



Dear Kinoton Customers,
Business Partners, and Colleagues!

Following a very long and extremely slow teething phase, digitization of the film industry has now finally reached a critical mass. Many cinema operators have by now equipped at least one auditorium with digital technology, and their staff have learned how to operate it properly and become used to the new work routines and requirements it involves.

However, the next step of switching multiple screens over to digital poses new challenges. In order to speed up, simplify, and optimize work routines in a digitized multiplex environment, a well-planned concept is essential. Owners have to familiarize themselves with the possibilities and advantages of theatre management systems (TMS) and make astute decisions. We have created this issue of "Kinoton Special" to help you master these challenges.

Sincerely,

Renate Zoller
CEO of Kinoton GmbH

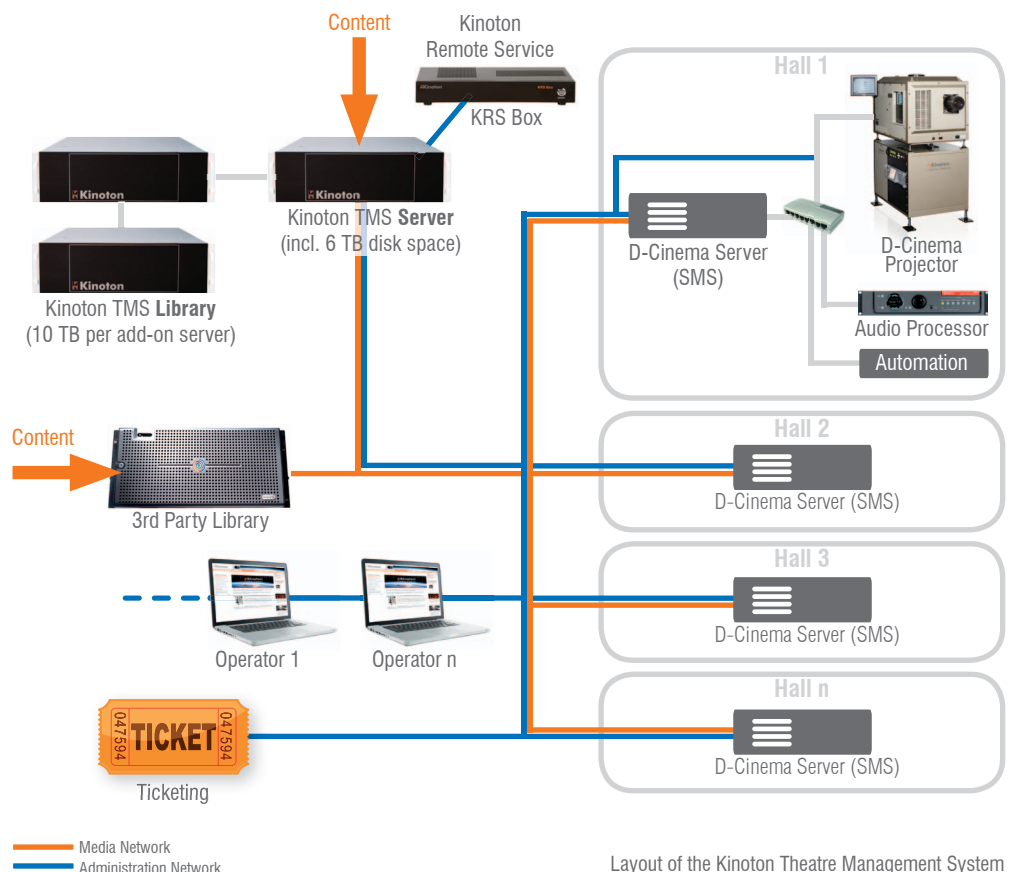
Theatre Management Systems: Networked Movie Theatres

Many theatres have already installed digital technology for multiple screens. But digitizing more auditoriums also makes it more time-consuming to ingest movies and commercials and increasingly complicated to manage KDMs and playlists. A theatre management system, or TMS for short, centrally harnesses all of the processes and routines involved in digital cinema. This lets you fully tap the work and cost saving potential of digital technology.

