Shanghai Beauty

Ding Ye

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Shanghai Beauty

BY
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I. Proposal

<table>
<thead>
<tr>
<th>Working Title:</th>
<th>&lt;Shanghai Beauty&gt; (&lt;Hyacinth&gt;)</th>
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<td>Ding Ye</td>
</tr>
<tr>
<td>Start Date:</td>
<td>June 2002</td>
</tr>
<tr>
<td>End Date:</td>
<td>Summer 2004</td>
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<tr>
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<td>Around 5 minutes</td>
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One busy night around 1930 in pre-revolution Shanghai, a lively rickshaw driver gives a ride to the most famous dancer in the city. The driver falls in love with the girl, ultimately killing a man to protect her. Tragically, the rickshaw driver is killed by a detective, who was actually working with the dancer to set up the rickshaw driver. The dancer, like the Hyacinth flower, was beautiful but deadly.

A. Storyline

A beautiful night has fallen on Nan Jing Street, the most flourishing street in old Shanghai. Colorful neon lights flash, and crowds of people walk the street. The most famous dancer in the city, Mrs. A, dances and sings the classical song "Rose, Rose, I Love You" at Shanghai's largest dance hall. A young Detective C gazes at Mrs. A, obviously attracted. Mrs. A notices Detective C, and returns his gaze. She dances towards him and puts a rose in his jacket pocket.

Later, in the wee hours of the morning, the neon lights of Nan Jing Street have been turned off, and it is quiet. At the main entrance of the dance hall, some rickshaw drivers are waiting for the hall's rich patrons to leave for the night. Mrs. A leaves the dance hall and chooses the nearest driver, Guy B, a lively young man. Guy B starts to run with his client, who soon falls fast asleep.

When the rickshaw driver reaches Mrs. A's apartment, he finds her still sleeping soundly. He stops his coach and waits for her to wake. Suddenly, a boy runs past them, a young thief. Police chase after him, blowing their whistles. Mrs. A wakes at this sound, pays Guy B for the ride home, and approaches her apartment. At the top of the stairs, she turns to Guy B and says, "I need a rickshaw driver. Come here tomorrow at 9:00pm, okay?" Guy B looks at her for a while and says: "en."

Once again, Mrs. A sits in Guy B's rickshaw as he brings her to the dance hall, the neon lights of Nan Jing street reflecting beautifully in the rain. At a corner, he trips, and cuts his hand. When they arrive at the dance hall, Mrs. A notices the blood on Guy B's hand. She takes out a handkerchief with a hyacinth flower pattern on it and
The next day, Guy B paces in front of Mrs. A's apartment, her now clean handkerchief in hand. Mrs. A leaves her apartment, and Guy B quickly hides her handkerchief in his pocket. Though Mrs. A notices this, she doesn't say anything, and instead smiles at Guy B.

Another night on Nan Jing street, and Guy B waits under the cloudy sky for Mrs. A to leave the dance hall. The neon lights are turned off, and Mrs. A exits the hall, but this time a fat, obviously rich man, hugs her. Mrs. A does not look happy. "You do not need to serve me today," she tells Guy B. "You change your rickshaw driver?" the fat man sneers. The fat man throws a fifty-dollar bill at Guy B and leaves with Mrs. A. Guy B just stands there.

Worried, guy B waits for Mrs. A at her gate from morning until night, until she finally returns. She looks exhausted, cannot walk straight, and is wounded on her neck and arms. She sees Guy B and tells him, "I am all right. Today I cannot work. Come back tomorrow, okay?" She staggers and tumbles. Blushing, Guy B helps her upstairs to her apartment. Mrs. A sits down beside the window, while Guy B stands there awkwardly, not knowing what else he should do. On the veranda, some beautiful hyacinth plants grow. Guy B notices them and tells Mrs. A, "Those flowers are really beautiful." "Yes," Mrs. A responds, "Hyacinth is my favorite." A long silence follows. Suddenly, Mrs. A hugs Guy B, and starts crying. Guy B starts to hug Mrs. A back, but stops.

