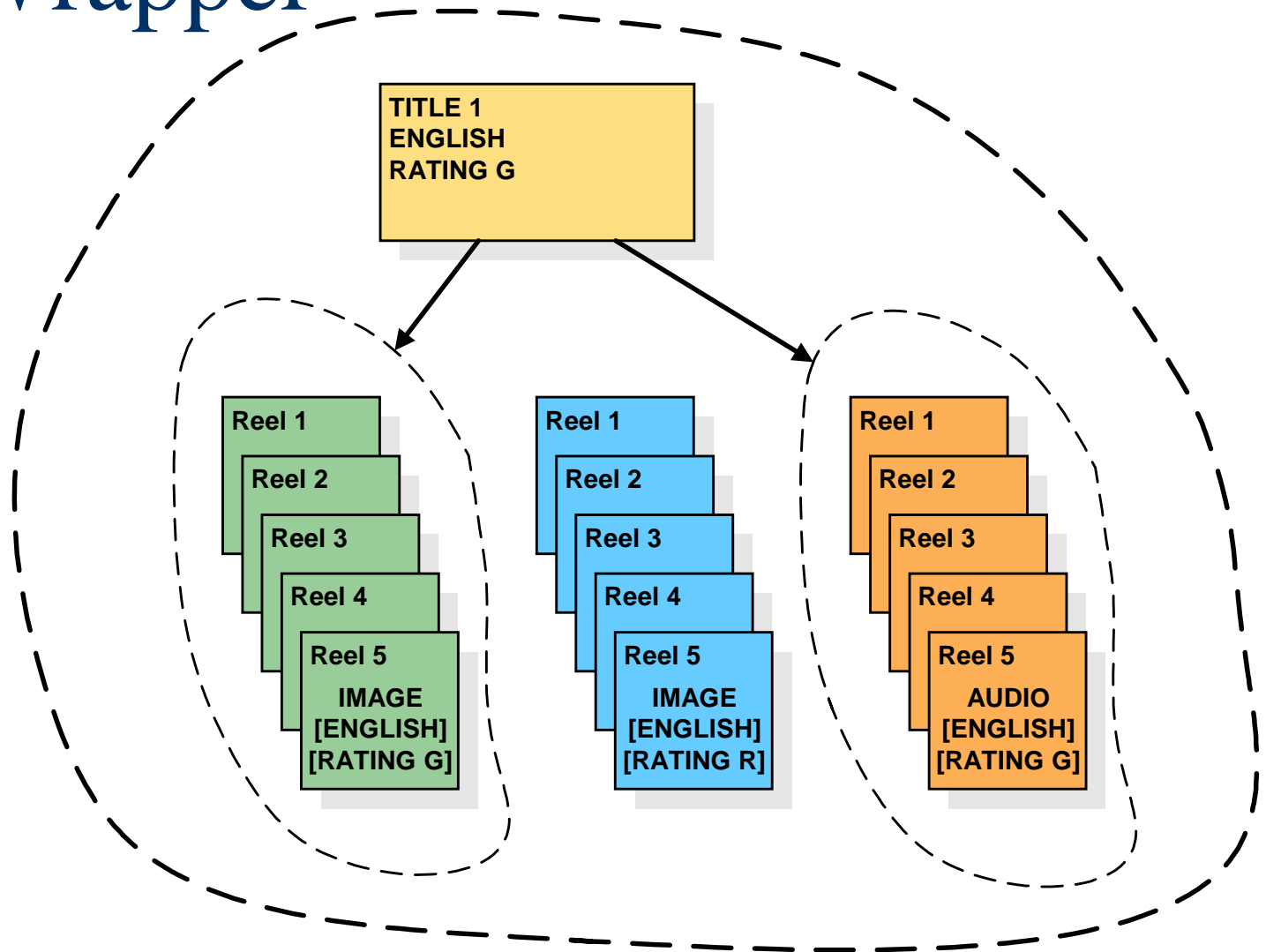
3

- Control & Monitoring
 - IETF (SNMP)
- Digital Rights Expression
 - XrML (Open Standard / ContentGuard)
- Key Distribution
 - ITU-T Recommendation X.509
 - IETF (IPSEC)

PACKAGING Method



PACKAGING Wrapper





Summary

- Complex Systems
- Interoperability is the Goal
 - Existing standards to build from
 - Standards to create

Thank you!

This presentation at: <http://mkpe.com/articles>

Michael Karagosian
NATO Digital Cinema Consultant