A theatre management system (TMS) is a networked, cinema-wide system for centrally managing and operating equipment such as projectors and servers in multiple projection rooms. Without budging from a single location in the theatre, you can load new digital cinema packages (DCPs), enter KDM keys, assemble, edit, and schedule shows, and automatically distribute them to the right auditoriums of a multiplex.

A bare-bones theatre management system consists of a set of basic functions and a library, which is a central repository for digital films. Many vendors also sell additional modules to expand the functionality of a TMS.

The digital cinema system specifications of the DCI cover not only screen management systems (SMSs) for local operation (synonymous with D-Cinema servers), they also include stipulations and recommendations for networked theatre management systems. All of the specifications and functions listed there were taken into account while developing the Kinoton TMS.



Layout of the Kinoton Theatre Management System

How a TMS Works and Benefits You

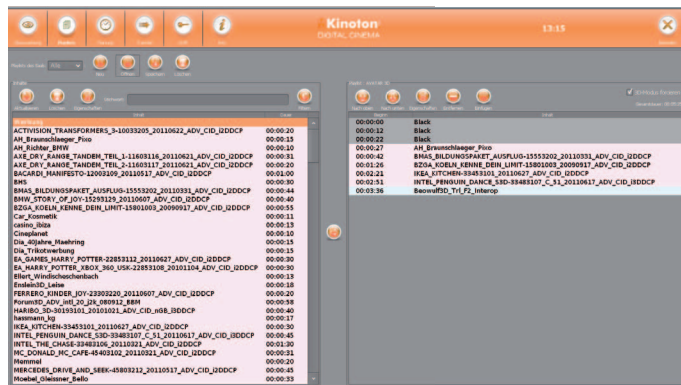
When new movies and KDMs arrive at a theatre, they are loaded into the local disk array of the TMS server, verified, and copied to a central database.

The user interface of the TMS lets you access all DCPs, playlists, and locally available automation macros for all connected D-Cinema servers as well as all content stored in the central library. As a result, when assembling a new show you can freely choose from all content available at the theatre without having to bother about where it is physically located. You can then either manually assign the finished playlist to an auditorium or manage it with the scheduler. The TMS automatically transfers the new show, along with all of the required DCPs, KDMs, etc., to the selected screen server. The system does this intelligently: to avoid overloading the overall network or its individual servers, which could interfere with shows in progress, it fetches content from different sources depending on availability. Afterward you can start the show either from the user interface of the corresponding D-Cinema server or directly via its scheduler, the theatre automation system, or the central auditorium controller of the TMS – from anywhere in the network.

Particularly in multiplex theatres, this centralized preparation of show playlists, content management, and scheduling saves a huge amount of time. Before the advent of theatre management systems, each time a hard drive arrived it was necessary to walk from one D-Cinema server to the next, each time repeating the time-consuming process of ingesting the new movies onto the server, entering its KDM, and assembling an auditorium-specific playlist. With a TMS, it's a snap to do this from a single workplace simply by clicking with the mouse. You can even quickly change auditoriums at short notice at the press of a button – provided, of course, that the KDM key is valid for both. To ensure this, the TMS displays a practical overview of all of the theatre's license keys and their validity. At the same time, the user interface provides information on the current system status of all connected equipment in all auditoriums.

Hardware Requirements

Sometimes a collection of networked D-Cinema servers is incorrectly called a theatre management system. A genuine TMS includes high-performance hardware and network components for transferring digital film data from a central library server or a D-Cinema server to an auditorium