The next day, Mrs. A asks Guy B to take her somewhere else instead of the dance hall. Guy B agrees, and soon they arrive at a large and luxurious mansion. Before entering, Mrs. A turns back, nervous, and asks Guy B to wait for her. Guy B looks up at the mansion, and sees the fat rich man standing in a second story window.

It is night, and street is quiet. Suddenly, the silence of the street is broken by a scream, and noise coming from one of the buildings. Guy B and Mrs. A run out of the building, their clothes stained with blood. Guy B throws a bloody knife away from them as they run. "This way!" Mrs. A shouts. They cut down a small, narrow street, and a man jumps out at them from the shadows.

Detective C stands in the dark, narrow street, smoking, and gazes at guy B. Guy B begs him not to give them away. Detective B says nothing, so Guy B and Mrs. A continue running. Detective C turns after them and takes out his pistol. Bang. Frightened pigeons flutter away into the night.
The sun rises, bathing the Huang Pu River in gold. Mrs. A and Guy B stagger towards the river bank, Detective C following behind them. Mrs. A and Guy B look at the river, and then at each other. They nod in silent agreement.

Splash. Detective C peers into the river. A handkerchief floats on the water. He shrugs, and turns away.

Two days later, on the corner of Nan Jing Street, a newsboy shouts, waving papers at passersby, "Extra, Extra, magnate killed!" A man stops and buys a paper. On the front page is a photo of Guy B, below the headline, "Rickshaw Driver Kills and Robs Magnate. Young Detective C Investigates Murder. Money Still Lost."

One week later, Mrs. A dances and sings the classical song "Rose, Rose, I Love You," at the biggest dance hall in the city. The young detective C gazes at Mrs. A, though something has changed: he looks much wealthier than before. When the dance hall closes, Detective C hugs Mrs. A and walks out with her, both of them laughing like old lovers.

B. Approach

In creating this animation, I plan to use traditional 2D drawing for all live characters. I will try to record live action references for the movement, especially the dancing scenes. I plan to use 3D for the background and vehicles. I will use some shaders, like Toonshader, to create the 2D and 3D objects in the same graphical style. I will composite the 2D and 3D elements together using After Effects. The main obstacle I will face is setting up the positions and timing the animation using both 2D and 3D. I have set aside one month to research and find the correct method.
II. Pre-Production

Based on the good and bad experiences of my winter film process, I knew ignoring the importance of pre-production costed me more time and effort than if I had used forethought and planning. For this film, I decided to take almost one year to complete pre-production, half of the time I planned to take to complete the project.

A. The Basic Technical Decision

During the original proposal, I started thinking about what kind of technique and style I would use. I based my decision on my animation ability and on what I wanted the story to represent.

I had four main characters and lots of background characters. I knew it was impossible to build all of them using Maya in this one-person project. Developing and animating 3D clothes and hair would also be too time-consuming. I decided my best choice was to create all of the characters traditionally, through hand drawing.

Another concern I had was the creation of backgrounds. Because I was not satisfied with my own drawing skill, I had two choices. One was to hire a background artist. I tried to find someone here or in China but could not find anyone satisfactory. My other choice was making the backgrounds in 3D. My final decision was to use Maya to create 3D backgrounds, so that I could take advantage of using Maya’s moving camera.

After these deliberations, I made two essential technical decisions: I would use 2D hand-drawn characters and 3D backgrounds.

B. Information Gathering and Deciding on a Graphic Style

I realized that a faithful recreation of Shanghai in the 1930s was a daunting task, and decided a site visit was necessary. I paid a short visit to Shanghai in the summer of 2002 and gathered information about Shanghai's glorious days in the 1930s. I collected, reviewed, and analyzed popular magazines, postcards, graphic calendars and comic books of that period to help me have a basic understanding of people's lives at that time - what they wore, how they commuted, how they entertained, etc. I also photographed the surviving old buildings and saved them for future use as modeling references.
After reviewing all the references, an old postcard finally gave me a strong feeling about the direction I should take for the graphic style of my animation. As the image below shows, a unique graphic style was created within the postcard by watercolor painting in two primary colors, yellow-orange and gray-green. The ragged edges and creases of shabby paper made the postcard more distinctive and impressive. I then decided watercolor painting with an aged film feeling was the main graphic direction I would take my animation in.

