## Spirtech: the Calypso Technical Expert

| Understand | Learn | Master |
| --- | --- | --- |
| the technologies and products implemented in Calypso transactions | how to do the usual operations using practical cases | the current technical specifications and their evolutions |

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More than 20 years' experience in the ticketing sector, they are the world experts of the Calypso standard.

### Advantages

**MODULAR TRAINING**

The Calypso training from Spirtech contains several modules, which may be adapted to your objectives. Modules close to your concerns are studied in depth.

**DETAILED TECHNICAL CONTENT**

The content, regularly updated, provides the technical background to enable the elaboration of an action plan for Calypso projects.

**PERSONALIZED TECHNICAL CONTENT**

Spirtech may assist you throughout your projects. From the specification design to assistance in your first work to ensure your success.

### Practical information

**TRAINING SESSION ORGANISATION**

- Duration: 1 to 3 days according to your needs.
- Location: 29 rue du Louvre in Paris, or at your organization.
- Number of participants: 1 to 10 persons from the same organization.

**INFORMATION AND INSCRIPTION**

- Email: formation@spirtech.com
- Web site: www.spirtech.com

### Main training modules

❶ **Contactless Technology overview**
- Understand contactless issues and perspectives.
- Contactless: origins, principles, standard (NFC, ISO14443), etc.
- CALYPSO, the open ticketing standard: origin, usages, governance.

❷ **Calypso Standard Overview**
- CALYPSO around the world: transport networks, best practices.
- Market offer: range of existing products (CD21, Celego, Tango FC, Applets Java, etc.), contactless tickets, NFC phones.
- New technologies: a new dimension for ticketing systems. Prospective and anticipation: NFC, Internet, remote vending, etc.

❸ **Security**
- Introduction: principles, practical aspects, risk management, counter measures.
- Security modules: SAM and HSM (specifications, HSP and PPS protocols).
- Typical security architecture for the keys and SAM.
- Central management: remote vending, SAM supervisor, fraud detector.
- Presentation of the test SAM (SAM-TEST F5).
- Analysis of the cards pre-personalization (key transfer).

❹ **Implementation**
- CALYPSO Specifications (Revision 2, Revision 3, work under way).
- In depth analysis of the main Calypso specification features (Session mechanism, security and file management, etc.).
- Analysis of typical transactions.
- Java Card applet: download, remote activation.
- Data models (management of the cards and tickets data).
- Validation terminal software (optimization of the processing time, SAM and card management).
- CALYPSO beyond transport: city pass, university card, enterprise card…
- Practical cases (Initialization of a CD21, keys pre-personalization, transaction: setting up Calypso secure sessions).

### Spirtech: *unmatched mastering of the Calypso open standard*

Spirtech is the main technical advisor of the **Calypso Networks Association (CNA):**
- Spirtech designed the Calypso standard security principles.
- CNA trust Spirtech to design and market the Calypso SAM since its origin.