Playlist Editor

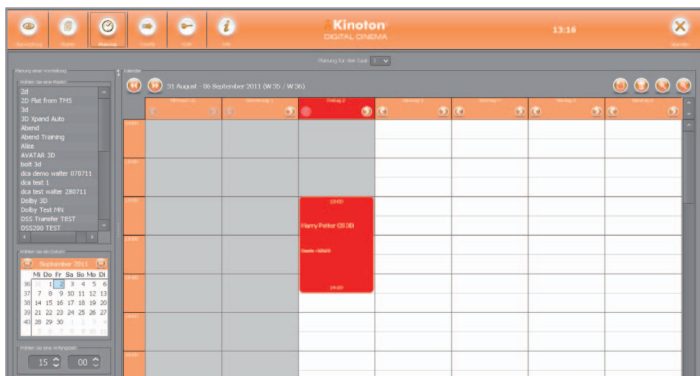
while complying with the DCI specifications. The TMS should also have ample spare capacity, or be designed to permit later expansion, for example in order to digitize additional screens or upgrade to 4K.

Especially in multiplexes, a theatre management system must be able to perform multiple operations concurrently. For example, while new content is being loaded and verified (ingested) in the central server, it might also need to transfer new shows to three different auditoriums while making a last-minute program swap between two other screens at the same time. Large cineplexes regularly need to perform feats like this one, which would be impossible with networked screen servers alone. The hardware of the TMS should also include all of the commonly required interfaces for copying new content, such as USB and DVD-ROM.

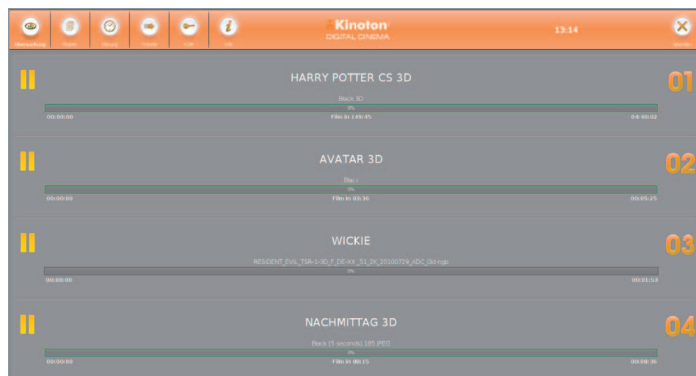
To prevent digital film data from being lost if a library hard disk fails, the entire disk array must be redundant and operate at a sufficiently secure RAID level (see the box on the next page for more information). The power supply unit of each server, which experience has shown to be the most vulnerable component, should also be duplicated.