I now had other decisions to make. What kind of characters could fit into this graphic style? Classic Japanese cartoon or American superhero looking characters
would not work at all. The characters should be realistic but simplified. I discovered an old famous Chinese comic that depicted several stories happening in Shanghai in the 1930s-1940s. The comic artist used a sketch-like outline and exaggerated but realistic facial expressions. It is a kind of old style that has almost been forgotten in modern times. I developed my own characters from this style and they fitted into the whole set very well.

Comic book by a famous cartoon artist, Leping Zhang

C. Character Design

My film has four main characters, a Shanghai Cabaret dancer, a detective, a rickshaw boy, and a rich merchant. It is also only four minutes long. What does this mean? I must let the audience recognize different characters easily and clearly through each character’s appearance while using quick, MTV-style cutting. The characters’ outside representation should show their characteristics clearly and lead the audience to fit them into the correct types. Therefore, I designed my own characters by developing some well-known film roles. First, I followed some basic methods, such as the silhouette rule, and I set up four characters in different primary colors and sizes. Then I drew several sketches, asked other people’s opinions, and improved my drawings. After repeating this process several times, I had my final versions and made detailed character sheets, include three views, facial expressions, different costumes, etc.

The dancer may look unsophisticated, but is insidious in deep, unsatisfied with her status quo and wanting more. Her hair is a classic flip style of the 1930s. Her costume sets focus on multiple designs of the Chinese traditional dress – the cheongsam.
The dancing girl’s costume design

The detective is a low level officer at the beginning of the story. He is searching for any chance he can get to become rich and powerful. The gentleman’s mustache shows he is educated, and dreams of an expensive, western-like life. His costume sets are a classic business suit and coat with modern leather shoes.

The detective’s costume design

The rickshaw boy is an honest and unsophisticated guy who was born in northern China. He is young and strong. You can see lots of vitality from his behavior. He wears a classic rickshaw driver’s costume.

The rickshaw boy

Like most evil, rich roles, the merchant was short, fat, ugly, overbearing and silk-stocking. He has a modern gentleman’s mustache and always wears a tuxedo.

The fat ugly merchant

Background characters on the street
D. Technical Preparation

I devoted the first several months of preproduction to solving technical problems. I analyzed potential technical issues I might encounter in making this film and figured out possible solutions. Then I created short animation sequences to test different technologies, from 3D rotooning to synchronization of 3D computer generated sequences.

The first task was making watercolor-like scenes with Maya. After viewing several online documents, even the book The Making of Spirited Away, I found out there was not a ready-made method, but some toonshading technologies were similar to what I wanted. I developed my own process. I created a cartoon shader in Maya to give the 3D background a 2D look, then added watercolor effects with the help of Photoshop. The most important element in this process was the texture map. I did not model highly-detailed buildings, instead I used detailed and complicated texture maps to simulate the realistic lighting and hand-drawn feeling. As a test, I made the Paramount, a famous dance hall of Shanghai in the 1930s. This scene was also used for other technical tests later.

There were several vehicles in the film. I needed them to look like the 2D hand-drawn characters because they were all moving foreground elements. Therefore, the vehicles would need to be flat color with dark edge lines. I adjusted the toonshader, which I used for buildings, to make flat color. Before Maya 5.0, there was no method for creating a high quality outline in Maya. I used a simple version of a Maya plug-in ‘Inkworks’ that had been used in the animated film The Prince of Egypt. Inkworks was limited and unstable in the Windows platform. It worked only with polygon and NURBS geometries and did not support texture mapping. It took me several weeks to figure out the method. The whole process of making vehicles had three steps. The first step was rendering the flat color
image out with the regular Maya toonshader. The second step was rendering outlines out using Inkworks. The final step was combining the two images through Photoshop or After Effects. After Maya 5.0 was released, the vector render worked much better, so I replaced Inkworks with it. I then wrote MEL (Maya Embeded Language) scripts to drive the vehicles’ movement and secondary animation.