Network Infrastructure

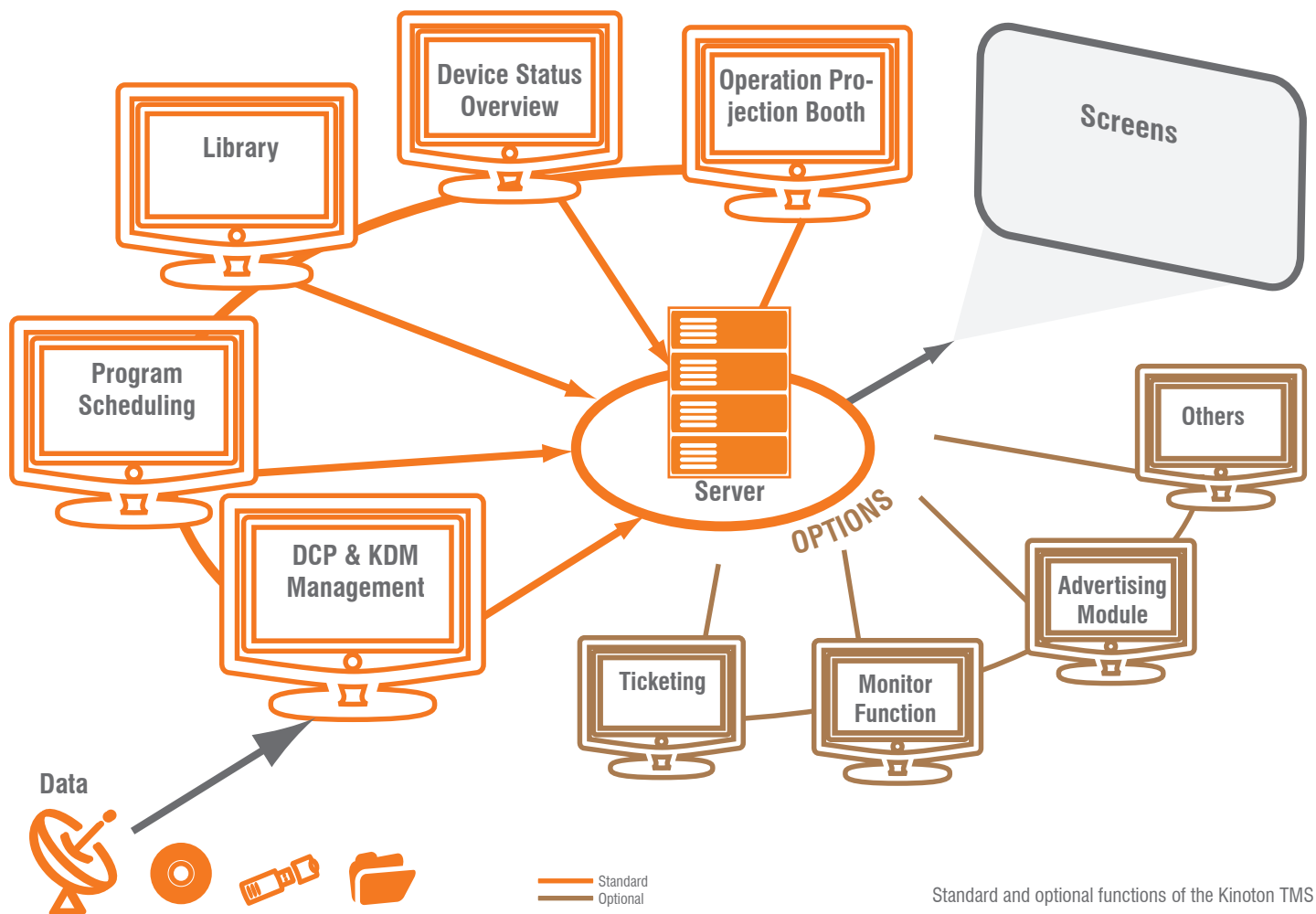
According to the DCI specifications, a TMS requires two independent networks. A management network is used to control, administer, and



Higher-level program scheduling



Status overview for all auditoriums



Standard and optional functions of the Kinoton TMS

operate the system. In addition, the theatre requires a special dedicated, high-performance media network for exchanging data between the TMS and the individual D-Cinema servers. It is highly advisable to avoid using this media network for any other purposes. The Kinoton TMS also optionally provides a network interface for hooking up to external content sources, e.g. for satellite downloads or remote maintenance. To cope effortlessly with the enormous data volumes involved, dependable “programmable” network switches are also a must. For multiplexes with many screens, or in order to be ready to upgrade to 4K later on, it is worth considering to use copper or fiber-optic cables that conform to the 10-GBit/s standard. Custom planning by a Kinoton sales and service partner will save you unnecessary costs and ensure that your theatre management system works without a hitch.

The Library

Depending on the vendor’s philosophy and architecture, a theatre management system can already include disk storage for digital films, or else this storage unit – called the “library” – has to be separately purchased. The library should have at least enough capacity for an entire week’s programming for all auditoriums. To be prepared for future expansion of the system, e.g. for switching more screens over to digital cinema, it should be possible to easily extend the library’s capacity by any amount at any time. It is also important to make sure that stored digital content is reliably protected from data loss.

A TMS with integrated library is an attractive option for multiplexes and single-auditorium theatres alike. Arthouse and program cinemas in particular have to keep a large selection of films on hand. Many D-Cinema servers lack sufficient storage space for this and usually can’t be expanded by much, if at all. The TMS can therefore serve as a flexible, scalable film archive that, because of its redundant structure, also ensures a high level of data security.

Redundancy and RAID

Redundancy increases the reliability of critical components e.g. by duplicating them. If one should fail, the other takes over from the defective unit or part to ensure continued operation or prevent data loss.

RAID stands for “Redundant Array of Independent Disks”. There are different ways, known as RAID levels, to interconnect the individual disks within the RAID disk array. Most D-Cinema servers use RAID 5, which prevents data loss if one disk breaks down. High-end theatre management systems like the Kinoton TMS work with the much more secure RAID 6, which can even handle the simultaneous failure of two disks without any loss of data. RAID 6 also permits faster data transfer rates.



Data volumes

The following table shows how many digital 2D and 3D films lasting three hours (180 minutes), including the associated audio and meta data, can be stored in the Kinoton TMS in compliance with the DCI specifications *):

	Storage capacity	No. of movies
Basic TMS	6 TByte	18
Basic TMS + 1 extension	16 TByte	49
Basic TMS + 2 extensions	26 TByte	80

*) Figures not guaranteed; they depend on the bit rate.

Additional Functionality

Besides the basic functions of a theatre management system, the entry-level version of the Kinoton TMS already boasts a number of innovative additional features. For example, the system is compatible with screen servers from various manufacturers. It currently supports D-Cinema servers from Dolby, Doremi, Qube, and GDC, which lets you use the Kinoton TMS in a heterogeneous environment without any problems. Depending on the server model used in the projection room, the Kinoton TMS makes available a consistent, clearly structured user interface for all screen servers. You can also use its user interface to operate various functions of the digital cinema projectors such as switching the xenon lamp on and off, controlling the dowsers, and starting projector macros. You can also directly access the audio processor, for example to select audio formats or adjust the volume. Even automated functions like the auditorium lighting can be conveniently controlled via the user interface of the TMS if the corresponding hardware is installed.

The hardware of the Kinoton TMS also exceeds the standard requirements. For example, the base unit is equipped not only with the most frequently needed inputs for loading new content, but with ports for CRU removable disks, eSATA, and memory cards as well. An open interface also lets you connect to the established distribution channels. Taken together, this gives you maximum flexibility.

The library system of the Kinoton TMS is modular and extendible. It includes a basic disk array with about six terabytes of capacity that can be extended almost without limit by adding more library units with 10 TB each. The library units also deliver outstanding data security, thanks to RAID Level 6 and redundant power supply units. What's more, third-party libraries can be integrated into the media network of the Kinoton TMS and managed via its user interface. This makes the TMS highly

flexibly and adaptable, which reduces its purchase cost and makes for a manageable total cost of ownership (TCO).

The Kinoton TMS can be supplemented and adapted for meeting special requirements by buying various other options. An import/export module lets the TMS exchange programs and schedules with the box office system via a bidirectional interface. An advertising module allows you to incorporate predefined blocks of commercials into a show. To accomplish this, placeholders are inserted in the playlist, which the screen advertising agency dynamically fills with commercials and the corresponding spot scheduling information. A monitor function shows, via the TMS user interface, a live picture from a camera installed in any auditorium or projection room. This way you always have a complete overview of what's going on. A DCP preview function allows you to look at the contents of unencrypted DCPs, such as trailers or advertising, with reduced resolution while assembling a program. Other modules, such as a messenger module and one for lobby displays, are also available for the Kinoton TMS on request.

Service, Administration, and Maintenance

A theatre management system lets you realize considerable savings by optimizing work routines and deploying personnel more efficiently. Its redundancies also very effectively safeguard the overall system against failure – provided that the system is regularly and professionally checked and serviced. This should include its administrative functions, all of the IT equipment (hardware, the network, RAID, system upgrades, etc.), as well as software updates and extensions. System maintenance within the scope of an appropriate service contract makes sure that your TMS will continue to work reliably for many years to come with a minimal TCO.

Many maintenance tasks, such as software license management and preventive checks of hard disks, can be done online to save time and costs. The TMS should therefore be equipped with the interfaces and configuration possibilities required for remote maintenance. The Kinoton TMS, for example, is quick and easy to link to the Kinoton remote service platform for maintenance and administration. This remote diagnostics system has only recently been extended so even more tasks can be performed over the Internet without requiring a service technician to visit you.



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