Several old style vehicles

Compositing with dark line layer and color layer

The dancer’s five cheongsams were carefully designed by researching several old posters and books. I modeled the cheongsam by using subdivision technology and adjusted UV maps for different texture maps. Outlines were made using specific texture maps and adjusted in Photoshop because ‘Inkworks’ did not support subdivision geometries. Body sets were also modeled and bound as reference for rotoscoping.
The dancer’s cheongsams

Only limited panning and zooming cameras can be used in traditional animation production. An advantage of building scenes in Maya was the use of a moving camera. The problem was synchronization of the 3D computer generated sequence with the 2D hand-drawn sequence. After attempting several industrial softwares, such as USAnimation and Animo, I returned to After Effects. After Effects can create 3D layers by importing limited Maya data and compositing different types of layers.

Editing tons of 3d layers at After Effects

E. Storyboard

I started drawing the storyboard at the same time I began technical preparation. In the beginning, I made too many shots and over designed transitions because I
followed the standard method of storyboard production for feature films. It resulted in the film lasting more than ten minutes. I discussed this issue with Johnny Robinson. He suggested a better method of handling length and complexity. We picked ten indispensable scenes from the original storyboard and followed quick, MTV-style cutting to convey the most information in a short period of time. After several improved drafts, the storyboard had only forty-four shots and was less than five minutes long.

F. Making a Schedule

After all the pre-production work was done, I made a detailed production schedule by carefully calculating workload. I also made several minor adjustments during the production.
III. Production

Production began in the spring of 2003 and took one year. The production stage covered 3D modeling, texturing, rigging, the animation process, traditional hand drawing, and the computer coloring processes. To complete my production I used Maya, Adobe Photoshop and the Adobe After Effects Production Bundle.

A. 3D Scenes

There were seven scenes, and most of the scenes had multi-lighting sets for different times of the day. Modeling and texturing work was not difficult, was but time-consuming. To save time and decrease my workload, I reused models as much as possible.

To keep the correct scale, I made a small polygon man, and when I started a new scene, I always put several men at the horizon and built several cubes as references for buildings. I modeled most of the scenes by using polygons because it is simple for cube-based objects and easy for texture mapping. For neon lights, electrical wires, and Chinese letters of outdoor advertisements, I used NURBS with two MEL scripts that can transform Chinese letters to curves and extrude high quality pipelines from multi-curves. I avoided creating too much detail during the modeling stage. The details were created later on in the texturing process. I only used a one direction light to illuminate the whole set for each scene. The lighting effects and shadows were totally made by texture.

Because I would composite 3D scenes with other elements in After Effects, I grouped several sets as layouts of traditional animation production so I could render them separately and used these layers as masks in After Effects.

B. 3D foreground elements
There were three parts of the 3D foreground elements: vehicles, cheongsams and the rickshaw with the driver. At the pre-production process, I finished most modeling and texturing work. Work in the production process focused on rigging and animation.

I wrote several MEL scripts to enhance the vehicles animation. After I gave the vehicle a moving path, the rolling motion of wheels, rotation of front wheels and the secondary animation of vehicles were all done by MEL scripts.

An example MEL script for controlling vehicle’s wheel action.

```maya
//Wheel rotation
float $distance = `arclen PathCar02`; 
float $radius = 0.398;
float $pi = 3.1416;

float $Upec = ( motionPath1.fractionMode ? 1 : 
PathCar0Shape2.spans );

//new version front wheel
float $currentCarrotateY;
float $futureCarrotateY;
float $Currentframe = `currentTime -q`;

$currentCarrotateY = groupCar02.rotateY;
$Currentframe = $Currentframe + 10;
currentTime -edit $Currentframe;

$futureCarrotateY = groupCar02.rotateY;
float $frontRotateY = $futureCarrotateY - $currentCarrotateY;
Wheel1.rotateY = $frontRotateY;
Wheel2.rotateY = Wheel1.rotateY;
Wheel3.rotateX = Wheel1.rotateX;
Wheel4.rotateX = Wheel1.rotateX;

Wheel1.rotateX = motionPath1.uValue * $distance * $Upec * 180 / $pi / $radius/2;
Wheel2.rotateX = Wheel1.rotateX;
Wheel3.rotateX = Wheel1.rotateX;
Wheel4.rotateX = Wheel1.rotateX;

//for car stop
float $CurrentDistance;
float $LastDistance;
float $LastTwoDistance;
```
float $Currentframe = `currentTime -q`;

$CurrentDistance = motionPath1.uValue * $distance * $Upec ;
if ($Currentframe<=0)
{
$LastDistance = $CurrentDistance ;
$LastTwoDistance = $CurrentDistance ;
}
if ($Currentframe>0)
{
if (($CurrentDistance-$LastDistance)<($LastDistance-$LastTwoDistance))
{
if (groupCar02Up.rotateX < 2) groupCar02Up.rotateX = groupCar02Up.rotateX + 0.2;
}
else
{
if (groupCar02Up.rotateX > 0) groupCar02Up.rotateX = groupCar02Up.rotateX - 0.4;
else groupCar02Up.rotateX = 0;
}
$LastTwoDistance = $LastDistance; //reset lastdistance to remember last frame's distance
$LastDistance = $CurrentDistance ;
}

Body sets were modeled with the cheongsam for rotoscoping. I created a skeleton and did the rigging set up. I also used driven keys for several joints and a classical double IKs method on her heels. For smooth and undistorted deformation of the cheongsam during animation, I used a blending shapes method. Sixteen blend shapes were made for different parts or poses of the cheongsam. The Maya vector render function was used to generate image sequences for rotoscoping because the dark outlines helped me rotoscoping clearly.

Full body sets with skeleton and IKs were made for different characters.
I have one shot in my film where the boy pulls the rickshaw with the dancer in it. The rickshaw was made by Maya and would be composited with the hand-drawn boy and dancer. After I did some research and considered my drawing skill, I decided to make a stick figure in Maya as reference, which could be bound with the 3D rickshaw. Rotoscoping the 3D stick figure with the rickshaw was much easier than drawing the boy separately to follow the 3D rickshaw’s movement. The IK sets for animating the rickshaw and the stick figure together took me a whole week. The whole set is driven by the stick figure, who is following a moving path. The stick figure’s hands controll the rickshaw’s facing direction, and the rickshaw is restricted by the range of the two hands’ movement. The cheongsam with the reference body sets was also parented to the rickshaw and animated separately. After all the IKs and driven keys were set up, I only animated the stick figure manually, while the other parts of animation were driven automatically. The quality of the final result was good.  

From 3d skeleton sets to final result
C. Pencil test and Rotoscoping process

Because the characters were designed in a realistic style, their movement could not follow the exaggerated Disney cartoon style. It is difficult to draw realistic full animation. My best choice was to get some references. I shot several live-action sequences as reference by following the camera sets in Maya. Some of this footage was used for rotoscoping.

Most shots that contained camera movement were made in Maya first and then composed with hand-drawn characters. However, for the shots based on live-action footage, the 3D camera had to match the camera setup of the live action sequence. So, when I shot this kind of footage, I put several cube-shaped objects as references in the background, such as boxes and tables. This way, I could build several 3D spaces with these references later to simulate the circumstances of the live action footage and then matched the camera movements.

D. Inking and Coloring process

The last processes of production were Inking and Coloring. The main problem of inking was avoiding jitter lines. It took me a week to fix these problems in Photoshop after scanning.

In order to get better line quality, I developed a new coloring process. I cleaned up me image sequences and set up layers by using the batch actions in Photoshop. However, detailed coloring had to be done one by one.
Coloring frame sequences at Photoshop
IV. Post-Production

One of the most important things during post-production was asset management because I had such a large number of elements, from 2D image sequences to 3D camera sets. So I made a set of rigid rules about file and folder naming, version control, etc. It was really helpful during the compositing and editing processes.

A. Composition and Editing

The main compositing and editing tools I used were Adobe After Effects and Adobe Premiere. Because I already solved all the technical problems during pre-production, such as synchronization of 3D computer generated sequences with 2D hand-drawn sequences, the compositing process was time-consuming, but without any major difficulty. It took me almost one month to finish more than forty single shots. Five of them were extremely complicated shots, which were filled with vehicles and background characters.

I did not put all my shots together in one After Effects file for editing. There were two reasons. First, some shots had more than thirty layers in the tree structure. It is impossible to put all those shots in one file systematically. Second, this kind of file would be too heavy to run on the 3D lab computers. So I did the compositing and the editing work totally separately. After compositing, I rendered out the movie file for each shot and edited them together in After Effects.

Because I had a well-developed storyboard and animatic, the editing went well, and on schedule.

Compositing one shot of the train station scene at After Effects
B. Aged film style

I used a plug-in named Aged Film in Adobe Photoshop, After Effects and Premiere. Because of the differences of light and color, I used a different set up for different scenes.

C. Sound Effects and Music

Carl Irwin was my composer. We discussed a lot during the whole production. I suggested that he write the background sound track using the traditional musical instruments found on the CDs of old Chinese music I sent him. We also used some famous songs of old Shanghai in some specific scenes, such as in the Paramount hall. After several reworked iterations, the music matched the feeling of the film well.

I edited more than one hundred sound effects using Adobe Premiere, including special effects, background noise, voices, etc. For better quality, I used two channels to simulate stereo. This way, the audience can easily notice the character’s position through sound effects. However, most of the detailed sound effects were covered by background music in the finished film.
V. Conclusion

After two years of hard work, I finally finished my thesis film on schedule. Because of my computer science background, I regarded the creation process as a systemic project, not totally an art creation. The detailed pre-production and timeline schedule saved me plenty of time during production and post-production. It’s very important for both animation studios and independent filmmakers. There are still many places that can be improved in <Shanghai Beauty>. One big problem is how to let the audience clearly understand all the subtle hints in the film. I will continue to improve my skills at storytelling, camera editing and my animation technique in my next film.

VI. References

Books:

<Grammar of The Film Language> by Daniel Arijon published at 1991, USA
<Old Shanghai Monthly Calendars> published at 2003, Shanghai, China
<Old Shanghai Classical Buildings> published at 1995, Shanghai, China
<San Mao Liu Lang Ji> by Leping Zhang published at 1970, Shanghai, China
<The History in Comics> published at 1990, Shanghai, China

Website:

www.highend3d.com
www.cgtalk.com
www.chinadv.com

Toolbox:

Adobe Photoshop, After Effects, Premiere
Maya
Animo and Inkworks
Final Cut Pro
Painter
Scan Fix

www.adobe.com
www.alias.com
www.animo.com
www.apple.com
www.corel.com
www.rit.edu/~dpalyka/a.html
Appendix A (Timeline, Budget)

**Time Line:**

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<td>Draft Character design</td>
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<td>July</td>
<td>Back to China, get detailed buildings and history material</td>
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<td>March</td>
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<td>Detailed Character design with facial expression</td>
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<td>Hr</td>
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<th>Expense</th>
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<td>3D Software</td>
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Total Budget 56001

Actual Budget:

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Total Budget $1348.63
Appendix B (Storyboard)
Appendix C (Color Prints)
Appendix D (Credits)

A Ding Ye Film

<Shanghai Beauty>

Music by:
Carl Irwin

"When Shall You Return"
Lyrics Jia mo Huang
Composer Xue an Liu
Vocals Xuan Zhou

Color Assistant:
Wan-chun Lee

Film Crew:
Chen-ni Hsu
Han-yi Tseng
Wan-Chun Lee
Yan Hu
Zhen Wang

Advisors:
Duane M. Palyka
Johnny Robinson
Malcolm Spaull

Special Thanks:
Callahan Student Grant
Zhan Ye
Seth McCaughey
and all my friends

Student Produced
School of Film and Animation
Rochester Institute of Technology
Rochester, NY

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